Chapter 3
Aviation Forecasts

Chapter 3
AVIATION FORECASTS

3.1 INTRODUCTION AND SUMMARY

This chapter presents forecasts of aviation activity in support of the Master Plan Update for George Bush Intercontinental Airport (the Airport, Intercontinental, or IAH). The forecasts presented in this memorandum are "unconstrained" and, therefore, do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth. Forecasts of aviation activity are presented for enplaned passengers, air cargo, and aircraft operations, including passenger, all-cargo, general aviation, and military operations. Using calendar year 2011 as the base year, annual forecasts were prepared for four future demand years—2016, 2021, 2026, and 2035. In addition, aviation activity for 2012 is forecast based on year to date activity (January through March 2012) and advance published airline schedules through October 2012 available when this report was prepared.

3.1.1 Forecast Process and Approach

The IAH Master Plan forecasts were prepared using a collaborative process which included: (1) a review of the Federal Aviation Administration (FAA) 2011 Terminal Area Forecasts (TAF) for the Airport; (2) the collection and analysis of data related to the key issues and trends affecting future aviation demand at Intercontinental and the Houston region; (3) the development of statistical models to identify historical causal factors; (4) the analysis of passenger traffic for the airports in the Houston region; and (5) coordination with representatives of the Houston Airport System (HAS), the FAA, and the airlines serving the Airport.

The approach used in developing forecasts for Intercontinental included consideration of the Airport service region and the role of the Airport in providing commercial passenger service and recent trends in airline service development at the Airport. In particular:

- The enplaned passenger forecasts were developed using a variety of analytical tools, including trend analysis, regression models, and market share analysis, to address the key components of aviation activity and the Airport's share of total regional passenger demand. In addition, recent airline service development at the Airport was considered in the preparation of the passenger forecasts.

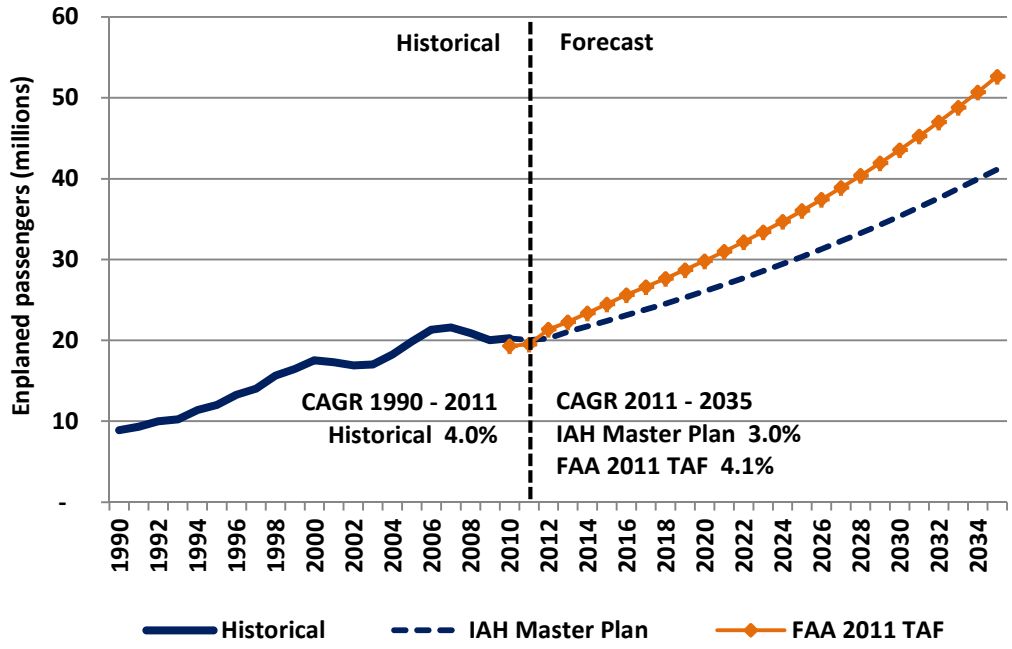
- The air cargo forecasts were developed based on a review of the recent trends, an evaluation of key components of air cargo activity (i.e., enplaned and deplaned cargo (freight and mail) for all-cargo and passenger airlines), and domestic and international sectors.

- The aircraft operations forecasts were derived from the forecasts of passenger and cargo activity for the Airport. Forecasts of aircraft operations were developed by (1) disaggregating the total demand into the components (i.e., domestic and international, mainline (air carrier) and regional affiliate); and (2) making assumptions about average aircraft size in terms of seats per departure and average enplaned passenger load factors (percentage of seats occupied, on average) for future years. In addition, the future aircraft fleet plans of the airlines serving Intercontinental were also considered based on available information.

3.1.2 Enplaned Passengers

Figure 3-1 presents historical enplaned passengers for 1990 through 2011 and forecasts for 2012 through 2035, compared with the FAA 2011 TAF for the Airport. The Master Plan enplaned passenger forecasts are based on 2011 actual data and are within 9.8% of the FAA 2011 TAF in 2016 and 13.3% in 2021*. The enplaned passenger average growth rate of 3.0% per year between 2011 and 2035 is lower than the rate forecast by the FAA in its 2011 TAF for the Airport—an average of 4.1% per year from Federal Fiscal Year (FFY) 2010 to FFY 2035.** A detailed comparison of the Master Plan enplaned passenger forecasts and the FAA 2011 TAF is presented in Section 3.7.

Figure 3-1
HISTORICAL AND FORECAST ENPLANED PASSENGERS



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

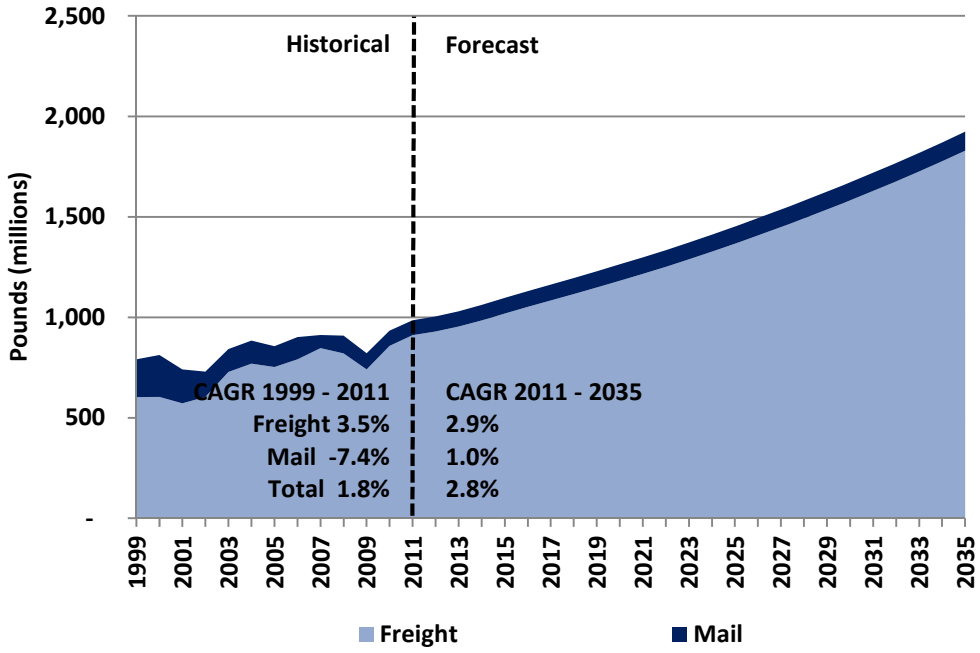
*U.S. Department of Transportation, Federal Aviation Administration, Forecasting Aviation Activity by Airport, July 2001, and Review and Approval of Aviation Forecasts, June 2008, http://www.faa.gov. "For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period."

**The Federal Fiscal Year begins on October 1 and ends on September 30.

3.1.3 Air Cargo

Figure 3-2 presents historical air cargo (in pounds) for 1999 through 2011 and forecasts for 2012 through 2035. (The FAA does not prepare cargo forecasts for individual airports as part of the TAF.) Since 1999, the cargo industry nationwide and at Intercontinental has experienced significant changes related to (1) air cargo security regulations by the FAA and Transportation Security Administration (TSA); (2) consolidation in the air cargo industry; (3) an increasing trend in the volume of cargo transported by truck; (4) the national and global economic recessions; (5) use of all-cargo carriers by the U.S. Postal Service to transport mail; and (6) increased use of email and electronic transmittals. All-cargo airlines are forecast to account for approximately 50% of total air cargo at the Airport through 2035, consistent with historical trends. Air freight is forecast to increase an average of 2.9% per year between 2011 and 2035, compared with an average forecast increase of 2.8% per year for mail. Together, total cargo (air freight and mail) is forecast to increase an average of 2.8% per year for the Airport as shown on Figure 3-2.

Figure 3-2
HISTORICAL AND FORECAST AIR CARGO



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

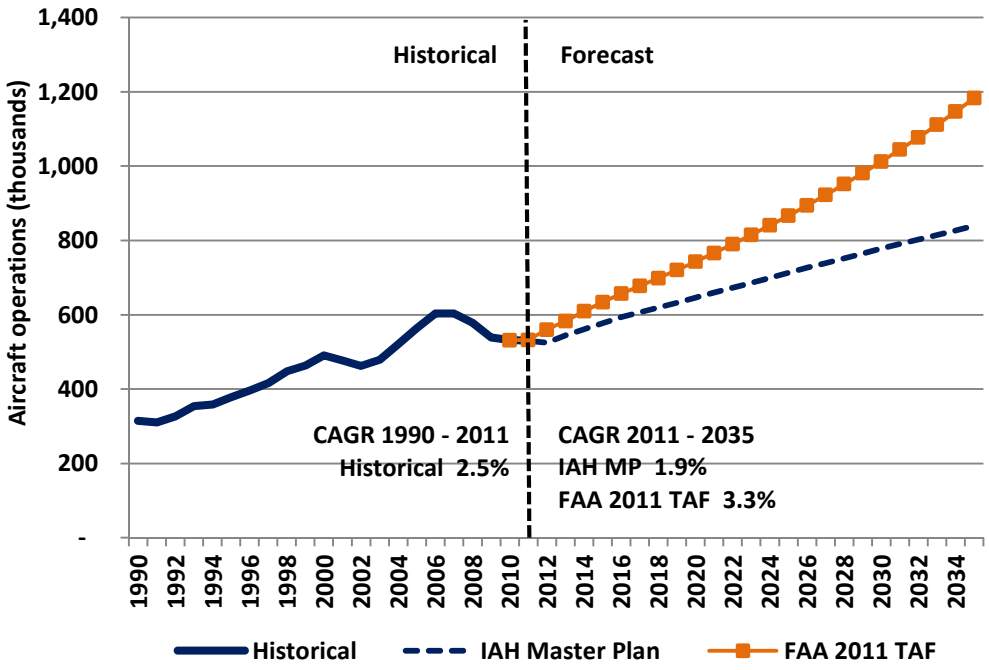
CAGR = Compound average annual growth rate
Includes freight and mail.

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

3.1.4 Aircraft Operations

Figure 3-3 presents historical total aircraft operations for 1990 through 2011 and forecasts for 2012 through 2035, compared with the FAA 2011 TAF for the Airport. (Total aircraft operations include air carrier, air taxi and commuter, general aviation, and military takeoffs and landings.) The aircraft operations forecasts are based on 2011 actual data and are within 9.6% of the FAA 2011 TAF in 2016 and 13.8% in 2021. The forecast average growth rate in total aircraft operations of 1.9% per year between 2011 and 2035 is lower than the rate forecast by the FAA in its 2011 TAF for the Airport—an average of 3.3% per year from FFY 2010 to FFY 2035. A detailed comparison of the Master Plan aircraft operations forecasts and the FAA 2011 TAF is presented in Section 3.7.

Figure 3-3
HISTORICAL AND FORECAST TOTAL AIRCRAFT OPERATIONS



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

3.1.5 Airport Service Region

The primary area of the Airport service region, both in terms of population and geography, is defined as the Houston-Sugar Land-Baytown Metropolitan Statistical Area (or Houston MSA). The population densities of the Houston MSA are shown on Figure 3-4 and reflect the importance of Harris County in generating passenger demand at the Airport. In 2011, the population of the Houston MSA was 6,086,536 as shown in Table 3-1, with Harris County accounting for 68.7% of the primary area. Because economic growth and activity within the primary area stimulate a significant portion of passenger demand at the Airport, statistics for the Houston MSA were used to evaluate aviation activity trends at the Airport.

Table 3-1
AIRPORT SERVICE REGION POPULATION

Metropolitan Statistical Area/County	2011 Population	Percent of total
Houston-Sugar Land-Baytown MSA		
Harris	4,180,894	68.7%
Fort Bend	606,953	10.0
Montgomery	471,734	7.8
Brazoria	319,973	5.3
Galveston	295,747	4.9
Liberty	76,206	1.3
Waller	44,013	0.7
Chambers	35,552	0.6
Austin	28,665	0.5
San Jacinto	26,801	0.4
Total primary area	6,086,538	100.0%

MSA = Metropolitan Statistical Area

Source: U.S. Department of Commerce Bureau of the Census, www.census.gov, accessed April 2012.

Two air carrier airports, both operated by HAS, serve the Airport service region: George Bush Intercontinental and William P. Hobby airports (Hobby or Hobby Airport). George Bush Intercontinental Airport is a major domestic and international connecting hub for United Airlines* and accounted for 80% of total passenger enplanements in the Airport service region in 2011. Hobby Airport accounted for the remaining 20% of Airport service region passenger enplanements in 2011. Hobby serves mainly domestic origin-destination passengers and is one of the top 10 busiest airports in the route system of low-fare carrier Southwest Airlines. Ellington Field, the Houston Airport System's general aviation airport, does not currently provide airline service although it has in the past. Continental Express operated regional aircraft service from Ellington to George Bush Intercontinental Airport through 2004.

*United completed its merger with Continental on October 1, 2010, and a single operating certificate was issued on November 30, 2011.

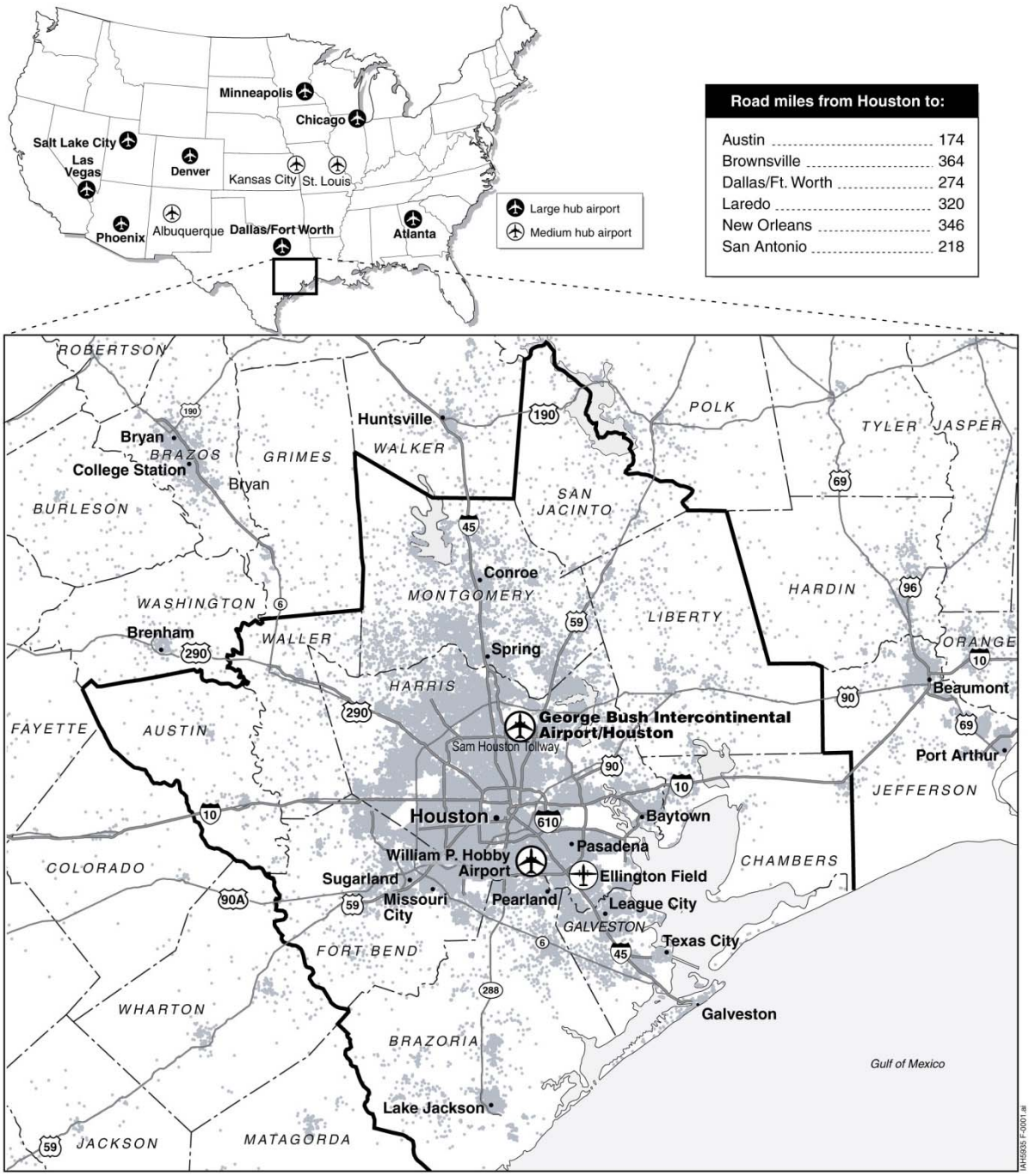


Figure 3-4
AIRPORT SERVICE REGION
George Bush Intercontinental Airport/Houston
June 2012

Leigh Fisher
Management Consultants

The secondary area served by the Airport, which includes many of the counties surrounding the Houston MSA, is defined by the location of and driving distance to other air carrier airports, as well as by the availability, price, and quality of airline service at those other airports. Austin Bergstrom and San Antonio International airports, located approximately 174 and 218 road miles from Intercontinental, respectively, limit the secondary service area to the west. The airports located in Austin and San Antonio are medium-hub airports with an average of 140 and 127 daily departures, respectively, in July 2012 and are served by low cost carriers, including Frontier, JetBlue, Southwest, and Virgin America airlines. Dallas/Fort Worth International Airport is the nearest large-hub airport (274 miles northwest) providing competitive service with an average of 884 daily departures in July 2012.

3.1.6 Airport Role

The role of an airport is important in evaluating the domestic and international components of aviation activity and preparing forecasts. The Airport has an important role in the national, state, and local air transportation systems and is the tenth busiest airport in the United States, in terms of total passengers (enplaned plus deplaned), as shown in Table 3-2. The Master Plan forecasts were developed with consideration of the Airport's (1) central geographic location, (2) large origin and destination (O&D) passenger base, (3) role as the primary commercial service airport in the Houston region, (4) role as a hub for United Airlines, and (5) role as an international gateway to Latin America.

Table 3-2
TOTAL PASSENGERS AT THE 10 BUSIEST U.S. AIRPORTS IN 2011

Rank 2011	City (airport)	Total passengers (millions) *(a)*					2007-2011 *(b)*
		2007	2008	2009	2010	2011	
1	Atlanta	89.4	90.0	88.0	89.3	92.4	0.8%
2	Chicago (O'Hare)	76.2	69.4	64.2	66.8	66.7	(3.3)
3	Los Angeles (International)	61.9	59.7	56.5	59.1	61.9	0.0
4	Dallas/Fort Worth	59.8	57.1	56.0	56.9	57.7	(0.9)
5	Denver	49.9	51.3	50.2	52.2	52.8	1.4
6	New York (John F. Kennedy)	47.7	47.8	45.9	46.5	47.7	0.0
7	San Francisco	35.8	37.3	37.3	39.3	40.8	3.3
8	Phoenix (Sky Harbor)	42.2	39.9	37.8	38.3	40.6	(1.0)
9	Las Vegas (McCarran)	47.0	44.1	40.5	39.8	40.6	(3.6)
10	**Houston (Bush)**	**43.0**	**41.7**	**40.0**	**40.5**	**40.1**	**(1.7)**
	Average for airports listed	55.3	53.8	51.6	52.9	54.1	(0.5%)

(a) Enplaned plus deplaned passengers.
(b) Average annual percent increase (decrease).

Source: Houston Airport System records and Airports Council International, Worldwide Airport Traffic Report and North American Airport Rankings, for years noted.

3.1.6.1 Central Geographic Location

Located near the geographic center of the continental United States, the Houston MSA has long been a major air transportation hub in the route system of both United and Southwest airlines. Houston's natural geographic advantage as a connecting hub location is enhanced by the capability of the Airport to

accommodate aircraft landings and takeoffs in virtually all weather conditions. Figure 3-4 shows the central geographic location of the Houston MSA compared with the locations of other U.S. hub airports.

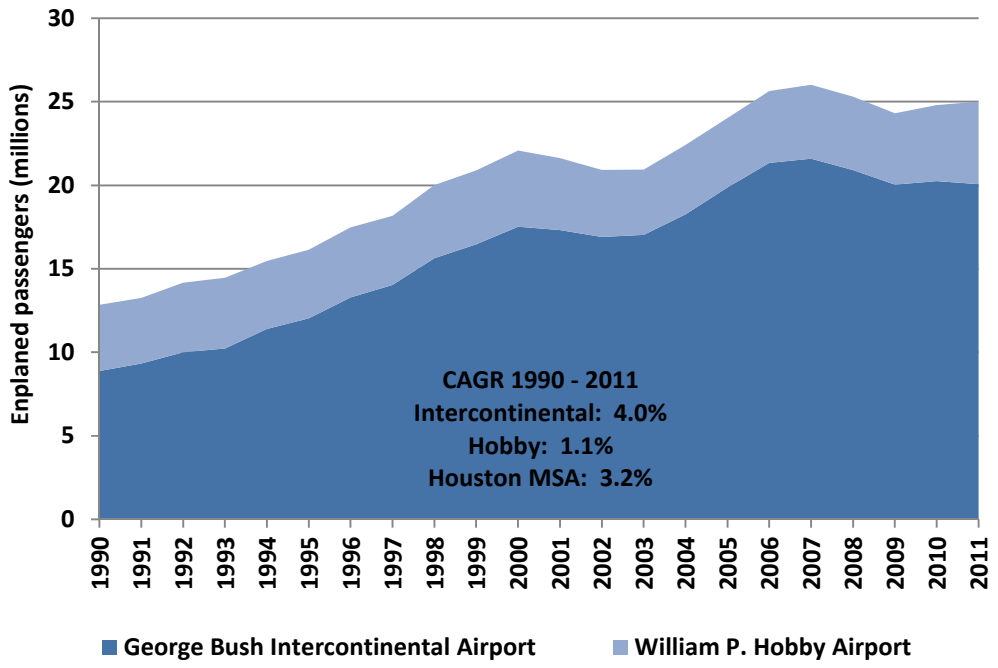
3.1.6.2 Large Origin-Destination Passenger Base

The Airport's large O&D passenger base is related to the strength of the Houston economy and supports the connecting hub operations of United Airlines and continued international service development. This large base of local passengers enables United to (1) improve load factors and profitability and (2) maintain high frequencies for scheduling passenger connections and international airlines with a large market of both leisure and business travelers. According to HAS data, the flights of 13.6 million passengers originated from both airports in the Houston MSA in 2011 (i.e., these originating passengers did not connect with another flight at the Airport).

3.1.6.3 Primary Commercial Service Airport in the Houston MSA

As shown on Figure 3-5, Intercontinental is the primary commercial service airport in Houston MSA, with 20.1 million passengers in 2011 (80% of total). A total of 4.9 million passengers were accommodated at William P. Hobby Airport in 2011, for the remaining 20% of passengers in the Houston MSA. Intercontinental had an average of 699 scheduled daily aircraft departures in July 2012 to a total of 171 destinations, 103 domestic and 68 international. In comparison, Hobby had an average of 162 scheduled daily departures to 38 domestic destinations.

Figure 3-5
HISTORICAL PASSENGERS IN THE HOUSTON REGION



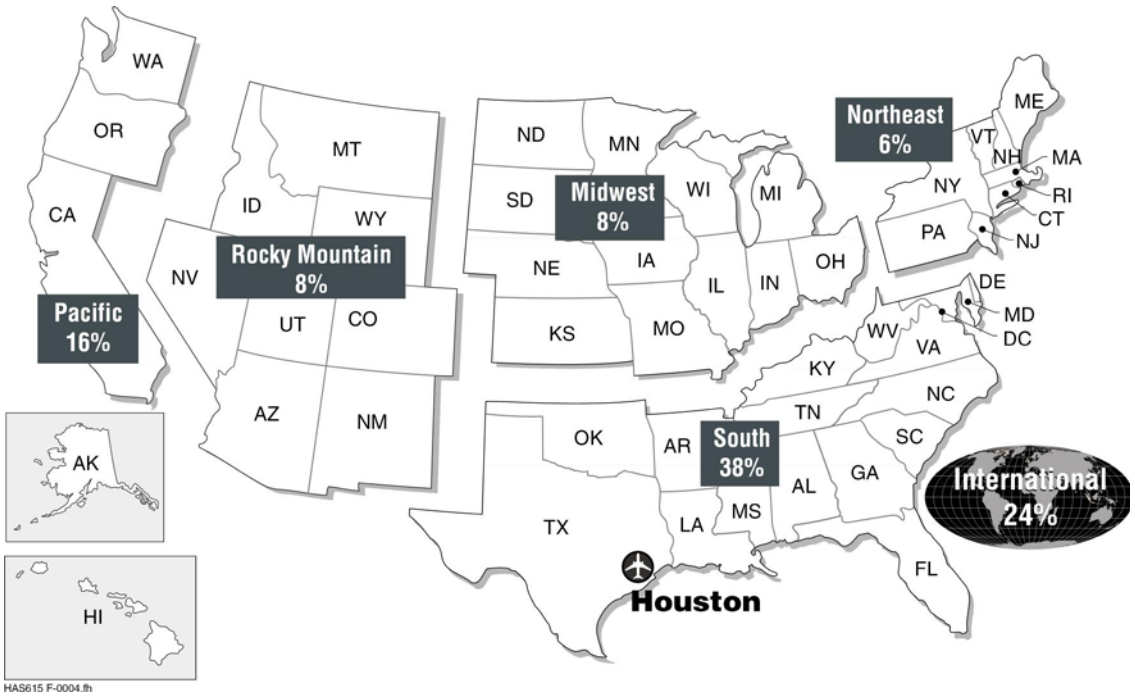
Note: CAGR = Compound average annual growth rate

Source: Houston Airport System records.

3.1.6.4 Hub for United Airlines

IAH serves as an important connecting hub in the route system of United Airlines. As shown on Figure 3-6, the shares of passengers connecting through the Airport in 2011 reflect the Airport's central geographic location, with the southern United States (states in the South Atlantic and East South Central regions) accounting for 38% of connecting passengers and the western United States (states in Pacific and Rocky Mountain regions) accounting for 24% of connecting passengers. International destinations accounted for 24% of passengers connecting through Intercontinental based on data from the U.S. Department of Transportation.

Figure 3-6
PASSENGERS CONNECTING THROUGH INTERCONTINENTAL BY REGION IN 2011



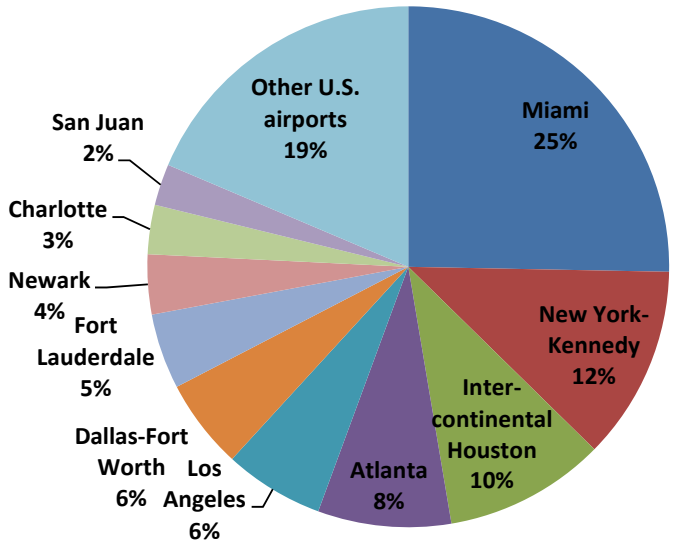
Note: Data are for the origins of passenger journeys in 2011.

Source: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database, accessed June 2012.

3.1.6.5 International Gateway

IAH is the third busiest U.S. international gateway to Latin America. In 2011, the Airport accounted for 10% of international scheduled departing seats from U.S. airports to countries in Central and South America and the Caribbean, as shown in Figure 3-7. United Airlines (mainline and regional affiliates) accounted for approximately 95% of seats to Latin America at the Airport, with foreign-flag airlines accounting for the remaining 5%. United Airlines is the principal U.S. airline in the Star Alliance which currently has 27 full members with service to 189 destinations in the Africa, the Americas, Asia, Europe, and the Pacific. A further description of the Star Alliance and its members is included in Section 3.

Figure 3-7
U.S. GATEWAYS TO LATIN AMERICA
Percent of Scheduled Departing Seats to Latin America in 2011



Note: Includes scheduled departing seats from U.S. airports to countries in Central and South America and the Caribbean.

Source: Official Airline Guides, Inc., online database, accessed January 2012.

3.2 ECONOMIC BASIS FOR AVIATION DEMAND

The economy of the Houston MSA is an important determinant of long-term passenger demand at the Airport. Generally, regions with large populations, high levels of employment, and high average per capita incomes will generate strong demand for airline travel. The demographics and economy of the region—as measured by changes in population, employment, and per capita income—as well as airline service and airfares—are typically the most important factors affecting origin-destination (O&D) passenger demand. In 2011, approximately 47% of the Airport's passengers were O&D passengers; the remaining 53% were on-line connecting passengers. Connecting passenger traffic is determined more by the route network decisions of the hubbing airlines. The Airport's role as a connecting hub results, in part, from its geographic location and, in part, from the route network decisions of United Airlines.

The following sections present a discussion of the economic basis for airline traffic at the Airport—the historical population, nonagricultural employment, and per capita income of the Houston MSA, comparative unemployment rates, and tourism. Also provided is a summary of the economic outlook for world regions, the United States, Texas, and the Houston MSA.

3.2.1 Socioeconomic Trends

Table 3-3 presents comparative trends in population, nonagricultural employment, and per capita personal income in the Houston MSA, the State of Texas, and the United States in 1990 and from 2000 through 2011. Projections are also presented for 2016, 2021, 2026, and 2035.

3.2.1.1 Population

Historically, population growth in the Houston MSA and the State has exceeded that in the nation. From 1990 to 2011, population in the Houston MSA increased an average of 2.4% per year, compared with an average increase of 2.0% per year in the State and 1.1% per year in the nation. Population growth in the Houston MSA is projected to increase an average of 1.8% per year between 2011 and 2035, with stronger growth in the near-term—an average increase of 2.5% per year between 2011 and 2016.

3.2.1.2 Employment

From 1990 to 2011, nonagricultural employment in the Houston MSA and the State increased an average of 1.8% and 1.9% per year, respectively, faster than that for the nation (an average of 0.9% per year). Since 2000, nonagricultural employment in the Houston MSA has increased an average of 1.3% per year, compared with an increase of 1.0% per year in the State. Employment in the nation has remained relatively unchanged since 2000. Nonagricultural employment growth during the past 10 years reflects the effects of the national economic recessions in 2001 and 2008. Nonagricultural employment in the Houston MSA is projected to increase an average of 1.5% per year between 2011 and 2035, with stronger growth in the near-term—an average increase of 1.9% per year between 2011 and 2016.

3.2.1.3 Income

From 1990 to 2010, per capita personal income in the Houston MSA increased an average of 1.4 % per year, equal to that for the State (an average of 1.4% per year between 1990 and 2011) and the nation (an average of 1.1% per year between 1990 and 2011). Since 2000, the growth in per capita income has slowed. In 2010, per capita income in the Houston MSA was $44,001, greater than that for the State and the nation. Per capita personal income in the Houston MSA is projected to increase an average of 1.2% per year between 2010 and 2035.

3.2.1.4 Nonagricultural Employment by Industry Sector

Figure 3-8 shows a comparative distribution of nonagricultural employment by industry sector for the Houston MSA in 2000 and in 2011, and for the State and the nation in 2011.

- **Business Services**. Business services in the Houston MSA accounted for the largest share of nonagricultural employment, with 22.0% in 2000 and 21.2% in 2011. From 2000 to 2011, Houston MSA employment in business services increased an average of 0.9% per year.

- **Trade.** Trade is comprised of wholesale and retail trade. From 2000 to 2011, Houston MSA employment in trade increased an average of 0.9% per year, reflecting slower growth in retail trade than in wholesale trade. Notwithstanding the increase in trade employment, the share of trade employment in the Houston MSA decreased from 16.3% in 2000 to 15.6% in 2011.

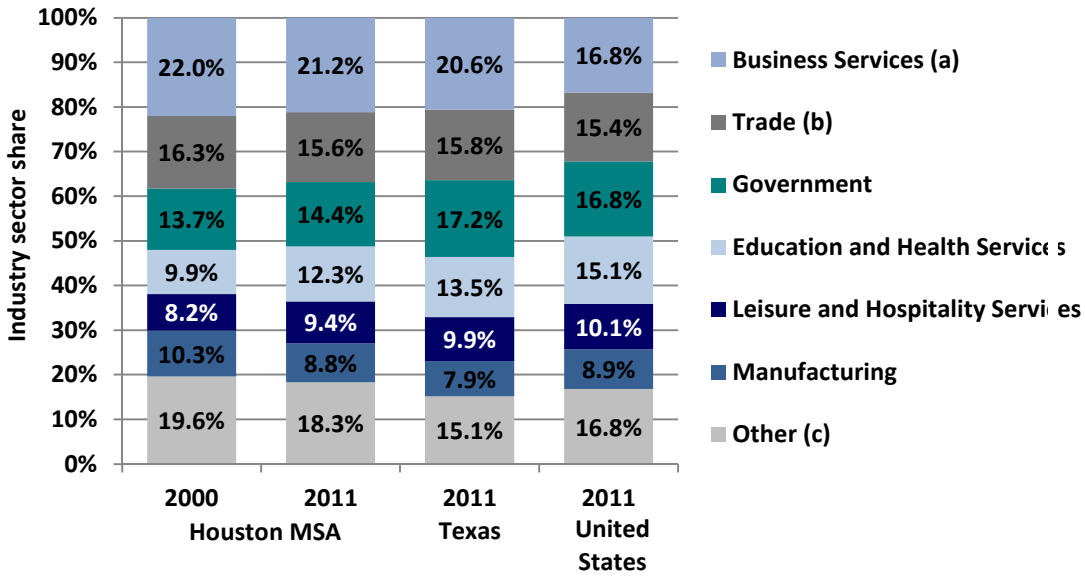
Table 3-3
HISTORICAL AND PROJECTED SOCIOECONOMIC DATA

	Population (thousands)			Nonagricultural employment (thousands)			Per capita personal income in 2000 dollars		
	Houston MSA	State of Texas	United States	Houston MSA	State of Texas	United States	Houston MSA	State of Texas	United States
Historical									
1990	3,731	16,986	248,791	1,765	7,101	109,487	33,548	28,796	32,290
2000	4,739	20,944	282,162	2,251	9,432	131,785	43,282	36,097	38,393
2001	4,851	21,320	284,969	2,290	9,514	131,826	43,393	35,934	38,362
2002	4,979	21,690	287,625	2,285	9,416	130,341	41,279	35,110	38,158
2003	5,084	22,031	290,108	2,270	9,370	129,999	41,152	35,105	38,272
2004	5,190	22,394	292,805	2,286	9,497	131,435	42,700	35,917	39,143
2005	5,300	22,778	295,517	2,350	9,740	133,703	44,513	37,091	39,583
2006	5,485	23,360	298,380	2,448	10,066	136,086	46,493	38,167	40,804
2007	5,598	23,832	301,231	2,548	10,395	137,598	47,191	39,015	41,547
2008	5,727	24,309	304,094	2,602	10,607	136,790	49,364	40,122	41,471
2009	5,867	24,802	306,772	2,533	10,307	130,807	43,517	37,099	39,483
2010	5,947	25,146	308,746	2,529	10,342	129,818	44,001	37,747	39,937
2011	6,087	25,675	311,592	2,593	10,557	131,359	n.a.	38,381	40,388
Projected									
2016	6,889	27,832	330,259	2,844	11,448	140,837	46,820	40,394	43,189
2021	7,566	29,805	346,313	3,054	12,313	149,227	49,586	42,967	46,233
2026	8,232	31,816	362,598	3,274	13,248	158,113	52,777	45,925	49,618
2035	9,442	36,022	404,369	3,742	15,121	175,454	59,657	52,280	56,629
	Percent increase (decrease))								
2000-2001	2.4	1.8	1.0	1.7	0.9	0.0	0.0	(0.5)	(0.1)
2001-2002	2.6	1.7	0.9	(0.2)	(1.0)	(1.1)	(5.0)	(2.3)	(0.5)
2002-2003	2.1	1.6	0.9	(0.6)	(0.5)	(0.3)	(0.4)	(0.0)	0.3
2003-2004	2.1	1.6	0.9	0.7	1.4	1.1	3.6	2.3	2.3
2004-2005	2.1	1.7	0.9	2.8	2.6	1.7	4.1	3.3	1.1
2005-2006	3.5	2.6	1.0	4.1	3.3	1.8	4.6	2.9	3.1
2006-2007	2.1	2.0	1.0	4.1	3.3	1.1	1.6	2.2	1.8
2007-2008	2.3	2.0	1.0	2.1	2.0	(0.6)	5.6	3.1	(0.2)
2008-2009	2.5	2.0	0.9	(2.6)	(2.8)	(4.4)	(4.5)	(7.8)	(4.8)
2009-2010	1.4	1.4	0.6	(0.1)	0.3	(0.8)	0.1	1.8	1.2
2010-2011	2.3	2.1	0.9	2.6	2.1	1.1	n.a.	1.7	1.1
	Average annual percent increase (decrease)								
Historical									
1990-2000	2.4	2.1	1.3	2.5	2.9	1.9	2.6	2.3	1.7
2000-2011	2.3	1.9	0.9	1.3	1.0	(0.0)	0.2	0.6	0.5
1990-2011	2.4	2.0	1.1	1.8	1.9	0.9	1.4	1.4	1.1
Projected									
2011-2016	2.5	1.6	1.2	1.9	1.6	1.4	1.0	1.0	1.4
2016-2021	1.9	1.4	1.0	1.4	1.5	1.2	1.2	1.2	1.4
2021-2026	1.7	1.3	0.9	1.4	1.5	1.2	1.3	1.3	1.4
2026-2035	1.5	1.4	1.2	1.5	1.5	1.2	1.4	1.5	1.5
2011-2035	1.8	1.4	1.1	1.5	1.5	1.2	1.2	1.3	1.4

Note: Houston MSA includes Austin, Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, San Jacinto and Waller counties.
n.a. = not available

Sources: Historical: U.S. Department of Commerce, Bureau of the Census, www.census.gov; U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov; U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, www.bea.gov.
Projected: Texas State Data Center and Office of the State Demographer, Texas State Projections Program, http://txsdc.utsa.edu and Woods & Poole, Economic and Demographic Projections, 2010.

Figure 3-8
COMPARATIVE DISTRIBUTION OF NONAGRICULTURAL EMPLOYMENT



(a) Includes professional and business services, finance and information.
(b) Includes wholesale and retail trade.
(c) Includes mining, finance, insurance, real estate, construction, transportation and public utilities.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed June 2012.

- **Government**. Employment by federal, state and local government agencies* increased an average of 1.7% per year between 2000 and 2011. The share of government employment in the Houston MSA increased from 13.7% in 2000 to 14.4% in 2011.

- **Education and Health Services.** Employment in education and health services in the Houston MSA increased an average of 3.3% per year between 2000 and 2011 and was the fastest growing industry sector. The share of education and health services employment in the Houston MSA increased from 9.9% in 2000 to 12.3% in 2011.

- **Leisure and Hospitality Services.** Houston MSA employment in leisure and hospitality services increased an average of 2.6% per year between 2000 and 2011. The share of leisure and hospitality services in the Houston MSA increased from 8.2%in 2000 to 9.4% in 2011.

- **Manufacturing.** Manufacturing employment in the Houston MSA decreased an average of 0.2% per year between 2000 and 2011 and experienced the largest employment losses of any industry sector. The manufacturing sectors in Texas and the nation also experienced job losses between 2000 and 2011, decreasing an average of 2.2% and 3.4% per year, respectively, during this period. The share of manufacturing employment in the Houston MSA decreased from 10.3%in 2000 to 8.8% in 2011.

*As reported by the U.S. Department of Labor, Bureau of Labor Statistics, government employment includes only civilian employees.

- **Other Activities.** Other employment in the Houston MSA increased an average of 0.7% per year between 2000 and 2011, largely as the result of job gains in mining related to the energy sector. The share of other employment in the Houston MSA decreased from 19.6%in 2000 to 18.3% in 2011.

3.2.1.5 Unemployment Rates

in addition to the employment trends cited above, the unemployment rate is also indicative of general economic conditions. Table 3-4 shows comparative annual unemployment rates in the Houston MSA, the State, and the nation as a whole for 2000 through 2011. The unemployment rate in the Houston MSA has followed the trends in the State, but exceeded the national rate from 2002 to 2006. Since 2006, the unemployment rates in the Houston MSA and the State have remained lower than the national rate.

Table 3-4
COMPARATIVE UNEMPLOYMENT RATES

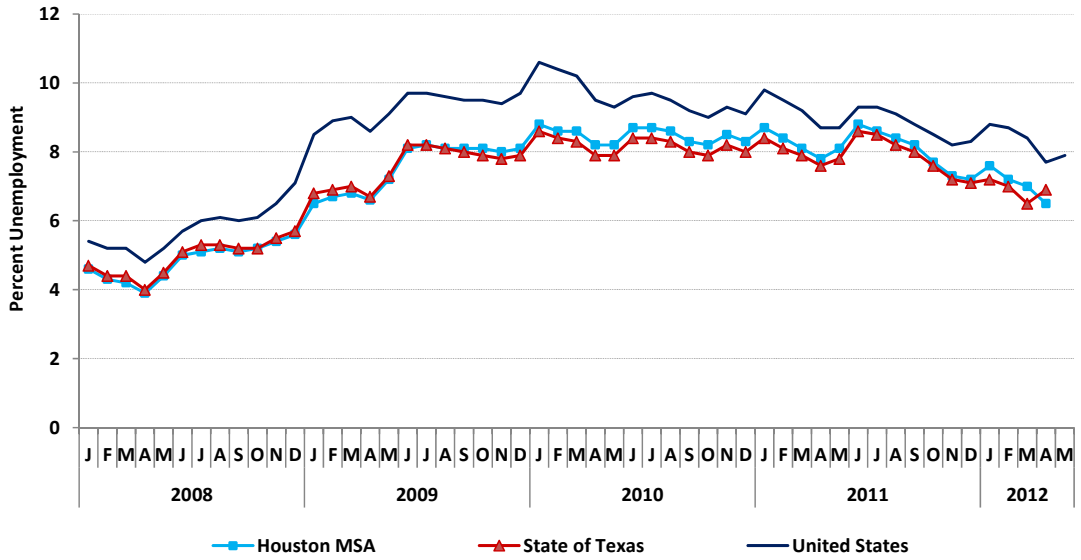
	Houston MSA	State of Texas	United States
2000	4.3%	4.4%	4.0%
2001	4.7	5.0	4.7
2002	6.0	6.4	5.8
2003	6.7	6.7	6.0
2004	6.2	6.0	5.5
2005	5.6	5.4	5.1
2006	5.0	4.9	4.6
2007	4.3	4.4	4.6
2008	4.8	4.9	5.8
2009	7.6	7.6	9.3
2010	8.5	8.2	9.6
2011	8.1	7.9	8.9

Note: Unemployment rates are not seasonally adjusted and represent annual averages.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed June 2012.

Since the beginning of the recession in December 2007, monthly unemployment rates in the Houston MSA, the State of Texas, and the United States have increased, as shown on Figure 3-9. Since June 2011, the Houston MSA unemployment rate (unadjusted) has decreased from a high of 8.8% in June 2011 to 6.5% in April 2012, lower than that for the State (6.9%) and the nation (7.7%).

Figure 3-9
MONTHLY UNEMPLOYMENT RATES



Note: Unemployment rates not seasonally adjusted.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed June 2012.

3.2.1.6 Major Employers

Table 3-5 lists the Fortune 500 companies with headquarters in Houston in 2010. The energy sector accounts for 20 of the 25 Fortune 500 companies in Houston reflecting the importance of this sector to the economy of the Houston MSA.

Table 3-5
FORTUNE 500 COMPANY HEADQUARTERS IN HOUSTON

Fortune 500 rank	Fortune 500 Company	Description
6	ConocoPhillips	Petroleum production/refinement
41	Marathon Oil	Petroleum production/refinement
55	Sysco	Food service distribution
92	Enterprise GP Holdings	Energy midstream infrastructure
128	Plains All American Pipeline	Transportation/storage of petroleum products
158	Halliburton	Petroleum production/refinement
182	National Oilwell Varco	Petroleum production/refinement
183	Continental Airlines *(a)*	Airline
193	KBR	Engineering and construction
196	Waste Management	Waste and environmental services
243	Baker Hughes	Petroleum production/refinement
260	Anadarko Petroleum	Petroleum exploration
271	Apache	Petroleum production/refinement
275	Centerpoint Energy	Gas/Electric power supply/distribution
277	Smith International	Petroleum production/refinement
315	Kinder Morgan	Pipeline transportation/energy storage
338	Calpine	Low-carbon, natural gas-fired, geothermal energy
364	Enbridge Energy Partners	Petroleum production/refinement
399	Cameron International	Petroleum and gas
434	EOG Resources	Petroleum and gas exploration
437	Spectra Energy	Gas gathering/processing/storage/distribution
447	El Paso	Gas/Electric power supply/distribution
457	Group 1 Automotive	Automotive retailer
467	FMC Technologies	Energy technology solutions
488	Frontier Oil	Petroleum production/refinement

(a) United completed its merger with Continental on October 1, 2010, and a single operating certificate was issued on November 30, 2011.

Source: Fortune, April 2010, as reported by the Greater Houston Partnership.

3.2.1.7 Tourism

Tourism represents an increasingly important source of economic activity in the Houston MSA. According to the Greater Houston Convention and Visitors Bureau, Houston hosted 230 conventions, events and shows in 2011, compared with 237 conventions in 2010. In 2011, a total of 545,398 convention delegates attended conventions in Houston and generated an estimated $531.2 million in economic impact for the Houston MSA. Houston's largest meeting and convention facilities include Reliant Park with 1.6 million square feet of meeting space and the George R. Brown Convention Center with 1.2 million square feet of meeting space.

Table 3-6
CONVENTION AND BUSINESS TRAVEL IN HOUSTON

Year	Number of conventions	Number of convention delegates	Economic impact (millions) *(a)*
2007	294	614,287	$598.3
2008	258	564,826	550.1
2009	193	484,802	472.2
2010	237	480,283	467.8
2011	230	545,398	531.2

(a) Estimated by the Greater Houston Convention Bureau based on delegate attendance and average spending per delegate.

Source: Greater Houston Convention and Visitors Bureau, www.visithoustontexas.com, accessed June 2012.

3.2.2 Economic Outlook

Economic activity in the Houston MSA and the State is directly linked to the production of goods and services in the world and the rest of the United States. Both airline travel and the movement of cargo through the Airport depend on the economic linkages between the regional, state, national, and global economies.

3.2.2.1 Global Economy

The globalization of the world economy has created linkages between national economics that relate not only to trade but also to air travel. The Houston MSA and the State have strong linkages to the global economy through the energy sector and the seven world regions that are currently served at Intercontinental. The economic growth of these world regions, in terms of Gross Domestic Product (GDP), is directly related to the growth in air travel. Projections of GDP for the world regions served at Intercontinental are shown in Table 3-7. In emerging economies such as Brazil, India, and China with strong growth in GDP combined with a growing middle class, the growth in passenger traffic has been significant. Continued growth in the economies of the world regions most closely aligned with the Houston MSA economy and airline service at Intercontinental are expected to contribute to continued growth in passenger traffic at the Airport.

Table 3-7
HISTORICAL AND PROJECTED GDP GROWTH BY WORLD REGION

World region	Compound average annual percent increase (decrease) in GDP (in constant U.S. dollars)		
	Historical		Projected
	1990-2010	2000-2010	2010-2030
Asia	n.a.	4.2%	4.6%
Canada	1.9%	3.6	2.3
Europe *(a)*	(1.2) *(b)*	4.9	1.7
Latin America	3.6	6.7	4.2
Mexico	1.5	1.4	4.2
Middle East/Africa	n.a.	11.0	2.4
United States	3.4	1.6	2.7
World	1.8	5.2	3.3

n.a. = not available

(a) Data are for the Euro area.
(b) Percent change between 1991 and 2000.

Sources: Historical: International Monetary Fund, *World Economic Outlook* database, www.imf.org, accessed December 2011 and U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.gov, accessed January 2012.
Projected: Global Insight as reported in U.S. Department of Transportation, Federal Aviation Administration, *FAA Aerospace Forecasts, Fiscal Years 2011-2031,* March 2011.

3.2.2.2 U.S. Economy

The U.S. economy continues to recover from the financial crisis and global recession, although the pace of the recovery remains slow. The consensus among economists is that downturns following financial crises tend to be more prolonged than other downturns. In addition, such recessions raise the level and duration of unemployment, reduce the number of hours that employees work, and dampen investment. Continued high unemployment, lower disposable incomes, and reduced spending by businesses and consumers, particularly in the near-term, has the potential to dampen growth in the U.S. economy and passenger traffic nationally and at Intercontinental.

3.2.2.3 Texas Economy

According to the Texas Comptroller, "job growth, sales tax collections – both from business and consumer purchases – as well as automobile sales, signal that the Texas economy has emerged from the recent recession."* The Comptroller's Economic Outlook highlights various indicators, including:

- The State's population increased by 421,000 people between 2010 and 2011, exceeding that for any other state.

*Texas Comptroller of Public Accounts, *Comptroller's Economic Outlook*, www.texasahead.org, updated January 13, 2012.

- The Texas economy has recovered more quickly than the nation as a whole, with the recovery of 97% of the total jobs shed by Texas employers during the recession as of November 2011, compared with a recovery of 30% of lost jobs nationally through December 2011.
- In 2011, Texas real gross domestic product increased 2.4% compared with 1.6% GDP growth for the nation.

Although the near-term outlook for the Texas economy points to a recovery with job growth and higher-than-expected tax revenues, the Texas Comptroller, in earlier statements, noted that the overall outlook is "one of slower-than-normal recovery with above-average risks of a new recession."

3.2.2.4 Houston MSA Economy

The near-term outlook for the Houston MSA economy is similar to that for the State. According to the Greater Houston Partnership,* "Houston has completed the recovery and is now in expansion mode."** in 2012, the Greater Houston Partnership expects job growth to be driven by high energy prices, advances in exploration technology, strong demand for Houston's exports, a weak U.S. dollar, and in-migration. Similar to trends in the State, employment in the Houston MSA now exceeds its pre-recession peak in several sectors—oil and gas extraction, food and beverage stores, utilities, trucking, computer systems design, health care, education services, food services and other (personal) services. Although Houston may face continued challenges in the near term, the Greater Houston Partnership notes that "the long-term outlook for Houston metro area is positive, and steady, healthy growth will be the norm for Houston for the foreseeable future."

3.2.2.5 Risks to the Economic Outlook

While the near-term outlook is improving and the mid- to long-term outlook is favorable, there are risks that expectations for growth may not be achieved. Key risks include:

- In the near term, the principal risk is that the federal government's policy response to the current economic environment in the United States may not be effective in providing the foundation for a full recovery in the near term.
- Inflation risks still persist due to the sizable amount of liquidity that the Federal Reserve Bank has injected into the banking system, which could eventually trigger upward pressures on prices. Also, increases in oil prices and rapid expansion of U.S. industrial capacity could trigger upward pressure on inflation.
- There is the risk that U.S. consumers may not be able to generate much spending growth due to persistent unemployment, reduced wealth and home values, and the various reasons described above.
- In the long term, the principal risks to U.S. economic performance are the sizable external and fiscal deficits. The continuing deficits in the U.S. balance of payments could result in greater volatility in the currency markets, which would then translate into higher interest rates and, potentially, slower economic growth. These risks could be compounded if the fiscal deficit is not reduced in the near-term, thereby leading to increased financing requirements and subsequent

*The principal objective of the Greater Houston Partnership is to build regional economic prosperity by facilitating relocations and expansions in the Houston area, international outreach initiatives such as business development missions outside the U.S. and receiving foreign trade delegations, and strategic planning.

**Greater Houston Partnership, *2012 Employment Forecast*, December 8, 2011.

increases in interest rates. Increased interest rates could lead to lower levels of investment and, consequently, slower productivity growth.

3.2.2.6 Economic Basis for Forecast Aviation Demand

The economic outlook for world regions, the United States, the State of Texas, and the Houston MSA form a basis for anticipated growth in aviation demand at the Airport. Employment and income projections for the Houston MSA and the State of Texas are for continued economic growth, particularly in energy, health, education, leisure and hospitality services. Factors expected to contribute to economic growth in the Houston MSA and associated increases in airline travel include (1) the diversity in the economic base, which lessens its vulnerability to weaknesses in particular industry sectors, (2) growth in the existing and emerging Houston MSA industry sectors described earlier, (3) an educated labor force able to support the development of knowledge-based and service industries, and (4) continued reinvestment to support the development of tourism, conventions, and other businesses. This outlook is reflected in the aviation demand forecasts presented in Section 2.6, "Aviation Demand Forecasts."

3.3 HISTORICAL PASSENGER AIRLINE TRAFFIC

A review of airline activity at the Airport provided the foundation for the enplaned passenger forecasts and included an analysis of (1) the airline passenger service and market shares; (2) overall trends in enplaned passengers, including originating connecting passengers, and (3) monthly airline traffic for enplaned passengers, scheduled departing seats, and passenger airline landings.

3.3.1 Airlines Serving Intercontinental

The Airport was served by 26 passenger airlines, including 5 mainline airlines, 10 regional affiliates of which 4 are associated with more than one mainline airline, and 11 foreign-flag airlines, as of July 2012, as shown in Table 3-8.

3.3.2 Enplaned Passengers

As shown in Table 3-2, the number of enplaned passengers at George Bush Intercontinental and Hobby airports increased an average of 3.2% per year between 1990 and 2011, exceeding growth in the nation as a whole during this period (an average increase of 2.2% per year). Intercontinental accounted for much of the growth during this period—increasing an average of 4.0% per year, compared with an average increase of 1.1% per year at Hobby. Intercontinental's share of Houston Airport System enplaned passengers has increased since 1990—from 69% in 1990 to 80% in 2011, reflecting the continued development of United's hub at Intercontinental for domestic and international passenger service.

3.3.2.1 Domestic and International Passengers

Between 1990 and 2011, the number of domestic enplaned passengers at Intercontinental increased an average of 3.4% per year and accounted for most of the growth in domestic passenger activity in the Houston MSA, as shown in Table 3-3. The number of international passengers at the Airport increased an average increase of 6.7% per year between 1990 and 2011, faster than growth in the nation as a whole during this period (an average increase of 3.5% per year). International passengers accounted for 21.4% of total passengers in 2011, compared with a 1990 share of 12.4%.

Table 3-8
AIRLINES SERVING INTERCONTINENTAL AS OF JULY 2012

Mainline	Foreign-flag
Alaska Airlines	Aeromexico
American Airlines	Air Canada
Delta Air Lines *(a)*	Air France
United Airlines *(b)*	British Airways
US Airways	Emirates Airlines
	KLM- Royal Dutch Airlines
Regional affiliates	Lufthansa Airlines
American Eagle Airlines	Qatar Airways
Colgan Air (United Express)	Singapore Airlines
Comair (Delta Connection)	TACA Airlines
Compass Airlines (Delta Connection)	Viva Aerobus
ExpressJet (Delta Connection, United Express)	
Pinnacle Airlines (Delta Connection)	
Republic Airlines (Frontier Express, US Airways Express)	
Shuttle America (Delta Connection, United Express)	
Skywest (Delta Connection, United Express)	
Trans States Airlines (United Express)	

(a) Delta completed its merger with Northwest on October 29, 2008, and a single operating certificate was issued on December 31, 2009.
(b) United completed its merger with Continental on October 1, 2010, and a single operating certificate was issued on November 30, 2011.

Sources: Houston Airport System records and Official Airline Guides, Inc., online database, accessed June 2012.

As shown in Figure 3-10, Mexico accounted for the largest share of international passengers at Intercontinental in 2011, with 34.6%, followed by Latin America and the Caribbean (30.4%), Europe (17.4%), Canada (9.5%), and Asia, Africa, and the Middle East (8.1%).

The Asia, Africa, and the Middle East region was the fastest growing region at Intercontinental between 2000 and 2011, increasing an average of 15.2% per year, albeit with a small base relative to other regions. Latin America and the Caribbean region experienced the second fastest growth, increasing an average of 4.9% per year between 2000 and 2011, followed by Canada (an average of 4.1% per year), Europe (an average of 2.6% per year), and Mexico (an average of 2.3% per year).

Table 3-9
HOUSTON AIRPORT SYSTEM HISTORICAL ENPLANED PASSENGERS

	George Bush Intercontinental Airport			William P. Hobby Airport		Houston Airport System	
Year	Total	Percent increase (decrease)	Share of Houston Airport System	Total	Percent increase (decrease)	Total *(a)*	Percent increase (decrease)
1990	8,878,368	--%	69%	3,960,893	--%	12,839,261	--%
1991	9,324,119	5.0	70	3,930,586	(0.8)	13,254,705	3.2
1992	9,994,852	7.2	71	4,165,717	6.0	14,160,569	6.8
1993	10,232,053	2.4	71	4,229,561	1.5	14,461,614	2.1
1994	11,392,870	11.3	74	4,079,553	(3.5)	15,472,423	7.0
1995	12,027,602	5.6	75	4,107,245	0.7	16,134,847	4.3
1996	13,282,380	10.4	76	4,193,914	2.1	17,476,294	8.3
1997	14,031,627	5.6	77	4,138,971	(1.3)	18,170,598	4.0
1998	15,630,688	11.4	78	4,377,233	5.8	20,007,921	10.1
1999	16,464,987	5.3	79	4,422,032	1.0	20,887,019	4.4
2000	17,521,731	6.4	79	4,552,487	3.0	22,074,218	5.7
2001	17,313,485	(1.2)	80	4,318,209	(5.1)	21,631,694	(2.0)
2002	16,903,093	(2.4)	81	4,019,340	(6.9)	20,922,433	(3.3)
2003	17,031,572	0.8	81	3,901,871	(2.9)	20,933,443	0.1
2004	18,253,449	7.2	81	4,159,769	6.6	22,413,218	7.1
2005	19,868,437	8.8	83	4,152,111	(0.2)	24,020,548	7.2
2006	21,336,881	7.4	83	4,301,435	3.6	25,638,316	6.7
2007	21,588,106	1.2	83	4,427,334	2.9	26,015,440	1.5
2008	20,906,233	(3.2)	83	4,400,985	(0.6)	25,307,218	(2.7)
2009	20,041,360	(4.1)	82	4,267,287	(3.0)	24,308,647	(3.9)
2010	20,247,537	1.0	82	4,546,367	6.5	24,793,904	2.0
2011	20,065,669	(0.9)	80	4,944,699	8.8	25,010,368	0.9
	Compound average annual increase (decrease)						
1990-2010	7.0%			1.4%		5.6%	
2000-2011	1.2			0.8		1.1	
1990-2011	4.0			1.1		3.2	

(a) Excludes passengers for Ellington Field. In 2004, the last full year of regional airline service, a total of 41,500 passengers were enplaned at Ellington Field, primarily on Continental Express to Intercontinental.

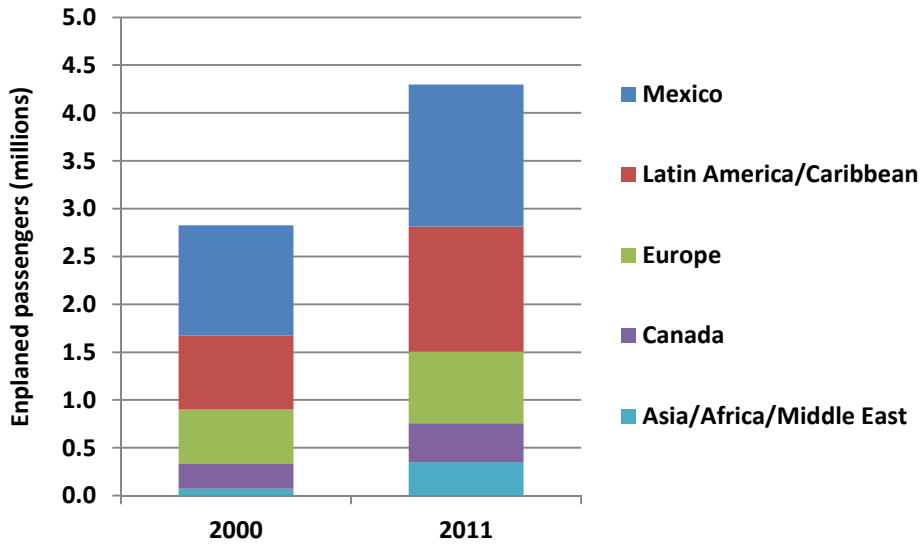
Source: Houston Airport System records.

Table 3-10
HISTORICAL ENPLANED PASSENGERS

	Domestic	International	Total	Percent increase (decrease)
1990	7,781,733	1,096,635	8,878,368	--%
1991	8,153,284	1,170,835	9,324,119	5.0
1992	8,765,274	1,229,578	9,994,852	7.2
1993	8,858,665	1,373,388	10,232,053	2.4
1994	9,929,367	1,463,503	11,392,870	11.3
1995	10,589,952	1,437,650	12,027,602	5.6
1996	11,612,545	1,669,835	13,282,380	10.4
1997	12,111,461	1,920,166	14,031,627	5.6
1998	13,343,879	2,286,809	15,630,688	11.4
1999	13,937,123	2,527,864	16,464,987	5.3
2000	14,690,848	2,830,883	17,521,731	6.4
2001	14,490,265	2,823,220	17,313,485	(1.2)
2002	14,045,601	2,857,492	16,903,093	(2.4)
2003	14,185,553	2,846,019	17,031,572	0.8
2004	15,016,276	3,237,173	18,253,449	7.2
2005	16,370,841	3,497,596	19,868,437	8.8
2006	17,595,472	3,741,409	21,336,881	7.4
2007	17,702,633	3,885,473	21,588,106	1.2
2008	16,904,085	4,002,148	20,906,233	(3.2)
2009	16,122,763	3,918,597	20,041,360	(4.1)
2010	16,000,315	4,247,222	20,247,537	1.0
2011	15,768,569	4,297,100	20,065,669	(0.9)
	Average annual percent increase (decrease)			
1990-1995	6.4%	5.6%	6.3%	
1995-2000	6.8	14.5	7.8	
2000-2005	2.2	4.3	2.5	
2005-2011	(0.6)	3.5	0.2	
1990-2011	3.4	6.7	4.0	

Source: Houston Airport System records.

Figure 3-10
INTERNATIONAL PASSENGERS BY WORLD REGION



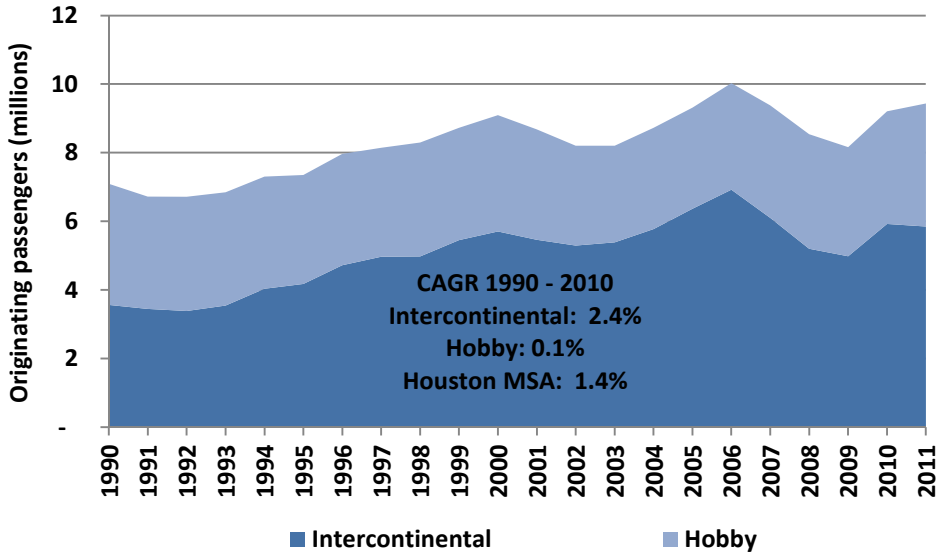
Source: Houston Airport System records.

3.3.2.2 Originating Passengers

O&D passenger demand is affected by the demographics and economy of the region served by the airport as well as airline service and airfares. From 1990 to 2011, the number of domestic originating passengers in the Houston MSA increased an average of 1.4% per year, with faster growth at Intercontinental (an average of 2.4% per year) compared with an average increase of 0.1% per year at Hobby, as shown on Figure 3-11. The growth in domestic originating passengers at Intercontinental most likely reflects the continued development of domestic airline service and United's hub and the decreasing trend in real airfare levels, in constant 2000 dollars, since 1990, as shown on Figure 3-12. Since 2007, airfares have increased, in both current and constant dollars, reflecting the oil price spike in 2008, the 2008-2009 national economic recession, and airline efforts to reduce capacity and put upward pressure on airfares.

Between 1990 and 2011, real airfare levels, in constant 2000 dollars, decreased an average of 0.9% per year. In contrast, airfares in current dollars, unadjusted for inflation, increased an average of 1.7% per year, compared with an average increase of 2.6% in inflation.

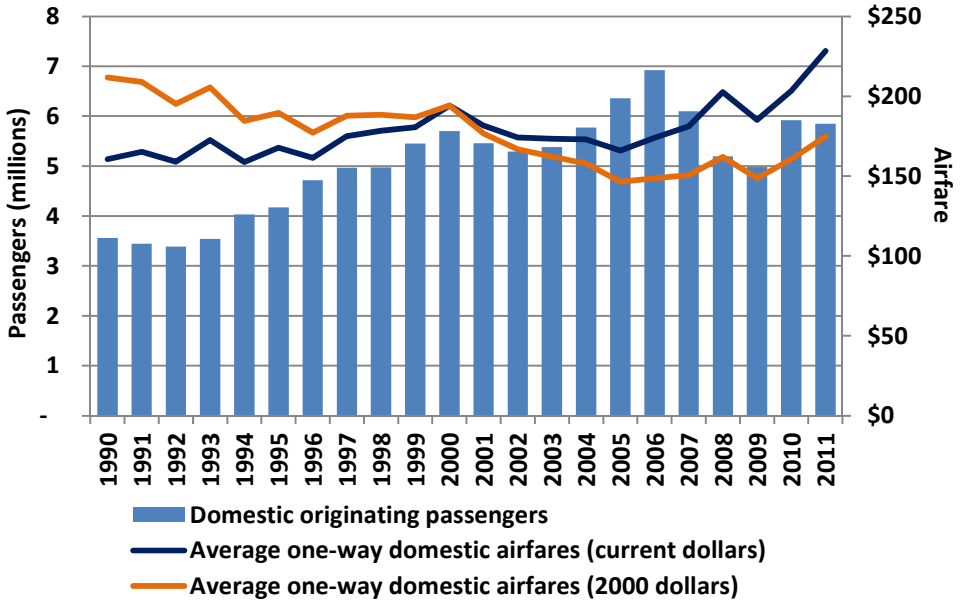
Figure 3-11
DOMESTIC ORIGINATING PASSENGERS IN THE HOUSTON MSA



CAGR = Compound average annual growth rate

Source: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), accessed June 2012.

Figure 3-12
DOMESTIC ORIGINATING PASSENGERS AND AIRFARES



Source: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), accessed June 2012.

3.3.2.3 Connecting Passengers

Connecting passenger traffic at Intercontinental reflects the Airport's role as a connecting hub for United Airlines and is affected by United's route network decisions. In 2006, the Houston Airport System began collecting data directly from airlines on the number of originating and on-line connecting passengers at Intercontinental. Based on these data, approximately 53% of revenue passengers boarded connecting flights at Intercontinental in 2011. (Data for non-revenue passengers is not reported for passenger connections.) During the first 3 months of 2012 (January through March), approximately 55% of revenue passengers boarded connecting flights at Intercontinental.

The U.S. Department of Transportation (U.S. DOT) Origin-Destination Survey is a second source of information on the number of connecting passengers at U.S. Airports. Data from the O&D Survey are based on a 10% sample of all tickets issued on U.S. airlines. Although foreign-flag airlines are not required to report to the USDOT, data for foreign-flag airlines that codeshare or are part of alliances with U.S. airlines are often captured in the O&D Survey. Based on data from the O&D Survey, it is estimated that approximately 60% of all passengers at Intercontinental are boarding connecting flights.

3.3.2.4 Revenue and Non-Revenue Passengers

In 2011, a total of 897,152 non-revenue passengers were enplaned at Intercontinental. (Non-revenue passengers are comprised of passengers using frequent flyer mileage and airline employees.) During the first 3 months of 2012 (January through March), the number of non-revenue passengers totaled 239,779, reflecting a 36.3% increase compared with the same period in 2011. United Airlines (mainline and regional affiliates) accounted for 90% of non-revenue passengers at Intercontinental in 2011. It is unclear whether the number of non-revenue passengers at Intercontinental will be affected by the establishment of United's headquarters in Chicago and the closing of the former headquarters of Continental Airlines in Houston.

3.3.3 Airline Market Shares and Passenger Service

The market shares for the passenger airlines serving the Airport are shown in Table 3-11. In 2011, United Airlines (mainline and regional affiliates) had the largest market share of enplaned passengers (87.1%) at the Airport, followed by Delta Air Lines (2.9%), US Airways (2.7%), and American Airlines (2.4%).

As of July 2012, United Airlines (mainline and regional affiliates) provides 619 average daily scheduled nonstop departures at Intercontinental, including 499 domestic flights and 120 international flights, as shown in Table 3-12. More than half of United's domestic flights (291 out of 499) are to cities in the southern United States while 102 of its 120 international flights were to cities in Central and South America and the Caribbean. The other airlines serving the Airport provide 80 scheduled nonstop departures—61 domestic and 19 international.

Table 3-11
AIRLINE MARKET SHARES OF ENPLANED PASSENGERS

	Enplaned passengers				
	2007	2008	2009	2010	2011
Star Alliance					
United Airlines					
Continental	18,914,802	18,211,710	17,358,830	17,368,918	17,037,811
United	355,371	352,623	360,232	408,525	448,709
	19,270,173	18,564,333	17,719,062	17,777,443	17,486,520
US Airways	292,221	428,785	436,981	506,083	546,727
Air Canada	50,295	79,759	80,148	106,743	118,435
Lufthansa	100,630	96,969	91,007	102,730	122,529
Singapore Airlines	--	21,350	33,460	52,149	64,385
Taca	35,101	29,165	30,611	26,148	27,661
	19,748,420	19,220,361	18,391,269	18,571,296	18,345,138
SkyTeam					
Delta	349,331	352,732	511,019	577,411	577,377
KLM- Royal Dutch Airlines	101,283	96,348	89,768	86,869	91,926
Aeromexico	91,828	65,413	60,572	83,636	89,716
Air France	124,906	114,369	91,112	77,196	74,674
	667,348	628,862	752,471	825,112	833,693
oneworld					
American	489,932	459,966	404,969	415,572	482,820
British Airways	106,869	101,891	113,123	111,658	125,554
	596,801	561,857	518,092	527,230	608,374
Emirates	3,160	74,638	75,935	91,271	101,410
Qatar Airways	--	--	48,065	72,829	74,348
Other	572,377	420,515	255,528	159,799	81,587
Total	21,588,106	20,906,233	20,041,360	20,247,537	20,065,669
	Share of total				
	2007	2008	2009	2010	2011
Star Alliance					
United Airlines					
Continental	87.6%	87.1%	86.6%	85.8%	84.9%
United	1.6	1.7	1.8	2.0	2.2
	89.3%	88.8%	88.4%	87.8%	87.1%
US Airways	1.4	2.1	2.2	2.5	2.7
Jazz Air	0.2	0.4	0.4	0.5	0.6
Lufthansa	0.5	0.5	0.5	0.5	0.6
Singapore Airlines	0.0	0.1	0.2	0.3	0.3
Taca	0.2	0.1	0.2	0.1	0.1
	91.5%	91.9%	91.8%	91.7%	91.4%
SkyTeam					
Delta	1.6	1.7	2.5	2.9	2.9
KLM- Royal Dutch Airlines	0.5	0.5	0.4	0.4	0.5
Aeromexico	0.4	0.3	0.3	0.4	0.4
Air France	0.6	0.5	0.5	0.4	0.4
	3.1%	3.0%	3.8%	4.1%	4.2%
oneworld					
American	2.3	2.2	2.0	2.1	2.4
British Airways	0.5	0.5	0.6	0.6	0.6
	2.8%	2.7%	2.6%	2.6%	3.0%
Emirates	0.0	0.4	0.4	0.5	0.5
Qatar Airways	0.0	0.0	0.2	0.4	0.4
Other	2.7	2.0	1.3	0.8	0.4
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Includes activity for regional affiliates.
Source: Houston Airport System records.

Table 3-12
NONSTOP AIRLINE SERVICE AS OF JULY 2012

Sector/Region	Average daily scheduled departures			Number of cities	
	United Airlines	Other airlines	Total	United Airlines	Other airlines
Domestic					
South	291	29	320	61	5
Midwest	70	13	83	16	4
Pacific	60	4	64	9	2
Rocky Mountain	44	10	54	13	3
Northeast	34	6	41	4	2
	499	61	560	103	16
International					
Central America	89	5	94	40	3
Canada	11	7	18	5	4
Europe	5	6	11	4	5
South America	8	--	8	7	--
Middle East	--	2	2	--	2
Caribbean	5	--	5	6	-
Africa	1	--	1	1	-
Far East	1	--	1	1	--
	120	19	139	64	14
Total Airport	**619**	**80**	**699**	**167**	**30**

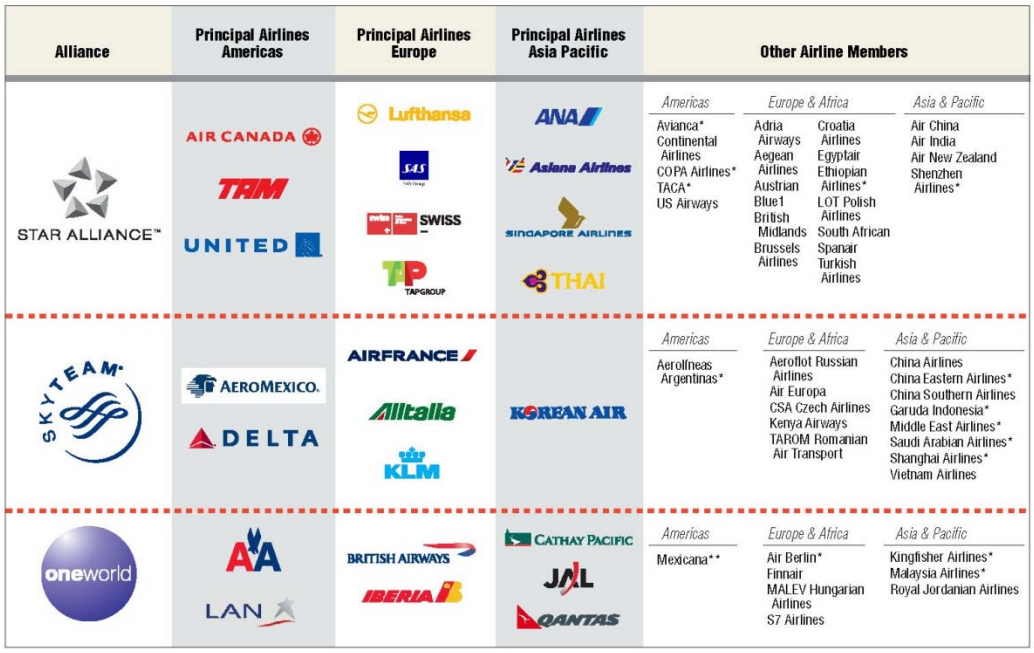
Note: Includes mainline and regional affiliates.

Sources: Official Airline Guides, Inc. online database, accessed June 2012.

3.3.3.1 Airline Alliances and the Star Alliance at Intercontinental

Airline alliances emerged from a need to create seamless international air travel. Globalized industries increasingly require access to local markets beyond a country's primary international gateway. In response to this requirement, large, strategic, branded airline alliances were formed, together with code-sharing and other marketing arrangements, to mitigate the effects of restrictive bilateral agreements, ownership restrictions, and licensing and control regulations. Airlines based in different countries formed alliances to facilitate access to specific markets and to leverage their local knowledge, relationships with suppliers, and specialized marketing and distribution channels. Figure 3-13 presents a summary of the three airline alliances and their member airlines.

Figure 3-13
AIRLINE ALLIANCES



* Member elect airline that has stated its intention to join the alliance and is currently completing the steps required for integration.
** In August 2010 suspended operations indefinitely.

The liberalization of international aviation-related treaties contributed to the development of airline alliances, including the creation of more than 100 U.S. Open Skies agreements. Recent U.S. DOT decisions are affecting the shape of alliances, including requirements for joint ventures with provisions for cost and revenue sharing and the operation of flights by any airline within the alliance (also referred to as "metal neutral" joint ventures). The most integrated airline alliances include a grant of antitrust immunity (ATI), which allows allied airlines to legally set prices, allocate routes, and otherwise operate as though they were one airline. Since 2007, the U.S. DOT's approval of ATI agreements for the major airlines in the three global alliances (Star Alliance, SkyTeam, and **one**world) has been based on the fulfillment of these requirements, as well as the existence of a signed U.S. Open Skies agreement.

Alliances enhance airline networks as airlines around the world link their networks to capture efficiencies and provide service to a larger number of city-pair markets – particularly longer-distance, under-served markets. A primary objective of airline alliances is to increase traffic in "behind-the-gateway" markets such as Kansas City that does not have nonstop service to Latin America or Brasilia, Brazil that has limited nonstop service to the United States. Within Star Alliance, a seamless trip is possible between Kansas City and Brasilia with United Airlines serving two of the three flight segments (i.e., Kansas City-IAH and IAH-Sao Paulo) and TAM, a Star Alliance partner, serving the remaining intra-Brazil flight segment (i.e., Sao Paulo-Brasilia). Similarly, behind-the-gateway markets outside of the United States can be linked via Intercontinental and other international gateways where other Star Alliance members serve. The Star Alliance provides the infrastructure to link world regions and has the potential to increase airline service and passenger traffic at Intercontinental. As shown in Table 3-11, the Star Alliance accounted for 91.4% of enplaned passengers at Intercontinental in 2011.

3.3.4 Origin-Destination Markets

in 2011, the top 20 domestic O&D passenger markets in the Houston MSA accounted for 61.2% of the total originating passengers, as shown in Table 3-6. The Dallas/Fort Worth area is the largest originating passenger market in 2011 with 6.5% of total originating passengers. The New York market is the second largest O&D market, with 6.2% of total originating passengers, followed by Los Angeles (5.4%), Chicago (4.6%), and Washington, D.C. (4.3%). In the Dallas/Fort Worth market, Intercontinental accounted for 25.0% of passengers originating in the Houston MSA, while Hobby accounted for the remaining 75.0%, reflecting the large number of daily nonstop flights between Hobby and the Dallas/Fort Worth airports. In July 2012, Hobby has 28 daily scheduled flights to Dallas/Fort Worth airports compared with 19 flights at Intercontinental. In the next four largest markets—New York, Los Angeles, Chicago, and Washington, D.C., Intercontinental accounted for the largest share of passengers originating from the Houston MSA, with 78.8%, 66.6%, 61.7%, and 65.3%, respectively. Intercontinental accounted for more than half of passengers originating from the Houston MSA in 16 of the top 20 markets in 2011.

3.3.5 Airfares for Domestic Origin-Destination Markets

Table 3-14 provides one-way airfare data for the top 20 domestic O&D passenger markets in the Houston MSA in 2011, including airfares for Intercontinental, Hobby, and an average for the Houston MSA. Overall, airfares at Intercontinental for all domestic O&D markets are higher than those at Hobby and the Houston MSA average—by 29.7% and 11.3%, respectively. However, it is important to note that the average trip length of Intercontinental passengers is 36% longer than that for Hobby passengers in 2011 and results in higher overall average airfares at Intercontinental.

Table 3-13
HISTORICAL DOMESTIC ORIGINATING PASSENGERS BY MARKET IN 2011
Ranked by total originating passengers in the Houston MSA

	George Bush Intercontinental Airport				Houston MSA	
Origin-destination market	Total	Share of IAH total	Share of O&D market	William P. Hobby Airport	2010	Share of Houston MSA
Dallas/Fort Worth *(a)*	153,910	2.6%	25.0%	462,920	616,830	6.5%
New York *(b)*	462,050	7.9	78.8	124,110	586,160	6.2
Los Angeles *(c)*	339,420	5.8	66.6	169,850	509,270	5.4
Chicago *(d)*	265,390	4.5	61.7	164,760	430,150	4.6
Washington, D.C. *(e)*	265,900	4.5	65.3	141,240	407,140	4.3
Denver	200,460	3.4	53.3	175,880	376,340	4.0
Las Vegas	192,700	3.3	58.3	137,630	330,330	3.5
San Francisco *(f)*	211,660	3.6	67.8	100,420	312,080	3.3
New Orleans	118,280	2.0	39.5	181,150	299,430	3.2
Atlanta	144,140	2.5	51.8	134,030	278,170	2.9
Orlando	128,480	2.2	58.8	89,900	218,380	2.3
Miami *(g)*	170,100	2.9	78.8	45,900	216,000	2.3
Philadelphia	151,280	2.6	81.0	35,590	186,870	2.0
Phoenix	101,660	1.7	59.1	70,260	171,920	1.8
Seattle-Tacoma	147,150	2.5	89.4	17,440	164,590	1.7
Boston	130,170	2.2	83.2	26,220	156,390	1.7
San Diego	88,220	1.5	61.5	55,120	143,340	1.5
Tulsa	47,280	0.8	37.4	79,080	126,360	1.3
Oklahoma City	43,840	0.7	36.2	77,420	121,260	1.3
Detroit	97,370	1.7	81.2	22,570	119,940	1.3
Airports Listed	3,459,460	59.2%	59.9	2,311,490	5,770,950	61.2%
Other Airports	2,387,490	40.8	65.2	1,276,200	3,663,690	38.8
Total	5,846,950	100.0%		3,587,690	9,434,640	100.0%

(a) Dallas/Fort Worth International Airport and Love Field.
(b) Newark Liberty International, LaGuardia, and John F. Kennedy International airports.
(c) Los Angeles International, Bob Hope, Ontario International, John Wayne (Orange County), and Long Beach airports.
(d) Chicago O'Hare and Midway International airports.
(e) Reagan Washington National, Baltimore/Washington International Thurgood Marshall, and Washington Dulles International airports.
(f) San Francisco, Oakland, and Mineta San Jose International airports.
(g) Fort Lauderdale-Hollywood and Miami International airports.

Sources: U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), accessed June 2012.

Table 3-14
AVERAGE DOMESTIC ONE-WAY AIRFARES BY MARKET IN 2011
Ranked by total originating passengers in the Houston MSA

Origin-destination market	George Bush Intercontinental Airport	William P. Hobby Airport	Houston MSA average	Percent difference from IAH airfares: William P. Hobby Airport	Percent difference from IAH airfares: Houston MSA average
Dallas/Fort Worth *(a)*	$148	$136	$139	(8.1%)	(6.1%)
New York *(b)*	278	183	258	(34.2)	(7.2)
Los Angeles *(c)*	241	183	222	(23.8)	(7.9)
Chicago *(d)*	214	169	197	(21.2)	(8.1)
Washington, D.C. *(e)*	258	177	230	(31.4)	(10.9)
Denver	179	126	154	(29.7)	(13.9)
Las Vegas	191	154	175	(19.3)	(8.0)
San Francisco *(f)*	269	191	244	(29.1)	(9.4)
New Orleans	153	136	142	(11.2)	(6.8)
Atlanta	197	155	177	(21.2)	(10.2)
Orlando	188	176	183	(6.7)	(2.8)
Miami *(g)*	199	174	194	(12.6)	(2.7)
Philadelphia	211	179	205	(15.1)	(2.9)
Phoenix	192	173	184	(10.1)	(4.1)
Seattle-Tacoma	197	177	195	(9.8)	(1.0)
Boston	260	168	244	(35.1)	(5.9)
San Diego	216	179	202	(16.7)	(6.4)
Tulsa	223	156	181	(30.2)	(18.9)
Oklahoma City	234	151	181	(35.5)	(22.7)
Detroit	237	193	229	(18.7)	(3.5)
Airports Listed	222	158	197	(28.9%)	(11.6%)
Other Airports	237	165	212	(30.4%)	(10.6%)
Total	228	161	203	(29.7%)	(11.3%)

(a) Dallas/Fort Worth International Airport and Love Field.
(b) Newark Liberty International, LaGuardia, and John F. Kennedy International airports.
(c) Los Angeles International, Bob Hope, Ontario International, John Wayne (Orange County), and Long Beach airports.
(d) Chicago O'Hare and Midway International airports.
(e) Reagan Washington National, Baltimore/Washington International Thurgood Marshall, and Washington Dulles International airports.
(f) San Francisco, Oakland, and Mineta San Jose International airports.
(g) Fort Lauderdale-Hollywood and Miami International airports.

Sources U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database (Databank 1A), accessed June 2012.

in individual market comparisons, airfare data highlight differences in airfares and service between airports serving a region. In the Dallas/Fort Worth market, airfares at Intercontinental differ by 9 to 12 dollars from airfares at Hobby and the Houston MSA average. As noted earlier, the Dallas/Fort Worth market is characterized by a large number of flights from both Intercontinental and Hobby; this competitive service puts downward pressure on airfares. In contrast, airfares at Intercontinental to the New York market are 34.2% higher than airfares at Hobby, reflecting, in part, a larger number of daily flights at Intercontinental (20) than at Hobby (4) in July 2012.

3.3.6 Monthly Airline Traffic

Trends in monthly airline traffic, including enplaned passengers, scheduled departing seats, enplaned passenger load factor, and passenger airline landings are presented in the following sections.

3.3.6.1 Monthly Enplaned Passengers

Table 3-15 presents monthly enplaned passenger data for the Airport for January 2007 through March 2012. The monthly data show the seasonal variation in enplaned passenger traffic, with peak levels occurring from June through August and the lowest monthly activity occurring from November through February

3.3.6.2 Monthly Scheduled Departing Seats

Table 3-16 presents monthly scheduled departing seats data for the Airport for January 2007 through December 2012. The trends in the number of scheduled departing seats follow the seasonal variation in enplaned passengers. The peak month shares of annual seats are less than the peak month shares of enplaned passengers, largely because of differences in monthly load factors (the percentage of occupied seats on an aircraft).

3.3.6.3 Monthly Enplaned Passenger Load Factor

As shown on Figure 3-14, enplaned passenger load factors at Intercontinental ranged from a low of 65% in September 2008 to a high of 90% during the summer months of 2011. Load factors at Intercontinental in recent years have averaged more than 80% reflecting, in part, reductions in airline seating capacity.

3.3.6.4 Monthly Passenger Airline Aircraft Landings

Table 3-17 presents monthly passenger airline aircraft landings data for the Airport for January 2007 through March 2012.

Table 3-15
HISTORICAL ENPLANED PASSENGERS BY MONTH

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Month												
2007	1,686,137	1,593,743	1,872,440	1,814,790	1,902,198	1,933,469	1,966,500	1,905,035	1,588,154	1,761,076	1,745,860	1,818,704	21,588,106
2008	1,695,724	1,647,350	1,903,949	1,777,000	1,885,845	1,945,059	1,984,876	1,881,089	1,281,809	1,630,971	1,553,319	1,719,242	20,906,233
2009	1,518,536	1,401,097	1,719,305	1,649,835	1,663,956	1,867,644	1,962,108	1,802,611	1,485,714	1,634,546	1,578,804	1,757,204	20,041,360
2010	1,547,931	1,434,289	1,702,049	1,624,922	1,729,400	1,874,073	1,946,662	1,775,830	1,528,243	1,683,037	1,632,781	1,768,320	20,247,537
2011	1,567,270	1,367,426	1,722,975	1,566,028	1,772,080	1,874,981	1,979,043	1,769,143	1,510,401	1,605,191	1,600,777	1,730,354	20,065,669
2012	1,541,378	1,452,575	1,716,881										
	Percent increase (decrease)												
2007-2008	0.6%	3.4%	1.7%	(2.1%)	(0.9%)	0.6%	0.9%	(1.3%)	(19.3%)	(7.4%)	(11.0%)	(5.5%)	(3.2%)
2008-2009	(10.4)	(14.9)	(9.7)	(7.2)	(11.8)	(4.0)	(1.1)	(4.2)	15.9	0.2	1.6	2.2	(4.1)
2009-2010	1.9	2.4	(1.0)	(1.5)	3.9	0.3	(0.8)	(1.5)	2.9	3.0	3.4	0.6	1.0
2010-2011	1.2%	(4.7%)	1.2%	(3.6%)	2.5%	0.0%	1.7%	(0.4%)	(1.2%)	(4.6%)	(2.0%)	(2.1%)	(0.9%)
2011-2012	(1.7%)	6.2%	(0.4%)										
	Percent of total												
2007	7.8%	7.4%	8.7%	8.4%	8.8%	9.0%	9.1%	8.8%	7.4%	8.2%	8.1%	8.4%	100.0%
2008	8.1	7.9	9.1	8.5	9.0	9.3	9.5	9.0	6.1	7.8	7.4	8.2	100.0
2009	7.6	7.0	8.6	8.2	8.3	9.3	9.8	9.0	7.4	8.2	7.9	8.8	100.0
2010	7.6	7.1	8.4	8.0	8.5	9.3	9.6	8.8	7.5	8.3	8.1	8.7	100.0
2011	7.8	6.8	8.6	7.8	8.8	9.3	9.9	8.8	7.5	8.0	8.0	8.6	100.0
5-year average	7.8	7.2	8.7	8.2	8.7	9.2	9.6	8.9	7.2	8.1	7.9	8.6	100.0

Note: Data include domestic and international passengers enplaned on mainline and regional passenger airlines. The 5-year average is for 2007 through 2011.

Source: Houston Airport System records.

Table 3-16
SCHEDULED DEPARTING SEATS BY MONTH

Year	Month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
2007	2,218,413	2,035,505	2,321,225	2,235,369	2,275,541	2,246,992	2,309,139	2,339,656	2,036,761	2,214,589	2,130,516	2,249,463	26,613,169
2008	2,160,008	2,052,805	2,268,548	2,161,359	2,235,638	2,239,101	2,358,045	2,325,775	1,969,944	2,042,653	1,965,630	2,122,823	25,902,329
2009	2,056,321	1,879,577	2,158,049	2,020,996	2,030,153	2,086,609	2,202,869	2,198,088	1,875,410	2,026,422	1,982,997	2,126,068	24,643,559
2010	2,044,602	1,860,314	2,057,060	1,936,547	2,042,728	2,107,295	2,209,347	2,130,230	1,899,629	2,039,265	2,003,670	2,174,483	24,505,170
2011	2,043,829	1,863,862	2,126,242	1,985,573	2,051,901	2,094,814	2,188,253	2,094,497	1,850,795	1,952,475	1,909,884	2,057,618	24,219,743
2012	1,936,740	1,813,788	2,125,984	2,022,981	2,062,332	2,142,310	2,204,089	2,148,115	1,919,631	1,958,658	1,896,590	2,030,425	24,261,643
	Percent increase (decrease)												
2007-2008	(2.6%)	0.8%	(2.3%)	(3.3%)	(1.8%)	(0.4%)	2.1%	(0.6%)	(3.3%)	(7.8%)	(7.7%)	(5.6%)	(2.7%)
2008-2009	(4.8)	(8.4)	(4.9)	(6.5)	(9.2)	(6.8)	(6.6)	(5.5)	(4.8)	(0.8)	0.9	0.2	(4.9)
2009-2010	(0.6)	(1.0)	(4.7)	(4.2)	0.6	1.0	0.3	(3.1)	1.3	0.6	1.0	2.3	(0.6)
2010-2011	(0.0)	0.2	3.4	2.5	0.4	(0.6)	(1.0)	(1.7)	(2.6)	(4.3)	(4.7)	(5.4)	(1.2)
2011-2012	(5.2)	(2.7)	(0.0)	1.9	0.5	2.3	0.7	2.6	3.7	0.3	(0.7)	(1.3)	0.2
	Percent of total												
2007	8.3%	7.6%	8.7%	8.4%	8.6%	8.4%	8.7%	8.8%	7.7%	8.3%	8.0%	8.5%	100.0%
2008	8.3	7.9	8.8	8.3	8.6	8.6	9.1	9.0	7.6	7.9	7.6	8.2	100.0
2009	8.3	7.6	8.8	8.2	8.2	8.5	8.9	8.9	7.6	8.2	8.0	8.6	100.0
2010	8.3	7.6	8.4	7.9	8.3	8.6	9.0	8.7	7.8	8.3	8.2	8.9	100.0
2011	8.4	7.7	8.8	8.2	8.5	8.6	9.0	8.6	7.6	8.1	7.9	8.5	100.0
2012	8.0	7.5	8.8	8.3	8.5	8.8	9.1	8.9	7.9	8.1	7.8	8.4	100.0

Note: Advance schedules are subject to change.
Data include domestic and international departing seats on mainline and regional passenger airlines.

Source: Official Airline Guides, Inc., online database, accessed June 2012.

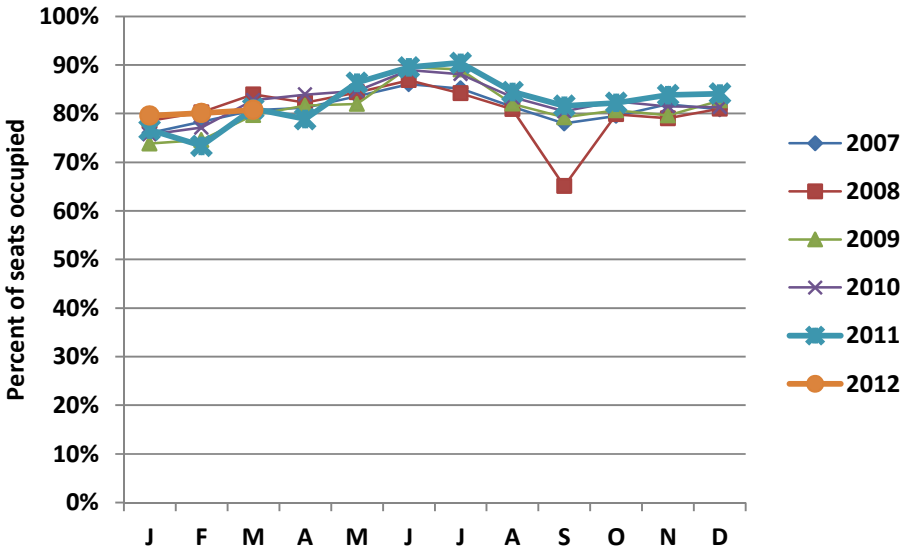
Table 3-17
HISTORICAL PASSENGER AIRLINE AIRCRAFT LANDINGS BY MONTH

Year	Month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
2007	23,345	21,920	25,151	24,242	24,482	24,128	24,714	25,302	21,936	23,996	22,997	23,911	286,124
2008	23,191	22,125	24,230	23,632	24,088	24,129	25,378	24,811	18,556	21,389	20,272	21,804	273,605
2009	21,270	19,692	22,510	21,095	20,986	21,965	23,232	23,086	19,631	20,759	20,423	21,567	256,216
2010	20,866	19,007	21,440	20,460	20,922	21,808	22,881	22,202	19,595	20,843	20,165	21,798	251,987
2011	20,705	18,260	21,772	19,505	21,423	21,604	22,850	21,985	19,573	20,132	19,607	21,276	248,692
2012	20,158	19,131	21,214										
	Percent increase (decrease)												
2007-2008	(0.7%)	0.9%	(3.7%)	(2.5%)	(1.6%)	0.0%	2.7%	(1.9%)	(15.4%)	(10.9%)	(11.8%)	(8.8%)	(4.4%)
2008-2009	(8.3)	(11.0)	(7.1)	(10.7)	(12.9)	(9.0)	(8.5)	(7.0)	5.8	(2.9)	0.7	(1.1)	(6.4)
2009-2010	(1.9)	(3.5)	(4.8)	(3.0)	(0.3)	(0.7)	(1.5)	(3.8)	(0.2)	0.4	(1.3)	1.1	(1.7)
2010-2011	(0.8)	(3.9)	1.5	(4.7)	2.4	(0.9)	(0.1)	(1.0)	(0.1)	(3.4)	(2.8)	(2.4)	(1.3)
2011-2012	(2.6)	4.8	(2.6)										
	Percent of total												
2007	8.2%	7.7%	8.8%	8.5%	8.6%	8.4%	8.6%	8.8%	7.7%	8.4%	8.0%	8.4%	100.0%
2008	8.5	8.1	8.9	8.6	8.8	8.8	9.3	9.1	6.8	7.8	7.4	8.0	100.0
2009	8.3	7.7	8.8	8.2	8.2	8.6	9.1	9.0	7.7	8.1	8.0	8.4	100.0
2010	8.3	7.5	8.5	8.1	8.3	8.7	9.1	8.8	7.8	8.3	8.0	8.7	100.0
2011	8.3	7.3	8.8	7.8	8.6	8.7	9.2	8.8	7.9	8.1	7.9	8.6	100.0
5-year average	8.3	7.7	8.7	8.3	8.5	8.6	9.0	8.9	7.5	8.1	7.9	8.4	100.0

Note: Data include aircraft landings by mainline and regional passenger airlines.
The 5-year average is for 2007 through 2011

Source: Houston Airport System records.

Figure 3-14
ENPLANED PASSENGER LOAD FACTOR



Sources: Houston Airport System records and Official Airline Guides, Inc., online database, accessed June 2012.

3.4 HISTORICAL AIR CARGO

A review of air cargo activity at the Airport provided the foundation for the air cargo forecasts and included an analysis of (1) overall trends in air cargo, domestic and international; (2) all-cargo airline market shares; and (3) monthly activity for air cargo and all-cargo airline landings.

3.4.1 All-Cargo Airlines Serving the Airport

The Airport was served by 14 all-cargo airlines, including 5 airlines providing domestic scheduled service and 9 airlines providing international scheduled service as of July 2012, as shown in Table 3-18. In addition, 14 airlines provided domestic and international charter cargo service at the Airport.

Table 3-18
ALL-CARGO AIRLINES SERVING INTERCONTINENTAL AS OF JULY 2012

Domestic scheduled	International scheduled
ABX Air, Inc.	Aerologic GmbH
FedEx Corporation	Air France Cargo
Martinaire Aviation, L.L.C.	Cargolux Airlines International, S.A.
Southern Air, Inc. *(a)*	Cathay Pacific Airways Limited
United Parcel Service Company *(a)*	China Airlines LTD - Cargo
	Global Supply Systems Limited
	Lufthansa Cargo
	Qatar Airways Cargo
	Saudi Arabian Airlines
Domestic charter	**International charter**
Air Cargo Carriers	Amerijet International, Inc.
Ameriflight, Inc.	Antonov Design Bureau - Volga Dnepr/Ruslan
Ameristar Jet Charter, Inc.	Avialeasing Aviation Company
Atlas Air, Inc. – Cargo *(a)*	USMX Airlink
Centurion Air Cargo	Volga-Dnepr Airlines
Evergreen International Airlines	
IFL Group, Inc.	
Kalitta Air, LLC *(a)*	
USA Jet Airlines *(a)*	

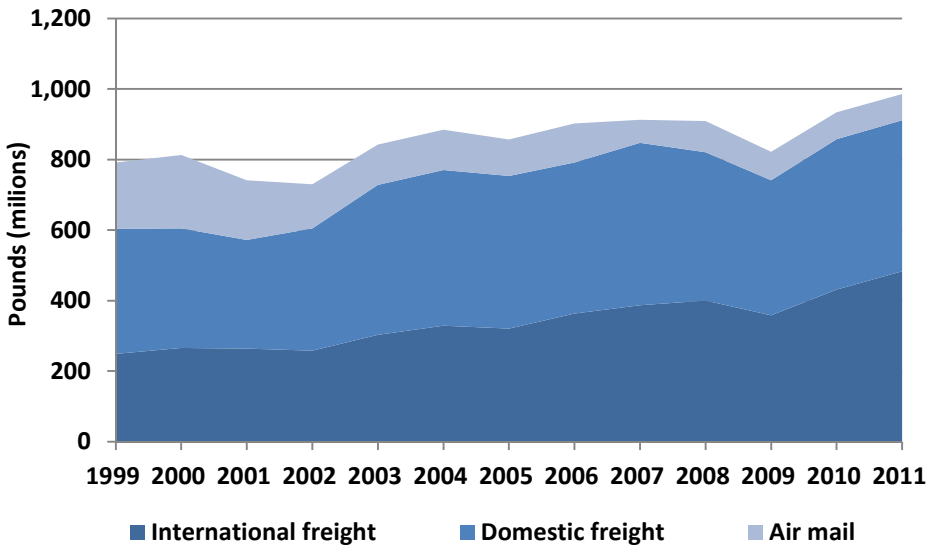
(a) Provides domestic and international service.

Sources: Houston Airport System records.

3.4.2 Historical Air Cargo

Figure 3-15 and Table 3-19 present historical trends in air cargo at the Airport from 1999 through 2011. Total freight and mail at the Airport increased from 791.4 million pounds in 1999 to 985.5 million pounds in 2011, an annual increase of 1.8% per year. International freight increased an average of 5.7% per year between 1999 and 2011 and accounted for most of the growth in cargo at the Airport, while domestic freight increased more slowly--an average of 1.6% per year over the same period. Enplaned air cargo at the Airport accounted for 51% of total cargo tonnage (enplaned plus deplaned) in 2011, consistent with recent historical trends.

Figure 3-15
HISTORICAL AIR CARGO TRENDS



Note: Sum of enplaned and deplaned cargo.

Source: Houston Airport System records.

Table 3-19
HISTORICAL AIR CARGO
in millions of pounds

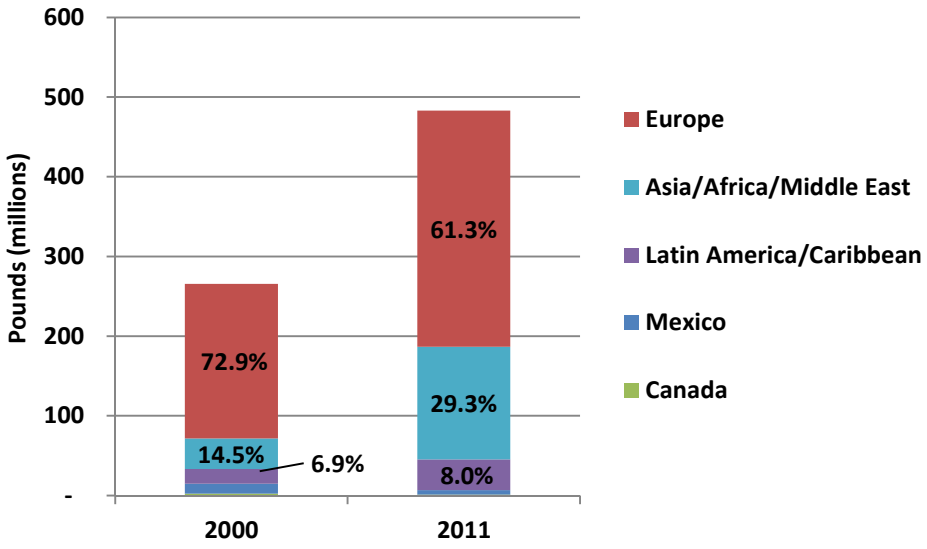
	Air mail	Freight			Total	Increase (decrease)
		Domestic	International	Total		
1999	187.9	354.8	248.8	603.5	791.4	--%
2000	208.2	339.0	265.4	604.4	812.5	2.7
2001	169.0	308.4	263.6	571.9	740.9	(8.8)
2002	125.2	346.6	257.7	604.4	729.6	(1.5)
2003	114.3	425.0	303.0	728.0	842.4	15.5
2004	114.5	441.5	328.6	770.0	884.5	5.0
2005	103.4	432.8	320.5	753.3	856.7	(3.2)
2006	110.6	428.5	363.0	791.5	902.1	5.3
2007	65.1	460.7	386.5	847.2	912.3	1.1
2008	88.8	420.4	399.8	820.3	909.0	(0.4)
2009	80.8	382.7	358.2	740.9	821.7	(9.6)
2010	76.0	426.6	431.2	857.8	933.8	13.6
2011	74.4	428.3	482.8	911.1	985.5	5.5
	Average annual percent increase (decrease)					
1999-2005	(9.5%)	3.4%	4.3%	3.8%	1.3%	
2005-2011	(5.3)	(0.2)	7.1	3.2	2.4	
1999-2011	(7.4)	1.6	5.7	3.5	1.8	

Note: Sum of enplaned and deplaned cargo.

Source: Houston Airport System records.

As shown in Figure 3-16, Europe accounted for the largest share of International freight at Intercontinental in 2011, with 61.3% of the total, followed by Asia, Africa, and the Middle East (29.3%), Latin America and the Caribbean (8.0%), Mexico (1.2%), and Canada (0.2%). The Asia, Africa, and Middle East region was the fastest growing region at Intercontinental between 2000 and 2011, increasing an average of 12.6% per year. The Latin America and Caribbean region experienced the second fastest growth, increasing an average of 6.9% per year between 2000 and 2011, followed by Europe (an average of 3.9% per year). Air freight from Intercontinental to Mexico and Canada decreased between 2000 and 2011—average decreases of 7.0% and 5.7% per year, respectively.

Figure 3-16
INTERNATIONAL AIR FREIGHT BY WORLD REGION



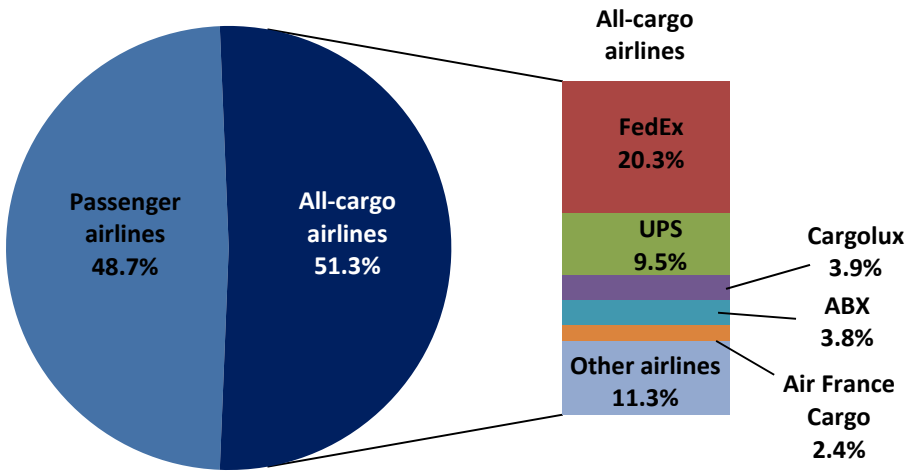
Note: Sum of enplaned and deplaned air freight.

Source: Houston Airport System records.

3.4.3 Airline Shares of Air Cargo

Airline market shares of air cargo and mail at the Airport are shown in Figure 3-17. In 2011, all-cargo airlines accounted for 51.3% of air cargo at the Airport, and the remaining 48.7% was carried as belly cargo on passenger flights. Of the cargo airlines serving the Airport, FedEx accounted for the largest share of air cargo in 2011 (20.3%), followed by United Parcel Service (UPS) with 9.5%, Cargolux with 3.9%, ABX Air with 3.8%, and Air France Cargo with 2.4%, as shown on Figure 3-17.

Figure 3-17
AIRLINE SHARES OF AIR CARGO IN 2011



Note: Sum of enplaned and deplaned cargo and freight and mail.

Source: Houston Airport System records.

3.4.3.1 Monthly Air Cargo

Table 3-20 presents monthly air cargo data for the Airport for January 2007 through March 2012. The monthly data show the seasonal variation in air cargo activity, with peak levels occurring typically in December and the lowest monthly activity occurring from January through February.

3.4.3.2 Monthly All-Cargo Airline Aircraft Landings

Table 4-21 presents monthly all-cargo airline aircraft landings data for the Airport for January 2007 through March 2012.

Table 3-20
HISTORICAL AIR CARGO BY MONTH
in thousands of pounds

Year	Month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
2007	70,228	68,799	81,198	79,914	78,686	76,734	72,890	77,250	72,482	80,917	78,424	74,733	912,255
2008	75,320	75,016	77,652	82,947	81,958	73,709	78,945	75,742	64,548	83,362	72,987	66,838	909,024
2009	65,785	61,119	64,968	66,660	65,976	66,250	70,213	66,554	67,268	76,161	72,219	78,574	821,747
2010	70,937	71,806	80,065	75,054	80,588	77,926	79,968	78,100	77,985	82,896	75,209	83,219	933,753
2011	74,434	77,566	87,499	83,774	81,990	80,777	82,118	80,923	78,850	85,472	84,046	88,054	985,502
2012	78,372	75,396	84,587										
	Percent change												
2007-2008	7.3%	9.0%	(4.4%)	3.8%	4.2%	(3.9%)	8.3%	(2.0%)	(10.9%)	3.0%	(6.9%)	(10.6%)	(0.4%)
2008-2009	(12.7)	(18.5)	(16.3)	(19.6)	(19.5%)	(10.1)	(11.1)	(12.1)	4.2	(8.6)	(1.1)	17.6	(9.6)
2009-2010	7.8	17.5	23.2	12.6	22.1	17.6	13.9	17.3	15.9	8.8	4.1	5.9	13.6
2010-2011	4.9	8.0	9.3	11.6	1.7	3.7	2.7	3.6	1.1	3.1	11.8	5.8	5.5
2011-2012	5.3	(2.8)	(3.3)										
	Percent of total												
2007	7.7%	7.5%	8.9%	8.8%	8.6%	8.4%	8.0%	8.5%	7.9%	8.9%	8.6%	8.2%	100.0%
2008	8.3	8.3	8.5	9.1	9.0	8.1	8.7	8.3	7.1	9.2	8.0	7.4	100.0
2009	8.0	7.4	7.9	8.1	8.0	8.1	8.5	8.1	8.2	9.3	8.8	9.6	100.0
2010	7.6	7.7	8.6	8.0	8.6	8.3	8.6	8.4	8.4	8.9	8.1	8.9	100.0
2011	7.6	7.9	8.9	8.5	8.3	8.2	8.3	8.2	8.0	8.7	8.5	8.9%	100.0

Note: Data include passenger and cargo airline, general aviation, military, and air taxi operations.

Source: Houston Airport System records.

Table 3-21
HISTORICAL ALL-CARGO AIRLINE LANDINGS BY MONTH

	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2007	361	354	411	368	420	409	380	407	339	404	360	385	4,598
2008	345	343	360	418	392	370	392	382	339	409	337	387	4,474
2009	384	370	395	431	404	390	414	391	369	410	355	438	4,751
2010	366	363	402	388	383	390	384	415	405	416	380	471	4,763
2011	406	393	464	436	428	434	427	450	407	395	396	468	5,104
2012	368	368	410										
	Percent change												
2007-2008	(4.4%)	(3.1%)	(12.4%)	13.6%	(6.7%)	(9.5%)	3.2%	(6.1%)	0.0%	1.2%	(6.4%)	0.5%	(2.7%)
2008-2009	11.3	7.9	9.7	3.1	3.1	5.4	5.6	2.4	8.8	0.2	5.3	13.2	6.2
2009-2010	(4.7)	(1.9)	1.8	(10.0)	(5.2)	0.0	(7.2)	6.1	9.8	1.5	7.0	7.5	0.3
2010-2011	10.9	8.3	15.4	12.4	11.7	11.3	11.2	8.4	0.5	(5.0)	4.2	(0.6)	7.2
2011-2012	(9.4)	(6.4)	(11.6)										
	Percent of total												
2007	7.9%	7.7%	8.9%	8.0%	9.1%	8.9%	8.3%	8.9%	7.4%	8.8%	7.8%	8.4%	100.0%
2008	7.7	7.7	8.0	9.3	8.8	8.3	8.8	8.5	7.6	9.1	7.5	8.6	100.0
2009	8.1	7.8	8.3	9.1	8.5	8.2	8.7	8.2	7.8	8.6	7.5	9.2	100.0
2010	7.7	7.6	8.4	8.1	8.0	8.2	8.1	8.7	8.5	8.7	8.0	9.9	100.0
2011	8.0	7.7	9.1	8.5	8.4	8.5	8.4	8.8	8.0	7.7	7.8	9.2	100.0

Note: Data include passenger and cargo airline, general aviation, military, and air taxi operations.

Source: Houston Airport System records.

3.5 HISTORICAL AIRCRAFT OPERATIONS

This chapter summarizes historical total aircraft operations at the Airport from 1990 through 2011. Aircraft operations include the total number of departures and arrivals by air carrier, air taxi and commuter, general aviation, and military aircraft. An aircraft operation is defined as either a takeoff or a landing at the Airport.

3.5.1 Air Carrier

Air carrier operations are those performed in revenue service by the passenger and all-cargo airlines serving the Airport. Included are scheduled flights, charter flights, diverted flights, and ferry operations (empty flights). The FAA defines an air carrier aircraft, for traffic counting purposes, as capable of carrying more than 60 passengers and provides a list of model types that are counted as air carrier operations (Appendix 3 in Order JO 7210.3W), even if the aircraft is conducting air freight operations.* As shown in Table 3-22, air carrier aircraft operations increased an average of 1.4% per year between 1990 and 2011, including an average decrease of 2.9% per year between 2000 and 2010.

3.5.2 Air Taxi and Commuter

Air taxi and commuter operations consist of unscheduled operations of "for hire" air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines operating aircraft with less than 60 seats. The FAA defines air taxi and commuter operations as those performed by aircraft other than those listed in Appendix 3 noted above and which use three-letter company designators. Fractional ownership and management companies and corporate flight departments that use a three-letter company designator are included in air taxi operations. As shown in Table 3-22, air taxi and commuter aircraft operations increased an average of 7.0% per year between 1990 and 2011, the fastest growing category of aircraft operations. However, since 2005, air taxi and commuter have decreased an average of 0.9% between 2005 and 2010.

3.5.3 General Aviation

General aviation operations include all civil aircraft operations not classified as air carrier or air taxi and commuter operations. As shown in Table 3-22, general aviation aircraft operations decreased an average of 5.8% per year between 1990 and 2011. According to the FAA 2011 TAF, a total of 37 general aviation aircraft were based at the Airport in 2010, including 3 single engine piston, 29 jet engine, 3 multi-engine turboprop, and 2 helicopters.

3.5.4 Military

Military aircraft operations at the Airport have averaged approximately 200 operations per year from 2000 through 2010. In 2011, military operations totaled 223, slightly exceeding the 10-year average. Historically, military operations have varied with geopolitical trends and mission changes.

3.5.5 Monthly Aircraft Operations

Table 3-23 presents monthly total aircraft operations data for the Airport for January 2007 through April 2012. The monthly data show the seasonal variation in total aircraft operations, with March and August each accounting for 8.8% of annual operations in 2011. From 2007 through 2011, July accounted for the peak share of annual aircraft operations at the Airport, with an average of approximately 9% of annual operations.

*U.S. Department of Transportation, Federal Aviation Administration, Order JO 7210.3W, February 11, 2010, http://www.faa.gov/air_traffic/publications.

Table 3-22
HISTORICAL AIRCRAFT OPERATIONS

	Commercial flights						
	Air carrier *(a)*	Commuter/ air taxi *(b)*	Subtotal	General aviation	Military	Total	Percent increase (decrease)
1990	216,933	54,033	270,966	42,067	1,403	314,436	--
1991	207,980	57,919	265,899	42,872	1,826	310,597	(1.2)
1992	224,810	58,359	283,169	42,027	1,690	326,886	5.2
1993	240,706	61,499	302,205	50,290	1,768	354,263	8.4
1994	249,819	70,914	320,733	36,580	899	358,212	1.1
1995	281,800	71,935	353,735	23,975	374	378,084	5.5
1996	297,015	75,164	372,179	23,615	659	396,453	4.9
1997	311,856	75,029	386,885	27,975	843	415,703	4.9
1998	346,073	74,622	420,695	26,409	597	447,701	7.7
1999	345,598	91,753	437,351	25,302	520	463,173	3.5
2000	340,982	121,628	462,610	27,604	354	490,568	5.9
2001	291,484	160,633	452,117	24,960	290	477,367	(2.7)
2002	277,829	161,736	439,565	22,509	181	462,255	(3.2)
2003	278,154	180,812	458,966	19,932	182	479,080	3.6
2004	274,535	227,742	502,277	18,601	220	521,098	8.8
2005	268,715	278,476	547,191	16,121	202	563,514	8.1
2006	271,072	316,401	587,473	15,596	177	603,246	7.1
2007	290,886	298,212	589,098	14,275	268	603,641	0.1
2008	276,828	287,789	564,617	13,427	244	578,288	(4.2)
2009	258,758	269,220	527,978	10,706	191	538,875	(6.8)
2010	253,021	267,112	520,133	11,596	254	531,983	(1.3)
2011	290,781	225,927	516,708	12,066	223	528,997	(0.6)
	Average annual percent increase (decrease)						
1990-2000	4.6%	8.3%	5.5%	(6.0%)	(15.0%)	4.4%	
2000-2005	(4.7)	18.3	3.5	(7.2)	(6.7)	3.1	
2005-2010	(1.2)	(0.9)	(1.0)	(6.3)	3.6	(1.1)	
2000-2010	(2.9)	8.3	1.2	(6.7)	(1.7)	0.9	
1990-2011	1.4	7.0	3.1	(5.8)	(8.4)	2.5	

Note: Sum of takeoffs and landings.

(a) Includes all-cargo carrier operations.
(b) Includes scheduled and for-hire service passenger and cargo service on aircraft with less than 60 seats.

Source: U.S. Department of Transportation, Air Traffic Activity System (ATADS), www.faa.gov, accessed June 2012.

Table 3-23
HISTORICAL AIRCRAFT OPERATIONS BY MONTH

	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2007	49,116	46,354	53,150	51,097	51,715	50,949	51,787	53,158	46,472	50,846	48,513	50,484	603,641
2008	48,845	46,864	50,986	50,209	50,931	50,696	53,142	52,126	40,484	45,423	42,942	45,640	578,288
2009	44,711	41,569	47,294	44,549	44,079	46,147	48,613	48,317	41,316	43,863	42,971	45,446	538,875
2010	43,842	40,325	45,411	43,253	44,167	45,911	48,000	46,778	41,570	44,162	42,582	45,982	531,983
2011	43,782	38,104	46,225	44,036	45,316	45,617	47,996	46,465	41,854	42,873	41,762	44,967	528,997
2012	42,647	40,738	45,212	43,210									
	Percent change												
2007-2008	(0.6%)	1.1%	(4.1%)	(1.7%)	(1.5%)	(0.5%)	2.6%	(1.9%)	(12.9%)	(10.7%)	(11.5%)	(9.6%)	(4.2%)
2008-2009	(8.5)	(11.3)	(7.2)	(11.3)	(13.5)	(9.0)	(8.5)	(7.3)	2.1	(3.4)	0.1	(0.4)	(6.8)
2009-2010	(1.9)	(3.0)	(4.0)	(2.9)	0.2	(0.5)	(1.3)	(3.2)	0.6	0.7	(0.9)	1.2	(1.3)
2010-2011	(0.1)	(5.5)	1.8	1.8	2.6	(0.6)	(0.0)	(0.7)	0.7	(2.9)	(1.9)	(2.2)	(0.6)
2011-2012	(2.6)	6.9	(2.2)	(1.9)									
	Percent of total												
2007	8.1%	7.7%	8.8%	8.5%	8.6%	8.4%	8.6%	8.8%	7.7%	8.4%	8.0%	8.4%	100.0%
2008	8.4	8.1	8.8	8.7	8.8	8.8	9.2	9.0	7.0	7.9	7.4	7.9	100.0
2009	8.3	7.7	8.8	8.3	8.2	8.6	9.0	9.0	7.7	8.1	8.0	8.4	100.0
2010	8.2	7.6	8.5	8.1	8.3	8.6	9.0	8.8	7.8	8.3	8.0	8.6	100.0
2011	8.1	7.7	8.8	8.5	8.6	8.4	8.6	8.8	7.7	8.4	8.0	8.4	100.0
5-year average	8.3	7.7	8.7	8.4	8.5	8.6	9.0	8.9	7.6	8.2	7.9	8.4	100.0

Note: Data include passenger and cargo airline, general aviation, military, and air taxi operations.
The 5-year average is for 2007 through 2011.

Source: Federal Aviation Administration, Air Traffic Activity Data System (ATADS), online database, accessed June 2012.

3.6 AVIATION DEMAND FORECASTS

This section summarizes the forecasts of enplaned passengers, air cargo, and total aircraft operations for the Airport, including the forecast approach, methodology, and assumptions. As noted earlier, the baseline forecasts presented in this report are "unconstrained" and, therefore, do not include specific assumptions about physical, regulatory, environmental or other impediments to aviation activity growth. Although annual forecasts were prepared, four future demand years are presented in this report to summarize the forecasts, including forecasts for 2016, 2021, 2026, and 2035. In addition, aviation activity for 2012 is forecast based on year to date activity (January through March 2012) and advance published airline schedules through October 2012 available when this report was prepared. The base year for the forecasts is 2011.

As noted, this section covers the baseline forecasts, which were used subsequently in the facility requirements analysis. Appendix A, *Alternate Forecast Scenarios,* includes a summary of aviation demand forecasts representing higher and lower growth projections to inform the master planning process.

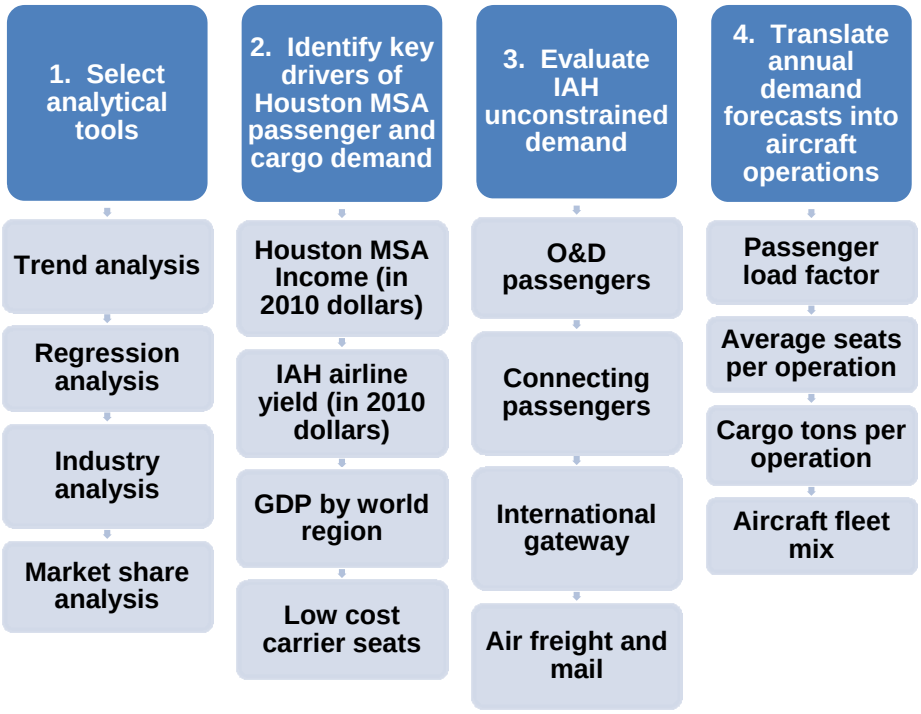
3.6.1 Enplaned Passengers

The key elements considered in the preparation of passenger forecasts for the Airport included (1) regional passenger trends for the two Houston commercial airports, (2) the Airport's share of the Houston MSA's domestic and international passengers, (3) the role of the Airport as an international gateway, (4) the role of the Airport as a primary domestic connecting hub, and (5) the key factors affecting future passenger traffic such as national and global economic conditions, oil price volatility, and airline industry trends.

3.6.1.1 Forecast Approach and Methodology

As shown in Figure 3-18, the forecast approach incorporated a multi-tiered approach to evaluate passenger traffic in the Houston MSA. It was recognized that no one approach would provide input on all of the key factors that affect the multi-airport Houston region. For example, an econometric analysis would provide input on the relationships between historical domestic and international passengers and regional economic conditions but little to no input on such factors as (1) the role of individual markets in airline scheduling and service decisions, (2) recent trends in the airline industry that have affected an airline's decisions in route planning and aircraft acquisition, and (3) the effect of low-cost carrier service on passenger traffic. Input from these factors is important to the development of reliable forecasts that can serve as the basis for planning efforts at the Airport.

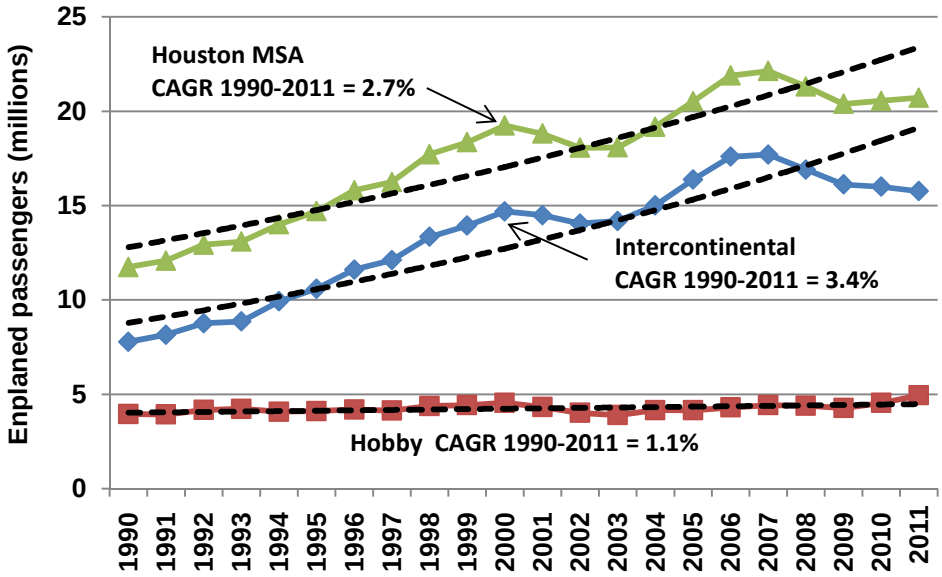
Figure 3-18
UNCONSTRAINED FORECAST APPROACH
Houston MSA Passenger Demand



3.6.1.2 Historical Trend Analysis

Trend analysis is used in aviation forecasting to examine changes in traffic characteristics or underlying factors over time. Simple mathematical techniques such as linear and exponential trends are used to represent changes in the historical data. The calculation of compound average annual growth rates is an example of trend analysis and is frequently used in aviation forecasting to benchmark future growth against historical trends. As shown on Figure 3-19, the compound average annual growth rate for domestic enplaned passengers in the Houston MSA is 2.7% between 1990 and 2011, including faster growth between 1990 and 2000 (an average of 5.1% per year) and slower growth between 2000 and 2011 (an average of 0.7% per year). Slower growth in domestic enplaned passengers since 2000 is related to the effects of two economic recessions, increasing fuel prices, and airline reductions in systemwide capacity. Figure 3-19 also illustrates that most of the growth in the number of domestic passengers in the Houston MSA has been driven by the continued development of domestic service at Intercontinental.

Figure 3-19
HISTORICAL TREND ANALYSIS – DOMESTIC ENPLANED PASSENGERS
Houston MSA



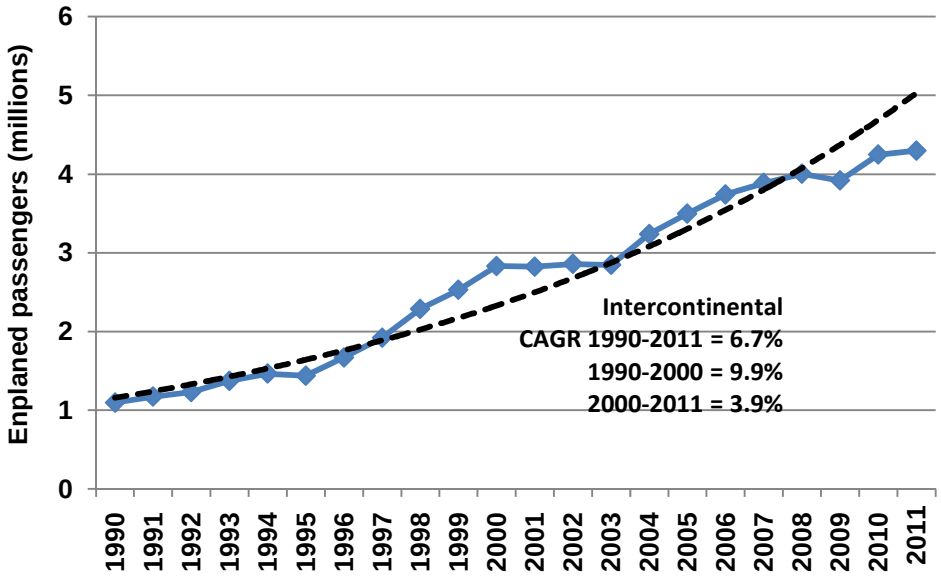
CAGR = Compound average annual growth rate

Source: Houston Airport System records.

Similarly, as shown on Figure 3-20, the compound average annual growth rate for international passengers in the Houston MSA (accommodated entirely at Intercontinental) is 6.7% per year between 1990 and 2011, including faster growth between 1990 and 2000 (an average of 9.9% per year) and slower growth between 2000 and 2011 (an average of 3.9% per year). International scheduled seats increased an average of 3.7% per year between 2000 and 2011, with United Airlines accounting for most of the growth in capacity.

Although trend analysis can be a valuable benchmarking tool, this technique does not model causal relationships, relies on the assumption that historical trends will continue into the future, and is unable to reflect changes in the underlying causal factors such as economic conditions or fuel prices. As a result, regression analysis was used as the primary basis for forecasting passenger demand at Intercontinental with the trend analysis informing the regression results.

Figure 3-20
HISTORICAL TREND ANALYSIS – INTERNATIONAL PASSENGERS
Houston MSA



CAGR = Compound average annual growth rate

Source: Houston Airport System records.

3.6.1.3 Regression Analysis

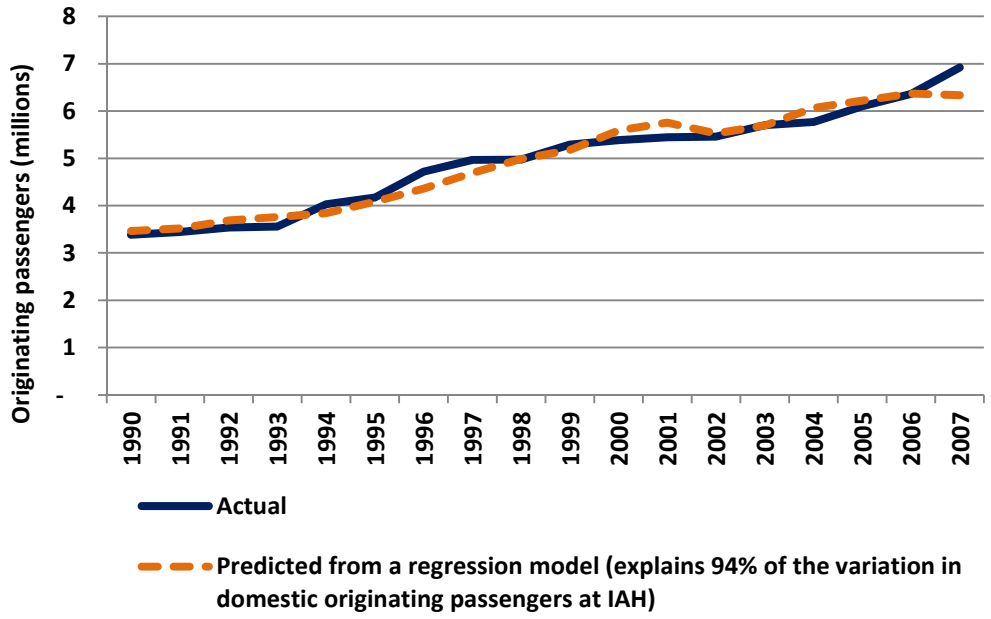
In regression analysis, a mathematical equation defines causal relationships between aviation activity and socioeconomic, airline travel cost, service, and other factors. This analytical tool typically requires independent forecasts of causal factors to produce aviation forecasts. To prepare passenger forecasts for Intercontinental, regressions analyses of domestic originating and international passenger activity were conducted.

Domestic Originating Passengers. The trend in domestic originating passengers can be explained by a regression analysis relating passenger trends to economic and airline industry metrics. Typically, a passenger regression model includes an income variable (e.g., total personal income, per capita income, or GDP—all expressed in constant dollars) and a cost of travel variable (e.g., yield or airfare—also expressed in constant dollars). The primary objective is to represent the two key variables that affect air travel demand, i.e., how much people have to spend and how much it costs to travel. Other variables may be important as well, depending on the traffic market characteristics.

As shown in Figure 3-21, the historical trend in domestic originating passengers relates strongly to the predicted values from a regression model based on annual data which includes total personal income in the Houston MSA, in 2010 dollars, and the number of low cost carrier seats at Intercontinental. The number of low cost carrier seats was used as a proxy for the cost of travel because airline yield was not significant in explaining the historical variation in domestic originating passengers at Intercontinental. The number of low cost carrier seats at IAH was considered an appropriate proxy for the cost of travel because increased low cost carrier competition at an airport has a downward influence on the cost of travel. That is, average

airfares typically decrease with the addition of low cost carrier service and stimulate additional passenger traffic at an airport. The forecasts of domestic originating passengers at Intercontinental were based on projections of total personal income in the Houston MSA, presented in Table 3-3 in Section 2, and the assumption that low cost carrier service would continue to be provided primarily at Hobby; therefore, low cost carrier seats at IAH would remain relatively unchanged during the forecast period.*

Figure 3-21
HISTORICAL AND PREDICTED DOMESTIC ORIGINATING PASSENGERS



Sources: Actual—U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic,* online database, accessed December 2011.
Predicted—LeighFisher, January 2012.

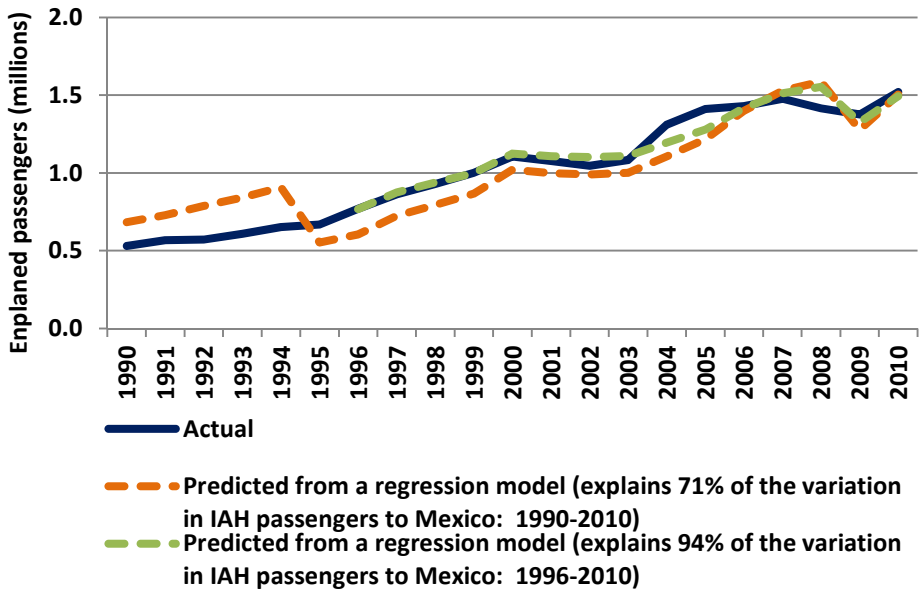
International Passengers. The trend in international passengers can also be explained by a regression analysis relating passenger trends to economic and airline industry metrics. The most effective models were those relating Intercontinental's international passengers by world region to the Gross Domestic Product (GDP) of that region. Data for the cost of international travel such as airline yield or airfares are not available but, together with GDP, would likely be significant in explaining the trends in international passengers. The forecasts of IAH international passengers by world region were based on projections of GDP by world region, presented in Table 3-7, and were benchmarked to industry forecasts of international passenger traffic by world region prepared by Airbus, The Boeing Corporation, and International Air Transport Association (IATA).

- **Mexico.** As shown in Figure 3-22, the historical trend in IAH passengers to Mexico relates strongly to the predicted values from regression models based on annual data for Mexico GDP, in 2010 dollars. Although a model based on a 21-year period (1990 through 2010) would be preferable, a

*Low cost carriers include AirTran, Allegiant, Frontier, JetBlue, Southwest, Spirit, and Virgin America.

model based on data for 1996 through 2010 explained more of the variation in passengers and produced a reasonable estimate of GDP elasticity.

Figure 3-22
HISTORICAL AND PREDICTED IAH PASSENGERS TO MEXICO

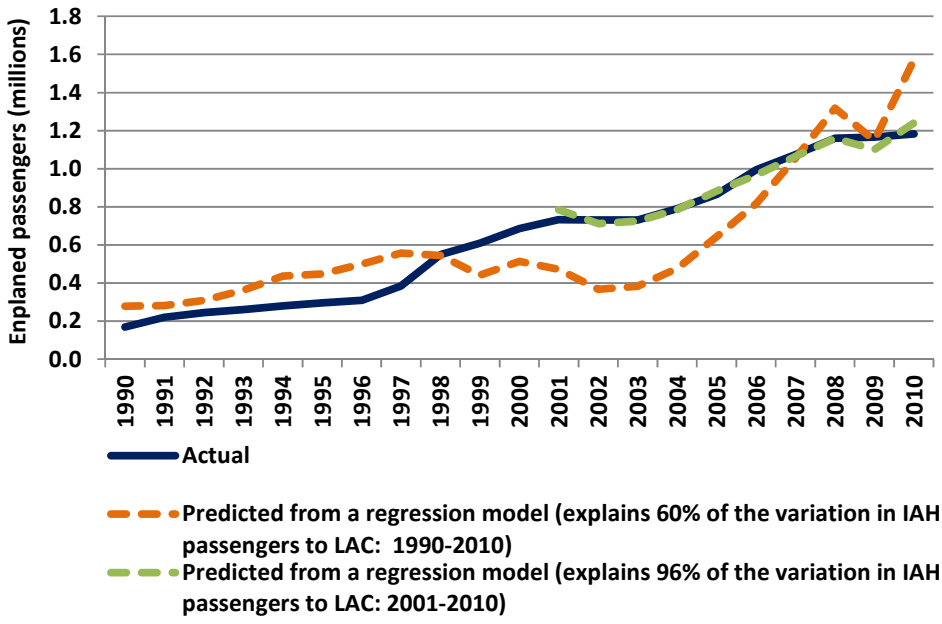


Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

- **Latin America/Caribbean (LAC).** As shown in Figure 3-23, the historical trend in IAH passengers to LAC relates strongly to the predicted values from regression models based on annual data for LAC GDP, in 2010 dollars. Although the 21-year model (1990 through 2010) explained less of the variation in LAC passengers than a model based on data for 2001 through 2010, the 21-year model produced a more reasonable estimate of GDP elasticity and was used as a basis for the forecasts of LAC passengers.

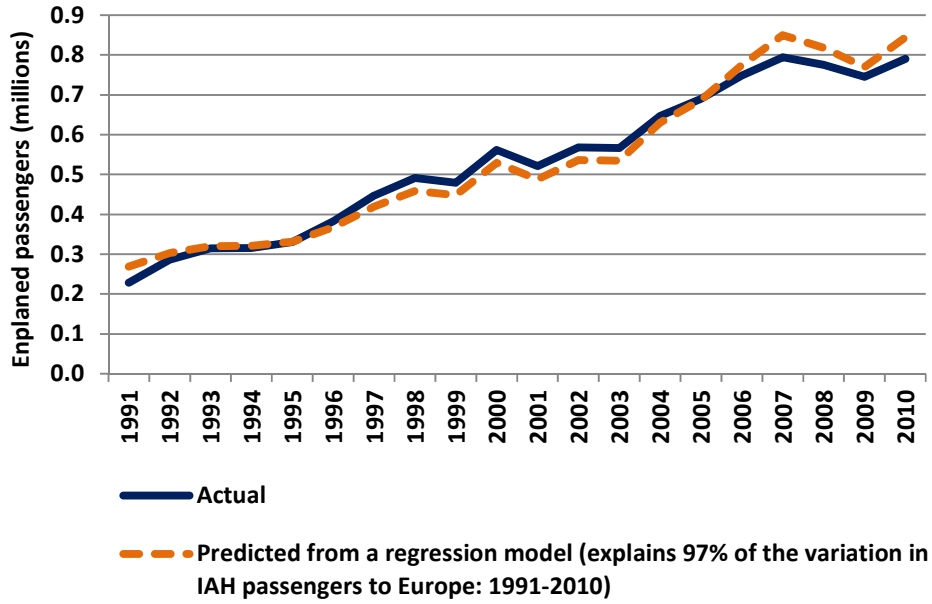
- **Europe.** As shown in Figure 3-24, the historical trend in IAH passengers to Europe relates strongly to the predicted values from regression models based on annual data for Euro Area GDP, in 2010 dollars. The 20-year year period from 1991 through 2010 produced a model that explained a significant share of the variation in passengers (97%) and produced a reasonable estimate of GDP elasticity.

Figure 3-23
HISTORICAL AND PREDICTED IAH PASSENGERS TO LATIN AMERICA/CARIBBEAN



Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

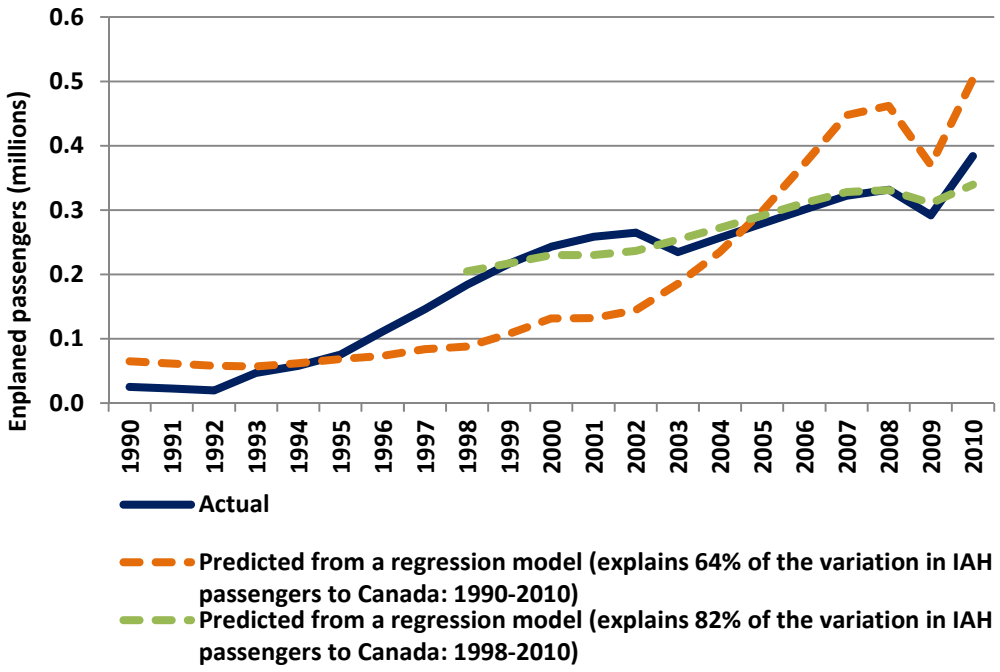
Figure 3-24
HISTORICAL AND PREDICTED IAH PASSENGERS TO EUROPE



Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

- **Canada.** As shown in Figure 3-25, the historical trend in IAH passengers to Canada relates strongly to the predicted values from regression models based on annual data for Canada GDP, in 2010 dollars. A model based on a 13-year period (1998 through 2010) explained more of the variation in passengers (82%) and produced a reasonable estimate of GDP elasticity.

Figure 3-25
HISTORICAL AND PREDICTED IAH PASSENGERS TO CANADA

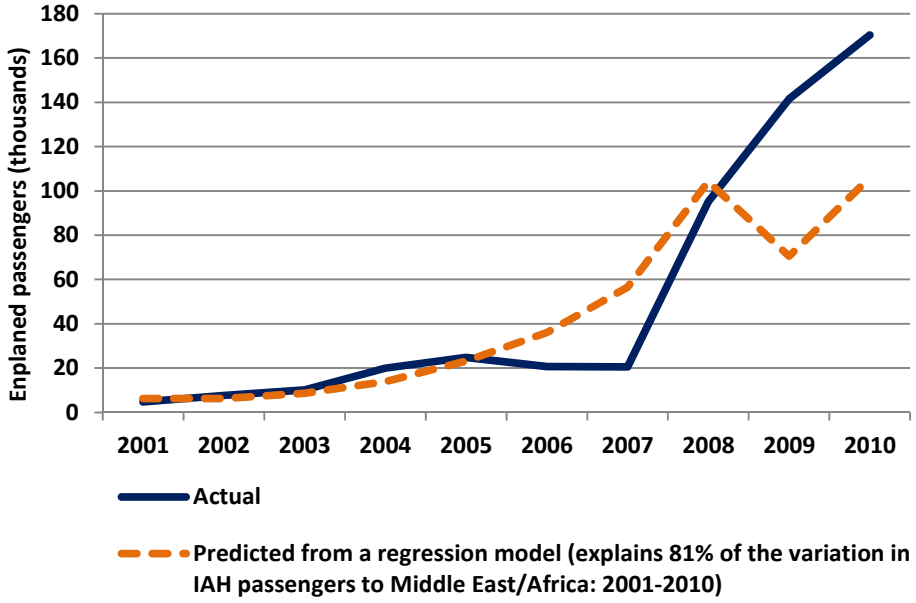


Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

- **Africa and Middle East.** As shown in Figure 3-26, the historical trend in IAH passengers to Africa and the Middle East relates strongly to the predicted values from regression models based on annual data for Africa and Middle East GDP, in 2010 dollars. A model based on a 10-year period (2001 through 2010—the longest period available) explained 81% of the variation in passengers and produced a reasonable estimate of GDP elasticity.

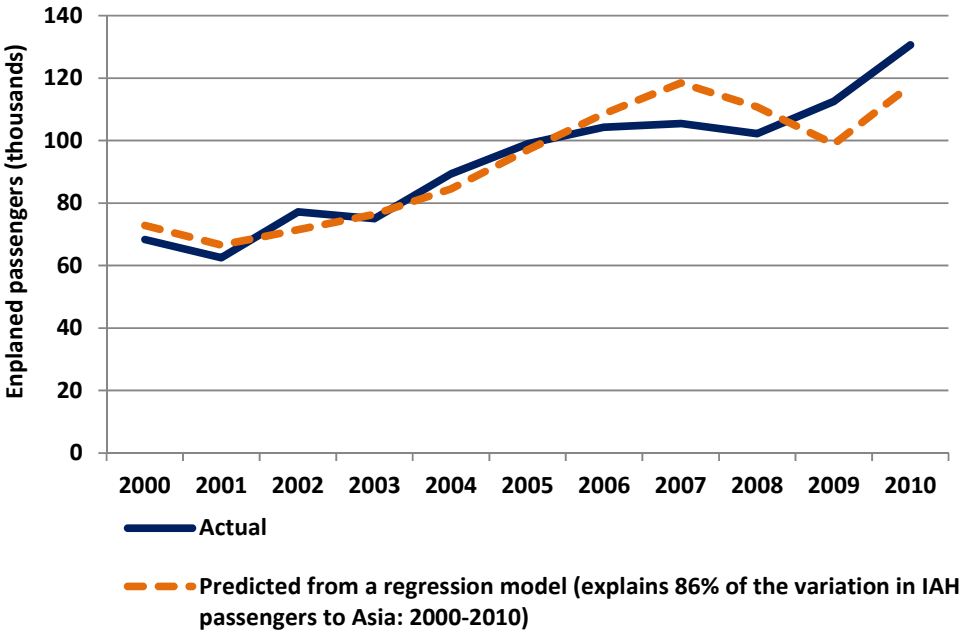
- **Asia.** As shown in Figure 3-27, the historical trend in IAH passengers to Asia relates strongly to the predicted values from regression models based on annual data for Asia GDP, in 2010 dollars. A model based on a 11-year period (2000 through 2010—the longest period available) explained 86% of the variation in passengers and produced a reasonable estimate of GDP elasticity.

Figure 3-26
HISTORICAL AND PREDICTED IAH PASSENGERS TO AFRICA/MIDDLE EAST



Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

Figure 3-27
HISTORICAL AND PREDICTED IAH PASSENGERS TO ASIA



Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

3.6.1.4 Industry Analysis

Industry trends, both past and present, were important in considering the reasonableness of the forecasts generated by the statistical analysis and evaluating the capacity of the airline industry to support the forecast passenger demand. For example, the current fleet mix and orders for new aircraft by airlines serving Intercontinental could affect the realization of the forecasts. Similarly, the potential for new entrant airlines and the development of additional low cost carrier service could accelerate growth beyond that forecast. Such factors are not reflected in the statistical analysis since many have not yet occurred.

3.6.1.5 Connecting Passengers

Connecting passenger traffic at Intercontinental reflects the Airport's role as a connecting hub for United Airlines and is affected by United's route network decisions. In 2010, approximately 55% of the Airport's revenue passengers were on-line connecting passengers; the remaining 45% were O&D passengers. Based on discussions with United Airlines, it is assumed that the number of connecting passengers will increase at rates similar to local passengers. As a result, the percent of connecting passengers is expected to remain relatively unchanged throughout the forecast period.

3.6.1.6 Enplaned Passenger Forecast Assumptions

Forecasts of enplaned passengers were developed taking into account analyses of the economic basis for airline traffic, analyses of historical airline traffic, and an assessment of the key factors that may affect future airline traffic, as discussed previously. In general, it was assumed that, in the long term, changes in airline traffic at the Airport will occur largely as a function of growth in the population and economy of the Airport service region and changes in airline service. It was also assumed that continued development of airline service at the Airport will not be constrained by the availability of aviation fuel, long-term limitations in airline fleet capacity, limitations in the capacity of the air traffic control system or the Airport, or government policies or actions that restrict growth. Also considered were recent and potential developments in the national economy and in the air transportation industry as they have affected or may affect airline traffic at the Airport.

For 2012 through 2035, it was assumed that:

- The U.S. economy will continue a gradual recovery from the economic recession and experience sustained GDP growth averaging between 2.0% and 2.5% per year, consistent with the historical trends and long-term growth projections (see Table 3-7 in Section 2).
- The economy of the Houston MSA (as measured by employment and per capita income) will increase at a rate comparable to that of the United States as a whole (see Table 3-7in Section 2).
- The economies of the world regions will experience sustained growth in GDP, (consistent with the historical trends and long-term growth projections (see Table 3-7in Section 2).
- IAH will continue to be the primary commercial service airport and international gateway for the Houston MSA. Development of international service and construction of a Federal Inspection Station at Hobby are assumed to have a small net effect on IAH passenger traffic based on a recent economic impact study.*

*GRA Incorporated and InterVISTAS Consulting LCC, The Economic Impact of International Commercial Air Service at William P. Hobby Airport, April 4, 2012.

- The Airport will continue to be a primary connecting hub and international gateway for United Airlines.
- A generally stable international political environment and safety and security precautions will ensure airline traveler confidence in aviation without imposing unreasonable inconveniences.
- There will be no major disruption of airline service or airline travel behavior as a result of international hostilities or terrorist acts or threats.
- Aviation fuel prices will stabilize at levels that are historically high, but lower than the record prices reached in mid-2008.
- Competition among the airlines serving the Airport will ensure the continued availability of competitive airfares.

3.6.1.5 Enplaned Passenger Forecasts

As shown in Table 3-24, Table 3-25, and Figure 3-28, the number of passengers at the Airport is forecast to increase from 20.05 million passengers in 2011 to 41.15 million in 2035, an average rate of 3.0% per year. The number of domestic passengers at the Airport is forecast to increase an average of 2.4% per year between 2011 and 2035, compared with an average increase of 4.9% in international passenger traffic.

3.6.2 Air Cargo

The key elements considered in the preparation of cargo forecasts for the Airport included (1) regional cargo trends in the Houston MSA, (2) the Airport's share of the Houston MSA's domestic and international cargo, (3) the role of the Airport as an international gateway, particularly for passenger airline belly capacity on international flights, and (4) the key factors affecting future cargo activity such as national and global economic conditions, oil price volatility, and airline industry trends.

3.6.2.1 Forecast Approach and Methodology

Similar to the forecast approach for passengers as shown previously in Figure 3-18, the methodology for preparing cargo forecasts incorporated a multi-tiered approach to evaluate cargo activity in the Houston MSA, as described in the following sections.

Table 3-24
ENPLANED PASSENGER FORECASTS BY SECTOR AND MARKET – BASELINE
2011-2035
in millions

	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Domestic	15.77	15.88	17.61	19.80	22.29	27.60	2.2%	2.4%	2.4%	2.4%	2.4%
International											
Mexico	1.49	1.51	1.94	2.48	3.15	4.62	5.5%	5.0%	4.9%	4.3%	4.8%
Latin America/Caribbean	1.30	1.33	1.85	2.60	3.56	5.84	7.3%	7.0%	6.5%	5.7%	6.5%
Europe	0.75	0.76	0.77	0.80	0.83	0.89	0.7%	0.8%	0.7%	0.7%	0.7%
Canada	0.41	0.41	0.47	0.53	0.60	0.75	2.8%	2.6%	2.4%	2.5%	2.6%
Middle East/Africa	0.21	0.22	0.30	0.43	0.59	1.03	7.3%	7.3%	6.8%	6.4%	6.8%
Asia	0.13	0.13	0.18	0.23	0.29	0.42	6.0%	5.3%	4.7%	4.3%	5.0%
International total	4.28	4.37	5.51	7.07	9.02	13.55	5.2%	5.1%	5.0%	4.6%	4.9%
Total Airport	20.05	20.25	23.12	26.88	31.31	41.15	2.9%	3.1%	3.1%	3.1%	3.0%
Percent domestic	78.6%	78.4%	76.2%	73.7%	71.2%	67.1%					
Percent International	21.4%	21.6%	23.8%	26.3%	28.8%	32.9%					
Revenue passengers											
Originating											
Domestic	6.83	6.92	7.71	8.71	9.84	12.26	2.5%	2.5%	2.5%	2.5%	2.5%
International	2.11	2.15	2.68	3.40	4.31	6.43	4.9%	4.9%	4.8%	4.5%	4.7%
Originating total	8.94	9.07	10.39	12.11	14.15	18.69	3.0%	3.1%	3.2%	3.1%	3.1%
Connecting											
Domestic	8.15	8.26	9.20	10.40	11.75	14.63	2.5%	2.5%	2.5%	2.5%	2.5%
International	2.07	2.11	2.73	3.56	4.61	7.01	5.7%	5.5%	5.3%	4.8%	5.2%
Connecting total	10.22	10.37	11.93	13.95	16.35	21.65	3.1%	3.2%	3.2%	3.2%	3.2%
Revenue passengers total	19.16	19.45	22.31	26.07	30.50	40.34	3.1%	3.2%	3.2%	3.2%	3.2%
Non-revenue passengers	0.89	0.81	0.81	0.81	0.81	0.81	(2.0%)	0.0%	0.0%	0.0%	(0.4%)
Total Airport	20.05	20.25	23.12	26.88	31.31	41.15	2.9%	3.1%	3.1%	3.1%	3.0%
Percent originating	46.7%	46.7%	46.5%	46.5%	46.4%	46.3%					
Percent connecting	53.3%	53.3%	53.5%	53.5%	53.6%	53.7%					

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Mainline includes charter passengers.
Sources: Historical: Houston Airport System records. Forecast: LeighFisher, June 2012.

Table 3-25
ENPLANED PASSENGER FORECASTS BY AIRLINE TYPE – BASELINE
2011-2035
in millions

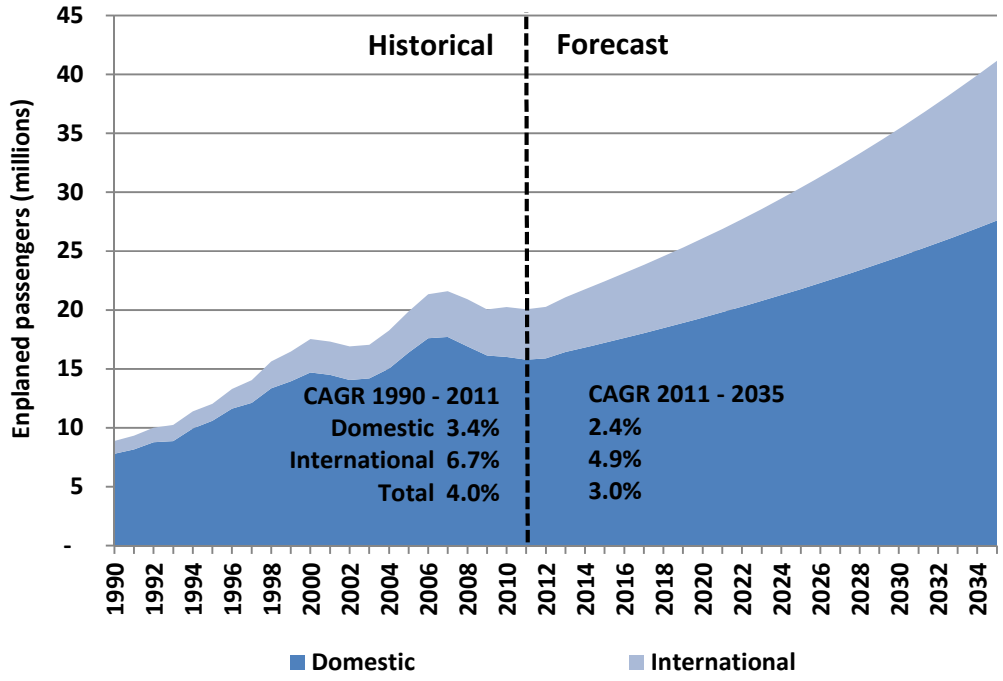
	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Domestic											
Mainline	10.87	10.65	11.81	13.28	14.94	18.50	1.7%	2.4%	2.4%	2.4%	2.2%
Regional affiliate	4.90	5.23	5.80	6.53	7.34	9.09	3.5%	2.4%	2.4%	2.4%	2.6%
Domestic total	15.77	15.88	17.61	19.80	22.29	27.60	2.2%	2.4%	2.4%	2.4%	2.4%
International											
Mainline	3.53	3.52	4.43	5.67	7.24	10.86	4.6%	5.1%	5.0%	4.6%	4.8%
Regional affiliate	0.77	0.86	1.09	1.40	1.79	2.69	7.2%	5.2%	5.0%	4.7%	5.4%
International total	4.30	4.37	5.51	7.07	9.02	13.55	5.1%	5.1%	5.0%	4.6%	4.9%
Total Airport	20.05	20.25	23.12	26.88	31.31	41.15	2.9%	3.1%	3.1%	3.1%	3.0%
Percent mainline	71.8%	69.9%	70.2%	70.5%	70.8%	71.4%					
Percent regional affiliate	28.2%	30.1%	29.8%	29.5%	29.2%	28.6%					

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Mainline includes charter passengers.

Sources: Historical: Houston Airport System records. Forecast: LeighFisher, June 2012

Figure 3-28
HISTORICAL AND FORECAST ENPLANED PASSENGERS



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

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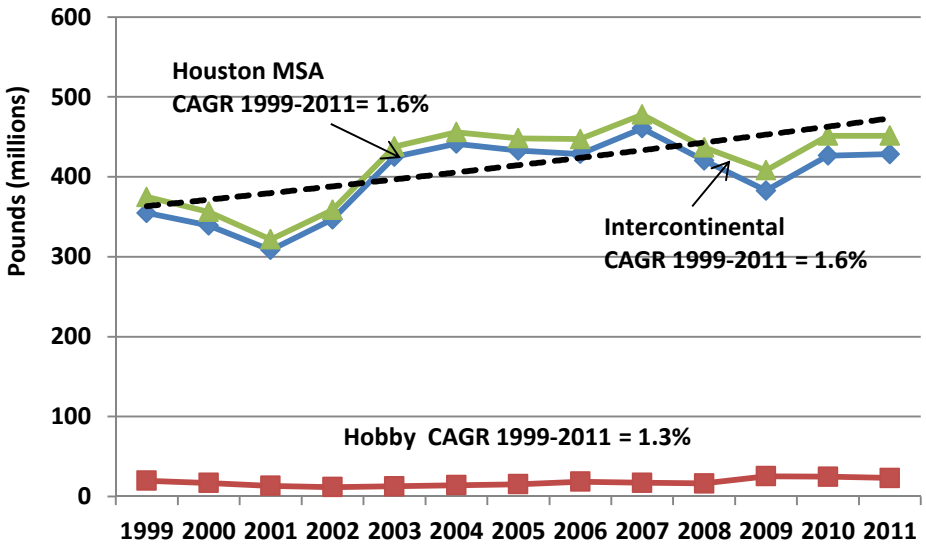
3.6.2.2 Historical Trend Analysis

As shown on Figure 3-29, domestic air freight in the Houston MSA increased an average of 1.6% between 1999 and 2011, including decreases related to the economic recessions in 2001 and 2008-2009. Similar to the trends in domestic passengers, Figure 3-29 also illustrates that most of the growth in domestic air freight in the Houston MSA has been driven by air cargo increases at IAH. In 2011, IAH accounted for 95% of domestic air cargo in the Houston MSA.

Figure 3-29
HISTORICAL TREND ANALYSIS – DOMESTIC AIR FREIGHT
Houston MSA

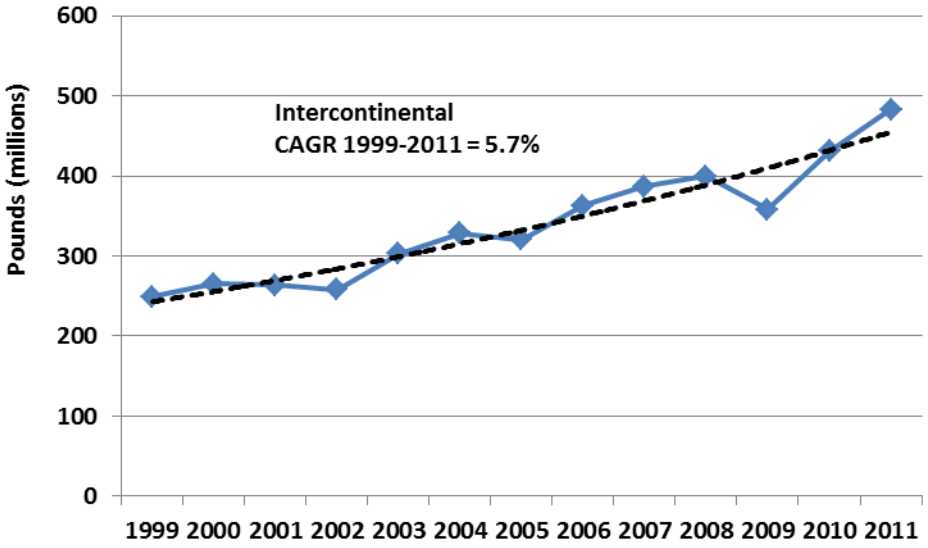


Notes: CAGR = Compound average annual growth rate
Includes enplaned and deplaned freight and mail at Hobby only.

Source: Houston Airport System records.

Similarly, as shown on Figure 3-30, the compound average annual growth rate for international air freight in the Houston MSA (accommodated entirely at IAH) is 5.7%per year between 1999 and 2011, consistent with the growth in international passenger traffic during this period.

Figure 3-30
HISTORICAL TREND ANALYSIS – INTERNATIONAL AIR FREIGHT
Houston MSA



Notes: CAGR = Compound average annual growth rate
Includes enplaned and deplaned freight and mail.

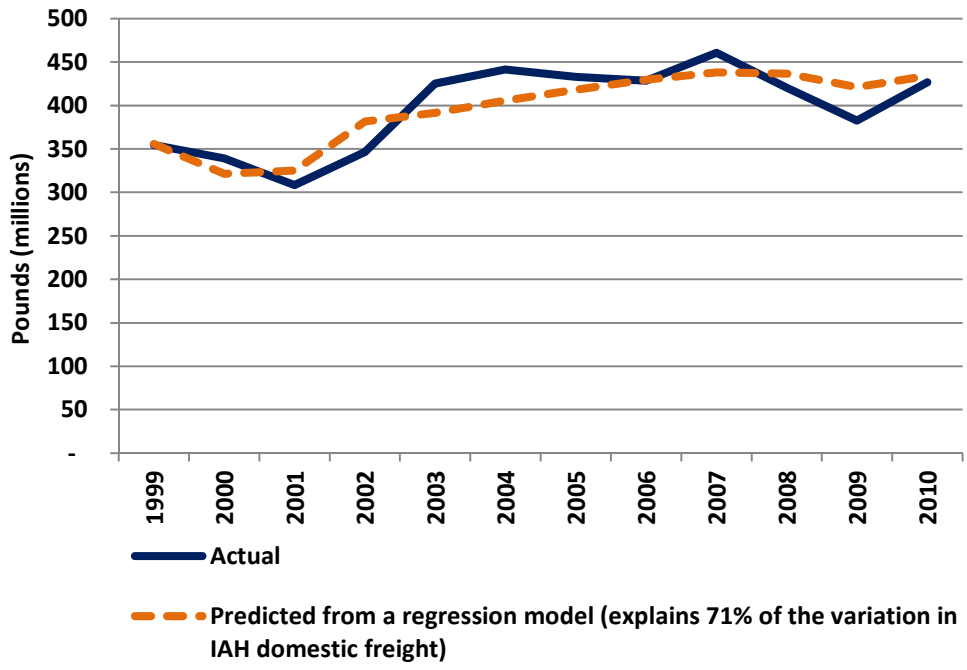
Source: Houston Airport System records.

3.6.2.3 Regression Analysis

To prepare air cargo forecasts for Intercontinental, regressions analyses of domestic and international air freight were conducted. Regression analyses of air mail were not conducted because of the small volume of mail relative to freight and the volatility in air mail volume historically, reflecting year-to-year changes in contracts with the U.S. Postal Service.

Domestic Air Freight. The trend in domestic air freight can be explained by a regression analysis relating cargo trends to economic and airline industry metrics. As shown in Figure 3-31, the historical trend in domestic air cargo relates strongly to the predicted values from a regression model based on annual data which includes U.S. GDP, in 2005 dollars. The forecasts of domestic air cargo at Intercontinental were based on projections of U.S. GDP, presented in Table 3-7 in Section 3.2.

Figure 3-31
HISTORICAL AND PREDICTED DOMESTIC AIR FREIGHT



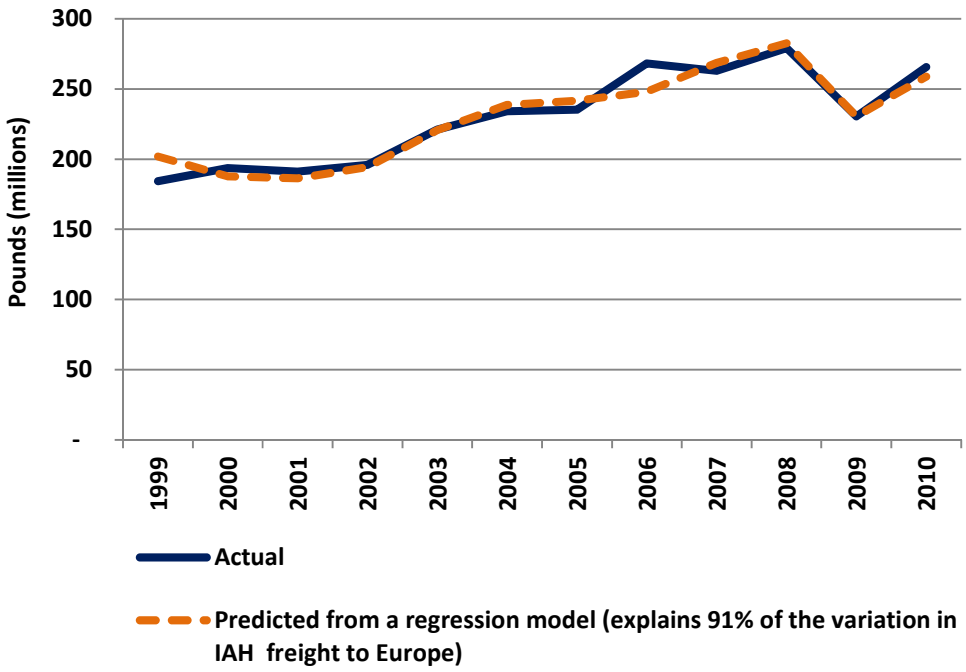
Sources: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

International Air Freight. Similar to international passengers, the most effective models were those relating Intercontinental's international air freight by world region to the GDP of that region. The forecasts of IAH international air freight by world region were based on projections of GDP by world region, presented in Table 3-7 in Section 2, and were benchmarked to industry forecasts of international air cargo traffic by world region prepared by Airbus, The Boeing Corporation, and IATA.

- **Europe.** As shown in Figure 3-32, the historical trend in IAH freight to Europe relates strongly to the predicted values from regression models based on annual data for Euro Area* GDP, in 2000 dollars. The 12-year year period from 1999 through 2010 produced a model that explained a significant share of the variation in freight (91%) and produced a reasonable estimate of GDP elasticity.

*Euro area is composed of 17 countries: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovak Republic, Slovenia, and Spain.

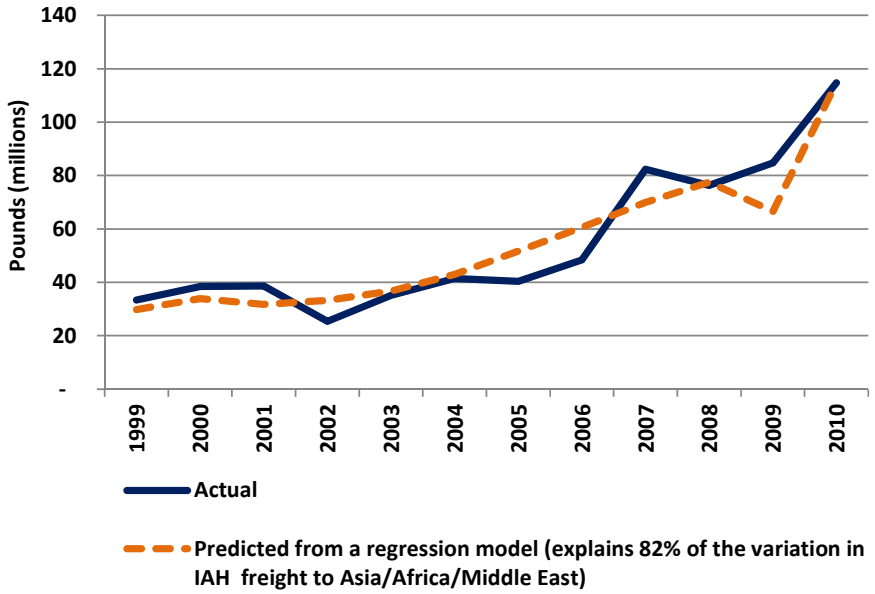
Figure 3-32
HISTORICAL AND PREDICTED IAH FREIGHT TO EUROPE



Sources: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

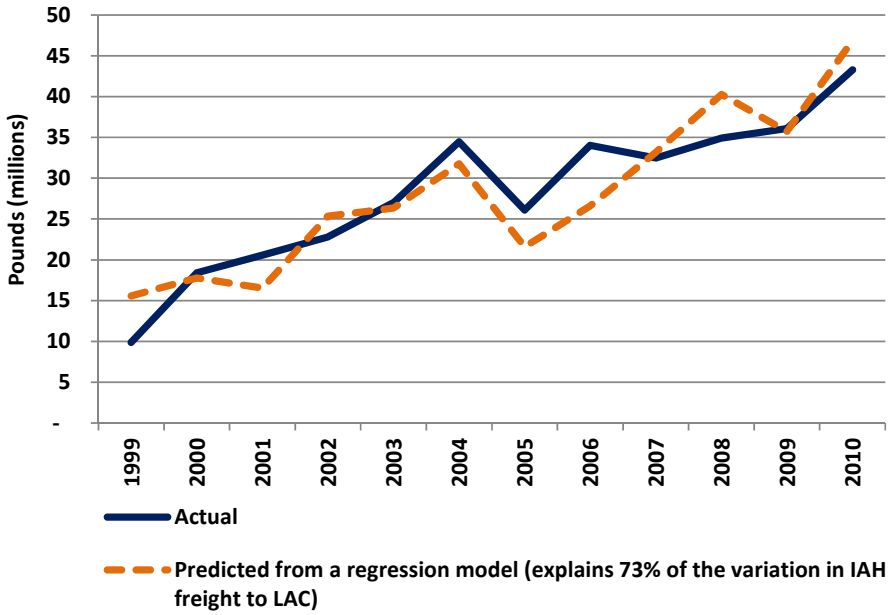
- **Asia/Africa/Middle East.** As shown in Figure 3-33, the historical trend in IAH freight to Asia, Africa, and the Middle East relates strongly to the predicted values from regression models based on annual data for the GDP, in 2000 dollars, of the combined region. The 12-year year period from 1999 through 2010 produced a model that explained a significant share of the variation in freight (82%) and produced a reasonable estimate of GDP elasticity.
- **Latin America/Caribbean (LAC).** As shown in Figure 3-34, the historical trend in IAH freight to LAC relates strongly to the predicted values from regression models based on annual data for LAC GDP, in 2000 dollars. The 12-year year period from 1999 through 2010 produced a model that explained a significant share of the variation in freight (73%) and produced a reasonable estimate of GDP elasticity.

Figure 3-33
HISTORICAL AND PREDICTED IAH FREIGHT TO ASIA/AFRICA/MIDDLE EAST



Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

Figure 3-34
HISTORICAL AND PREDICTED IAH FREIGHT TO LATIN AMERICA/CARIBBEAN

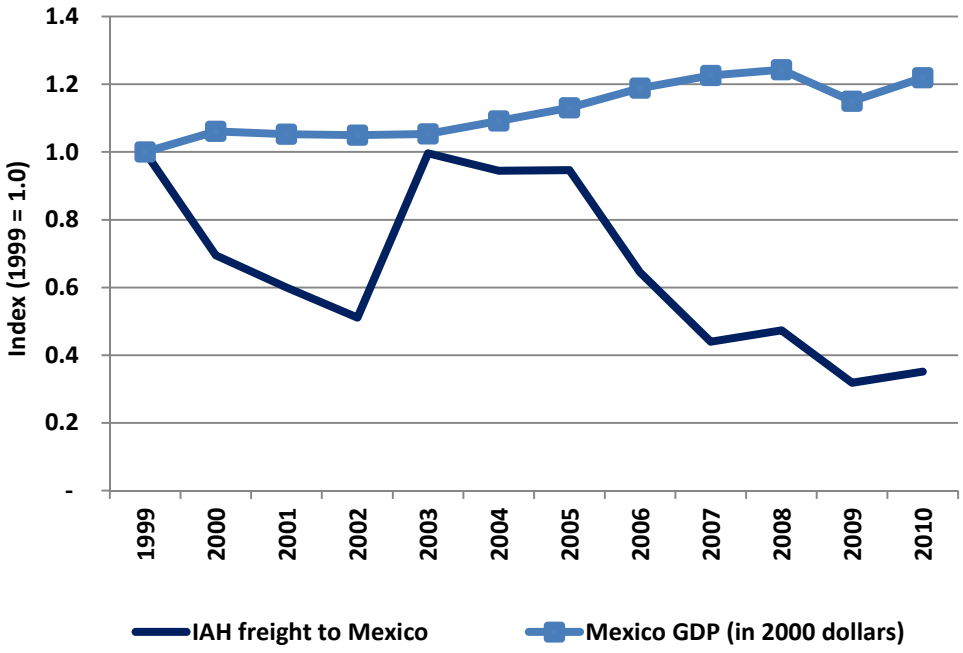


Source: Actual—Houston Airport System records.
Predicted—LeighFisher, January 2012.

- **Mexico.** As shown in Figure 3-35, the historical trend in IAH freight to Mexico has diverged from the increasing trend in Mexico GDP since 1999. IAH freight to Mexico decreased an average of 9.1% per year between 1999 and 2010, notwithstanding an increase in 2003. As a result, it is not possible to define a regression model that relates a declining trend in IAH freight to Mexico to a meaningful economic variable.

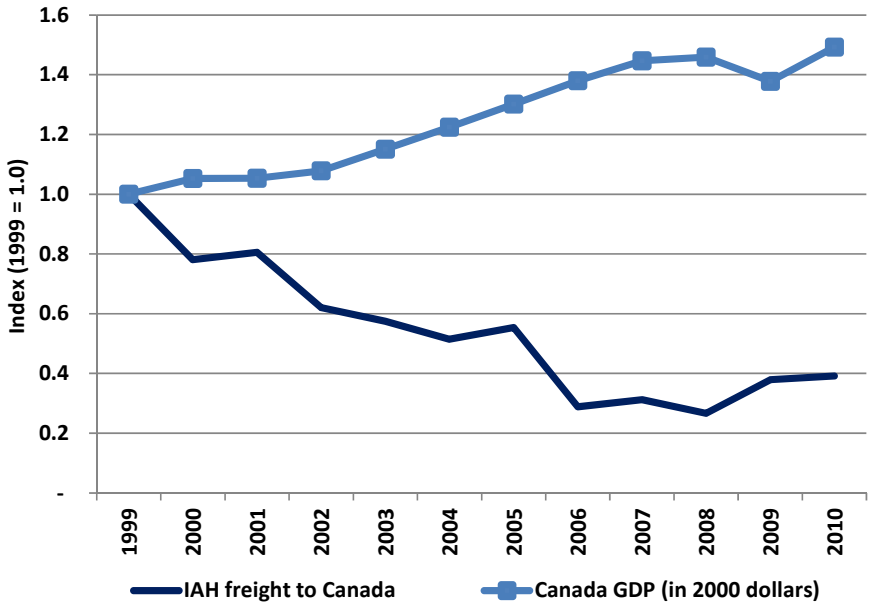
- **Canada.** Similar to the trends in Mexico air freight, IAH freight to Canada has declined since 1999, as shown in Figure 3-36. IAH freight to Canada decreased an average of 8.2% per year between 1999 and 2010.

Figure 3-35
IAH FREIGHT TO MEXICO



Sources: Houston Airport System records and International Monetary Fund, *World Economic Outlook* database, www.imf.org, accessed January 2012.

Figure 3-36
IAH FREIGHT TO CANADA



Sources: Houston Airport System records and International Monetary Fund, *World Economic Outlook* database, www.imf.org, accessed January 2012.

3.6.2.4 Industry Analysis

Industry trends, both past and present, were important in considering the reasonableness of the forecasts generated by the statistical analysis and evaluating the capacity of the airline industry to support the forecast air freight demand. In recent years, the cargo industry has been adversely affected by increased fuel prices, the world economic recession, and competition from other transportation modes. Although these factors have already had an impact on the cargo industry, the potential for continued adjustments are not reflected in the statistical analysis.

3.6.2.5 Air Cargo Forecasts

As shown in Table 3-26, Table 3-27, and Figure 3-37, total air cargo at the Airport is forecast to increase from 985.5 million pounds in 2011 to 1,924.1 million pounds in 2035, an average rate of 2.8% per year. Domestic air cargo at the Airport is forecast to increase an average of 2.5% per year between 2011 and 2035, compared with an average increase of 3.3% in international air cargo.

Table 3-26
AIR CARGO FORECASTS BY SECTOR AND MARKET – BASELINE
2011-2035
in millions of pounds

	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Freight											
Domestic	428.3	435.5	488.6	554.2	628.4	782.2	2.7%	2.6%	2.5%	2.5%	2.5%
International											
Europe	293.4	294.0	308.4	325.9	343.2	375.0	1.0%	1.1	1.0	1.0%	1.0%
Asia/Africa/Middle East	139.6	148.0	189.4	249.4	322.1	490.1	6.3	5.7	5.3	4.8	5.4
Latin America/ Caribbean	42.8	45.0	58.2	78.6	104.6	171.5	6.3	6.2	5.9	5.6	6.0
Mexico	5.7	5.7	6.3	6.9	7.6	8.9	2.0	1.9	1.9	1.8	1.9
Canada	1.3	1.3	1.4	1.5	1.6	1.9	1.9	1.8	1.6	1.7	1.7
International total	482.8	494.1	563.6	662.3	779.2	1,047.5	3.1	3.3	3.3	3.3	3.3
Freight total	911.1	929.6	1,052.3	1,216.5	1,407.6	1,829.7	2.9%	2.9%	3.0%	3.0%	2.9%
Mail											
Domestic	67.4	68.1	70.9	74.5	78.3	85.6	1.0%	1.0%	1.0%	1.0%	1.0%
International	6.9	7.0	7.3	7.6	8.0	8.8	1.0	1.0	1.0	1.0	1.0
Mail total	74.4	75.1	78.2	82.1	86.3	94.4	1.0%	1.0%	1.0%	1.0%	1.0%
Total cargo (freight and mail)											
Domestic	495.8	503.6	559.5	628.7	706.7	867.9	2.4%	2.4%	2.4%	2.3%	2.4%
International	489.7	501.1	570.9	669.9	787.2	1,056.2	3.1	3.2	3.3	3.3	3.3
Total Airport	985.5	1,004.7	1,130.4	1,298.6	1,493.9	1,924.1	2.8%	2.8%	2.8%	2.9%	2.8%
Percent domestic	35.1%	35.0%	34.6%	33.9%	33.3%	32.1%					
Percent international	64.9%	65.0%	65.4%	66.1%	66.7%	67.9%					

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Total cargo is the sum of enplaned and deplaned freight and mail.

Sources: Historical: Houston Airport System records. Forecast: LeighFisher, June 2012.

Table 3-27
AIR CARGO FORECASTS BY AIRLINE TYPE – BASELINE
2011-2035
in millions of pounds

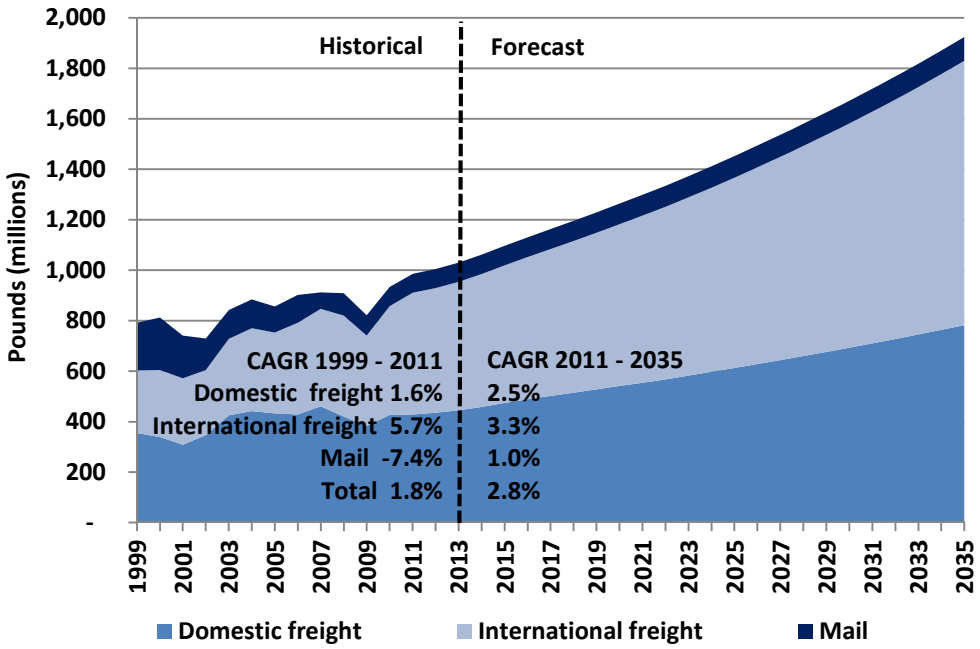
	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Freight											
Passenger airlines											
Domestic	72.4	74.0	83.1	94.2	106.8	133.0	2.8%	2.6%	2.5%	2.5%	2.6%
International	336.6	350.8	400.2	470.2	553.2	743.7	3.5%	3.3%	3.3%	3.3%	3.4%
Passenger—total	408.9	424.8	483.3	564.4	660.0	876.7	3.4%	3.2%	3.2%	3.2%	3.2%
All-cargo airlines											
Domestic	356.0	361.5	405.6	460.0	521.6	649.3	2.6%	2.6%	2.5%	2.5%	2.5%
International	146.2	143.3	163.5	192.1	226.0	303.8	2.3%	3.3%	3.3%	3.3%	3.1%
All-cargo—total	502.2	504.7	569.0	652.1	747.5	953.0	2.5%	2.8%	2.8%	2.7%	2.7%
Total freight											
Domestic	428.3	435.5	488.6	554.2	628.4	782.2	2.7%	2.6%	2.5%	2.5%	2.5%
International	482.8	494.1	563.6	662.3	779.2	1,047.5	3.1%	3.3%	3.3%	3.3%	3.3%
Freight total	911.1	929.6	1,052.3	1,216.5	1,407.6	1,829.7	2.9%	2.9%	3.0%	3.0%	2.9%
Mail											
Passenger airlines											
Domestic	64.3	65.0	67.6	71.0	74.7	81.7	1.0%	1.0%	1.0%	1.0%	1.0%
International	6.9	7.0	7.3	7.6	8.0	8.8	1.0%	1.0%	1.0%	1.0%	1.0%
Passenger—total	71.2	71.9	74.9	78.7	82.7	90.4	1.0%	1.0%	1.0%	1.0%	1.0%
All-cargo airlines											
Domestic	3.1	3.2	3.3	3.5	3.6	4.0	1.0%	1.0%	1.0%	1.0%	1.0%
Total mail											
Domestic	67.4	68.1	70.9	74.5	78.3	85.6	1.0%	1.0%	1.0%	1.0%	1.0%
International	6.9	7.0	7.3	7.6	8.0	8.8	1.0%	1.0%	1.0%	1.0%	1.0%
Mail total	74.4	75.1	78.2	82.1	86.3	94.4	1.0%	1.0%	1.0%	1.0%	1.0%
Total cargo (freight and mail)											
Passenger airlines	480.1	496.8	558.1	643.1	742.7	967.1	3.1%	2.9%	2.9%	3.0%	3.0%
All-cargo airlines	505.4	507.9	572.3	655.5	751.2	957.0	2.5%	2.8%	2.8%	2.7%	2.7%
	985.5	1,004.7	1,130.4	1,298.6	1,493.9	1,924.1	2.8%	2.8%	2.8%	2.9%	2.8%
Percent passenger airlines	48.7%	49.4%	49.4%	49.5%	49.7%	50.3%					
Percent all-cargo airlines	51.3%	50.6%	50.6%	50.5%	50.3%	49.7%					

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Total cargo is the sum of enplaned and deplaned freight and mail.

Sources: Historical: Houston Airport System records. Forecast: LeighFisher, June 2012.

Figure 3-37
HISTORICAL AND FORECAST AIR CARGO



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

3.6.3 Aircraft Operations

This section summarizes the forecasts of total aircraft operations, including passenger airline, all-cargo airline, general aviation, and military operations.

3.6.3.1 Forecast Approach and Methodology

The forecasts of total aircraft operations are derived from the forecasts of passenger and cargo demand described previously and an evaluation of general aviation and military operations. In particular:

- The forecasts of passenger airline aircraft departures are based on the enplaned passenger forecasts and assumptions regarding average aircraft size and enplaned passenger load factor.
- The forecasts of all-cargo airline aircraft departures are based on the air cargo forecasts and assumptions regarding average cargo tonnage per operation and type of all-cargo service (integrated carrier or regional feeder).

- The forecasts of general aviation aircraft operations are based on historical trends, the number of aircraft based at the Airport, the average daily utilization of those aircraft, assumptions regarding aircraft utilization in the future, and industry forecasts of general aviation activity such as those prepared by the FAA.

- The forecasts of military aircraft operations are based on data for the base year of the forecasts and carried forward through the forecast period. Military operations typically increase and decrease with geopolitical trends and therefore this activity may vary in a given year.

3.6.3.2 Forecast Assumptions

Table 3-28 presents the forecast assumptions for passenger and cargo airline aircraft operations, including assumptions for the average enplaned passenger load factor, the average number of seats per departure, and average freight per operation.

3.6.3.3 Passenger Airline Aircraft Operations Forecasts

Passenger aircraft operations include total departures and arrivals performed by mainline and regional affiliate aircraft in the service of transporting passengers, as shown in Table 3-29. Passenger airline aircraft operations were calculated by dividing the enplaned passenger forecasts by sector (e.g., domestic and international) and category (e.g., mainline and regional affiliate carrier) by the estimated number of passengers enplaned per departure. In 2011, the average number of passengers enplaned per departure for the Airport as a whole was 83.9 and is derived by multiplying the load factor by the average seats per departure (e.g., 82.9% x 101.3 = 83.9). This number is expected to increase slowly over the forecast period based on an estimated increase in the average number of seats per aircraft and an estimated load factor, or percent of available seats filled with passengers. The average number of passengers enplaned per departure is expected to reach 103.2 in 2035. Dividing the enplaned passenger forecasts by the forecast number of passengers enplaned per departure yields passenger airline aircraft departures. The forecast departures were then multiplied by two to yield passenger airline aircraft operations for each category of activity.

Passenger airline aircraft operations at Intercontinental are forecast to increase from 497,400 in 2011 to 797,500 operations in 2035, an average increase of 2.0% per year, reflecting an average increase of 2.2% per year in air carrier operations and an average increase of 1.7% per year in air taxi operations, as shown in Table 3-29.

Table 3-28
ASSUMPTIONS FOR AIRCRAFT OPERATIONS FORECASTS – BASELINE
2011-2035

	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Enplaned passengers per departure											
Domestic											
Mainline	132.4	129.6	129.6	130.2	130.8	131.9	(0.4%)	0.1%	0.1%	0.1%	(0.0%)
Regional affiliate	43.4	44.1	44.2	46.3	49.6	59.5	0.4%	0.9%	1.4%	2.1%	1.3%
Domestic total	80.9	78.7	79.2	81.5	84.9	94.1	(0.4%)	0.6%	0.8%	1.1%	0.6%
International											
Mainline	132.0	132.3	133.2	143.3	154.0	175.0	0.2%	1.5%	1.5%	1.4%	1.2%
Regional affiliate	43.7	43.4	44.3	47.1	51.0	61.9	0.2%	1.2%	1.6%	2.2%	1.5%
International total	97.3	93.6	95.4	102.0	109.9	128.3	(0.4%)	1.3%	1.5%	1.7%	1.2%
Total Airport	83.9	81.5	82.5	86.1	90.9	103.2	(0.3%)	0.8%	1.1%	1.4%	0.9%
Enplaned passenger load factor											
Domestic											
Mainline	84.9%	84.9%	84.9%	85.0%	85.1%	85.2%	(0.0%)	0.0%	0.0%	0.0%	0.0%
Regional affiliate	84.6%	84.6%	84.6%	84.7%	84.8%	85.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Domestic total	84.8%	84.8%	84.8%	84.9%	85.0%	85.2%	(0.0%)	0.0%	0.0%	0.0%	0.0%
International											
Mainline	75.7%	75.7%	75.7%	77.9%	80.1%	84.0%	0.0%	0.6%	0.6%	0.5%	0.4%
Regional affiliate	77.4%	77.4%	77.4%	79.3%	81.2%	84.4%	0.0%	0.5%	0.5%	0.4%	0.4%
International total	76.3%	76.3%	76.3%	78.4%	80.5%	84.2%	(0.0%)	0.5%	0.5%	0.5%	0.4%
Total Airport	82.9%	82.8%	82.6%	83.1%	83.6%	84.8%	(0.1%)	0.1%	0.1%	0.2%	0.1%
Average seats per departure											
Domestic											
Mainline	155.9	152.6	152.7	153.3	153.8	154.7	(0.4%)	0.1%	0.1%	0.1%	(0.0%)
Regional affiliate	51.3	52.1	52.3	54.7	58.5	70.1	0.4%	0.9%	1.4%	2.0%	1.3%
Domestic total	95.4	92.8	93.4	96.0	99.9	110.5	(0.4%)	0.6%	0.8%	1.1%	0.6%
International											
Mainline	174.3	174.7	175.9	183.8	192.2	208.2	0.2%	0.9%	0.9%	0.9%	0.7%
Regional affiliate	56.5	56.0	57.2	59.3	62.8	73.3	0.2%	0.7%	1.1%	1.7%	1.1%
International total	127.6	122.6	125.1	130.1	136.6	152.4	(0.4%)	0.8%	1.0%	1.2%	0.7%
Total Airport	101.3	98.4	99.9	103.6	108.7	121.6	(0.3%)	0.7%	1.0%	1.3%	0.8%

Table 3-28 *(Page 2 of 2)*
ASSUMPTIONS FOR AIRCRAFT OPERATIONS FORECASTS – BASELINE
2011-2035

	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Freight per operation (pounds)											
All-cargo airlines											
Domestic											
Scheduled	50,892	50,892	50,892	52,177	53,494	55,950	0.0%	0.5%	0.5%	0.5%	0.4%
Charter	4,336	4,336	4,336	4,445	4,558	4,767	0.0%	0.5%	0.5%	0.5%	0.4%
Domestic total	43,487	42,244	43,832	44,939	46,074	48,189	0.2%	0.5%	0.5%	0.5%	0.4%
International											
Scheduled	72,497	72,497	72,497	74,327	76,204	79,703	0.0%	0.5%	0.5%	0.5%	0.4%
Charter	68,862	68,862	68,862	70,601	72,384	75,707	0.0%	0.5%	0.5%	0.5%	0.4%
International total	72,324	71,601	71,005	74,036	75,666	79,471	(0.4%)	0.8%	0.4%	0.5%	0.4%
Total Airport	49,199	47,808	49,246	50,822	52,250	55,102	0.0%	0.6%	0.6%	0.6%	0.5%

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Mainline includes charter passengers.
Total cargo is the sum of enplaned and deplaned freight and mail

Sources: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

3.6.3.4 All-Cargo Airline Aircraft Operations Forecasts

Cargo airline operations at Intercontinental include the flight activity by airlines dedicated exclusively to the transportation of freight such as FedEx and by commuter/regional size aircraft. Air carrier size aircraft that perform all-cargo operations at the airport include widebody (e.g., Airbus A-300, Boeing 747 and 767, and MD-11) and narrowbody (e.g., Boeing 757 and DC-8) aircraft. Commuter or regional aircraft that perform all-cargo operations at the airport include small piston and turboprop aircraft such as the Cessna 208, Metroliner, and Short 360 aircraft. In 2011, there were 10,208 cargo airline operations performed at the Airport.

The forecast of all-cargo operations was developed by first estimating the share of future cargo tonnage expected to be carried by air carrier and commuter aircraft. The cargo tonnage expected to be carried by all-cargo carriers was then divided by an estimated cargo tons per departure ratio to yield total air carrier cargo operations. For example, air carrier all-cargo aircraft for domestic service carried approximately 50,900 pounds per operation in 2011. The ratio of tons per operation is expected to increase gradually over the forecast period to account for expected growth in cargo related to economic activity

Cargo airline aircraft operations at Intercontinental are forecast to increase an average of 2.2% per year from 10,208 in 2010 to 17,300 in 2035, as shown in Table 3-29.

3.6.3.5 General Aviation Aircraft Operations Forecasts

General aviation (GA) activity includes all flight operations by aircraft other than scheduled or charter passenger aircraft and military aircraft. GA includes not only pilot training and recreational flights on small single engine or multi-engine propeller driven aircraft, but also operations on large business jet aircraft.

On a nationwide basis, the number of general aviation aircraft operations has been in slow decline due to factors such as increases in aircraft, fuel, and insurance costs, as well as increased avionic instrument requirements. The current economic recession and the financial credit crisis further reduced general aviation activity nationwide. For the future, the FAA expects general aviation traffic to recover slowly.

The flight operations of GA aircraft are categorized as local or itinerant operations. Local operations are flights that operate within visual range or close proximity of the airport. Itinerant operations typically include those flights that leave the airport destined for another airport and require the filing of flight plans with the local air traffic control authorities. Historically, itinerant operations have accounted for nearly all GA operations at the Airport. In 2011, a total of 12,066 itinerant GA operations were performed at the Airport (100% of GA operations), as shown in Table 3-29.

GA operations in the future are forecast to continue to be comprised of itinerant operations only. The total number of general aviation operations is forecast to increase an average of 1.0% per year from 2011 through 2035.

in 2011, a total of 37 general aviation aircraft were based at the Airport, including 3 single engine piston, 29 jet engine, 3 multi-engine turboprop, and 2 helicopters. The total number of based aircraft at the Airport is forecast to remain relatively unchanged through 2035.

Table 3-29
AIRCRAFT OPERATIONS FORECASTS – BASELINE
2011-2035

	Historical	Forecast					Compound average annual percent increase				
	2011	2012	2016	2021	2026	2035	2011-2016	2016-2021	2021-2026	2026-2035	2011-2035
Air Carrier											
Passenger airlines											
Mainline	250.8	217.3	248.8	283.3	322.7	405.0	(0.2%)	2.6%	2.6%	2.6%	2.0%
Regional	22.8	31.0	35.7	40.6	46.3	58.5	9.4%	2.6%	2.7%	2.6%	4.0%
Passenger—total	273.6	248.3	284.5	324.0	369.0	463.4	0.8%	2.6%	2.6%	2.6%	2.2%
Cargo airlines	8.9	9.0	10.1	11.3	12.6	15.3	2.6%	2.2%	2.2%	2.2%	2.3%
Other	8.6	4.0	4.0	4.0	4.0	4.0	(14.3%)	0.0%	0.0%	0.0%	(3.2%)
Air Carrier total	291.1	261.3	298.6	339.2	385.6	482.7	0.5%	2.6%	2.6%	2.5%	2.1%
Air Taxi											
Passenger airlines	223.8	244.4	275.8	300.5	320.0	334.1	4.3%	1.7%	1.3%	0.5%	1.7%
Cargo airlines	1.3	1.3	1.4	1.6	1.7	2.0	1.5%	2.0%	2.0%	2.0%	1.9%
Other	1.3	5.0	5.0	5.0	5.0	5.0	31.4%	0.0%	0.0%	0.0%	5.9%
Air Taxi total	226.4	250.7	282.2	307.1	326.7	341.1	4.5%	1.7%	1.2%	0.5%	1.7%
General Aviation											
Itinerant	12.2	12.3	12.8	13.5	14.2	15.5	1.0%	1.0%	1.0%	1.0%	1.0%
Local	--	--	--	--	--	--	--	--	--	--	--
General Aviation total	12.2	12.3	12.8	13.5	14.2	15.5	1.0%	1.0%	1.0%	1.0%	1.0%
Military	0.2	0.3	0.3	0.3	0.3	0.3	4.6%	--	--	--	--
Total Airport	530.0	524.6	594.0	660.1	726.7	839.6	2.3%	2.1%	1.9%	1.6%	1.9%
Commercial aircraft operations											
Passenger airlines											
Air Carrier	273.6	248.3	284.5	324.0	369.0	463.4	0.8%	2.6%	2.6%	2.6%	2.2%
Air Taxi	223.8	244.4	275.8	300.5	320.0	334.1	4.3%	1.7%	1.3%	0.5%	1.7%
	497.4	492.7	560.3	624.5	689.0	797.5	2.4%	2.2%	2.0%	1.6%	2.0%
All-cargo airlines											
Air Carrier	8.9	9.0	10.1	11.3	12.6	15.3	2.6%	2.2%	2.2%	2.2%	2.3%
Air Taxi	1.3	1.3	1.4	1.6	1.7	2.0	1.5%	2.0%	2.0%	2.0%	1.9%
	10.2	10.2	11.5	12.8	14.3	17.3	2.4%	2.2%	2.2%	2.1%	2.2%
Total commercial operations	517.5	511.9	580.8	646.3	712.3	823.8	2.3%	2.2%	2.0%	1.6%	2.0%

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

Note: Mainline includes charter passengers.

Sources: Historical: Houston Airport System records. Forecast: LeighFisher, June 2012.

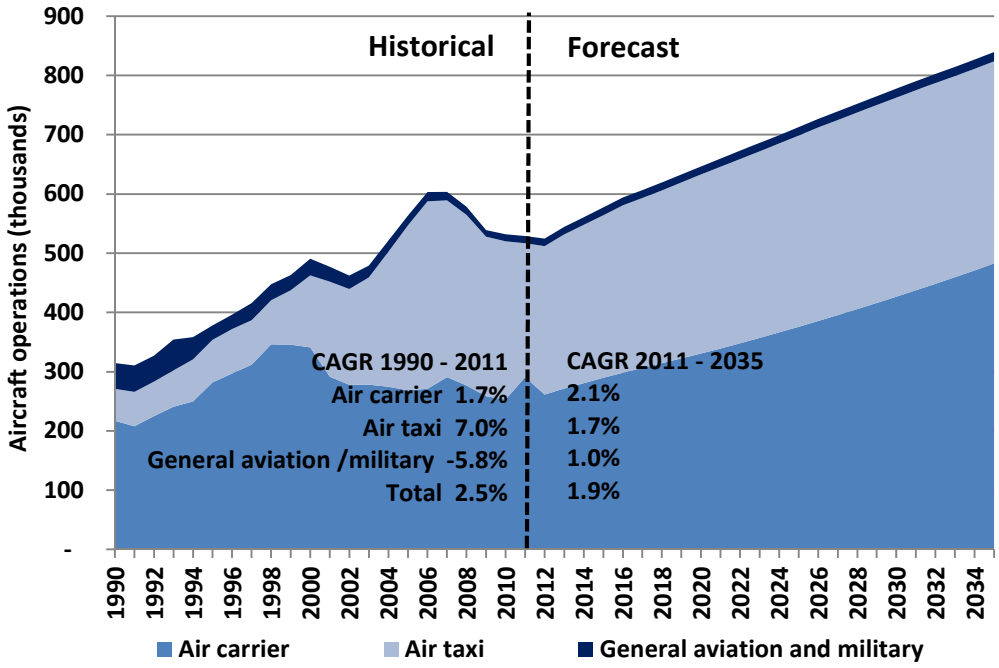
3.6.3.6 Military Aircraft Operations Forecasts

The number of military operations at the Airport averaged approximately 200 operations per year between 2000 and 2010. In 2011, military operations totaled 223, slightly exceeding the 10-year average. Military operations are expected remain at a level of about 300 operations through 2035, as shown in Table 3-29.

3.6.3.7 Total Aircraft Operations Forecasts

Total aircraft operations at Intercontinental are forecast to increase from 530,000 in 2011 to 839,600 operations in 2035, an average increase of 1.9% per year, as shown in Table 3-29 and on Figure 3-38.

Figure 3-38
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS



Note: The forecasts presented in this figure were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

CAGR = Compound average annual growth rate

Source: Historical: Houston Airport System records.
Forecast: LeighFisher, June 2012.

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3.7 COMPARISON WITH THE FAA 2011 TAF

Table 3-30 presents a comparison of the aviation demand forecasts prepared for George Bush Intercontinental Airport and the FAA 2011 TAF for the Airport. The forecasts are compared for the components of total enplaned passengers, commercial aircraft operations and total aircraft operations. The format of Table 3-30 is based on the template provided by the FAA for the comparison of airport planning forecasts and the FAA TAF.* As required, the results are presented for the base year of 2011 and forecast horizons years which are equal to the base year, plus 1, 5, 10 and 15 years (2012, 2016, 2021, and 2026). The IAH Master Plan aviation demand forecasts have been compared graphically with the FAA 2011 TAF in the figures presented throughout this report, including Figures 3-1 and 3-3 in Section 1.

The key findings of the comparison of the IAH Master Plan aviation demand forecasts with the FAA 2011 TAF are:

- The forecast of enplaned passengers for Intercontinental is lower than the TAF in 2016 and 2021. The variance between the IAH Master Plan enplaned passenger forecast and the FAA 2011 TAF is 9.8% in 2016 and 13.3% in 2021, as shown in Table 3-30.
- The forecast of commercial operations for Intercontinental is lower than the TAF in 2016 and 2021. The variance between the IAH Master Plan commercial operations forecast and the FAA 2011 TAF is 9.8% in 2016 and 14.2% in 2021.
- The forecast of total aircraft operations for Intercontinental is lower than the TAF in 2016 and 2021. The variance between the IAH Master Plan total aircraft operations forecast and the FAA 2011 TAF is 9.6% in 2016 and 13.8% in 2021.
- Overall, the IAH Master Plan aviation demand forecasts are similar to the FAA 2011 TAF for the Airport and "differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period", as stipulated in the FAA forecast guidance.

Table 3-31 presents a summary of the IAH Master Plan aviation demand forecasts using a second template provided by the FAA.

*U.S. Department of Transportation, Federal Aviation Administration, *Forecasting Aviation Activity by Airport*, July 2001, and *Review and Approval of Aviation Forecasts*, June 2008, http://www.faa.gov.

Table 3-30
FAA TAF FORECAST COMPARISON
2011 – 2026

	Year *(a)*	IAH Master Plan Update	FAA 2011 TAF	IAH MPU vs. 2011 TAF (percent variance)
Passenger enplanements				
Base yr.	2011	20,053,107	19,528,188	2.7%
Base yr. + 5yrs.	2016	23,122,000	25,642,928	-9.8%
Base yr. + 10yrs.	2021	26,875,000	30,984,270	-13.3%
Base yr. + 15yrs.	2026	31,311,000	37,441,322	-16.4%
Commercial operations *(b)*				
Base yr.	2011	517,506	519,828	-0.4%
Base yr. + 5yrs.	2016	580,800	644,090	-9.8%
Base yr. + 10yrs.	2021	646,300	753,211	-14.2%
Base yr. + 15yrs.	2026	712,300	881,117	-19.2%
Total operations *(c)*				
Base yr.	2011	529,964	532,121	-0.4%
Base yr. + 5yrs.	2016	594,000	656,720	-9.6%
Base yr. + 10yrs.	2021	660,100	766,030	-13.8%
Base yr. + 15yrs.	2026	726,700	894,126	-18.7%

(a) The IAH Master Plan Update (MPU) was prepared on a calendar year basis and the FAA 2011 TAF was prepared on a U.S. government fiscal year basis (October through September).
(b) Commercial operations include operations by passenger airlines, all-cargo airlines, and air taxi operators.
(c) Total operations include commercial operations plus operations by general aviation and military.

Sources: Base year 2011 (actual)—Houston Airport System records.
IAH MPU Forecasts—LeighFisher, June 2012.
FAA 2011 TAF for IAH—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed January 2012.

Table 3-31
SUMMARY OF IAH MPU FORECASTS USING FAA TEMPLATE

		Forecast				Average annual compound growth rates			
	Base year 2011	Base year + 1 year 2012	Base year + 5 years 2016	Base year + 10 years 2021	Base year + 15 years 2026	Base year to +1 year 2011 - 2012	Base year to +5 years 2010 - 2016	Base year to +10 years 2011 - 2021	Base year to +15 years 2011 - 2026
Passenger enplanements (millions)									
Air carrier *(a)*	14.40	14.16	16.24	18.95	22.18	-1.7%	2.4%	2.8%	2.9%
Commuter *(b)*	5.66	6.09	6.89	7.92	9.13	7.6%	4.0%	3.4%	3.2%
Total	20.06	20.25	23.12	26.88	31.31	0.9%	2.9%	3.0%	3.0%
Aircraft operations (thousands)									
Itinerant									
Air carrier	291.1	261.3	298.6	339.2	385.6	-10.3%	0.5%	1.5%	1.9%
Commuter/air taxi	226.4	250.7	282.2	307.1	326.7	10.7%	4.5%	3.1%	2.5%
Total commercial operations	517.5	511.9	580.8	646.3	712.3	-1.1%	2.3%	2.2%	2.2%
General aviation	12.2	12.3	12.8	13.5	14.2	1.0%	1.0%	1.0%	1.0%
Military	0.2	0.3	0.3	0.3	0.3	25.0%	4.6%	2.3%	1.5%
Local									
General aviation	-	-	-	-	-	--	--	--	--
Military	- -	- -	- -	- -	- -	--	--	--	--
Total operations	530.0	524.6	594.0	660.1	726.7	-1.0%	2.3%	2.2%	2.1%
Cargo/mail (enplaned + deplaned tons)	492,751	502,339	565,222	649,323	746,959	1.9%	2.8%	2.8%	2.8%
Based Aircraft									
Single-engine (nonjet)	3	3	3	3	3	--	--	--	--
Multiengine (nonjet)	3	3	3	3	3	--	--	--	--
Jet engine	29	29	29	29	29	--	--	--	--
Helicopter	2	2	2	2	2	--	--	--	--
Other	--	--	--	--	--	--	--	--	--
Total	37	37	37	37	37	--	--	--	--
Operational factors									
Average aircraft size (seats)									
Air Carrier *(a)*	157.8	160.4	158.4	160.9	164.1				
Commuter *(b)*	50.5	52.0	53.0	55.0	58.5				
Average enplaning load factor									
Air Carrier *(a)*	84.2%	82.6%	82.3%	82.7%	83.3%				
Commuter *(b)*	78.9%	83.6%	83.4%	83.6%	84.0%				
GA operations per based aircraft	330	334	347	365	383				

Note: The IAH Master Plan Update was prepared on a calendar year basis and the FAA 2011 TAF was prepared on a U.S. government fiscal year basis (October through September).

(a) Includes mainline and charter airline activity as summarized in the previous tables in this report.
(b) Includes regional affiliate airline activity, which includes flights using regional aircraft with more than 60 seats.

Sources: Base year 2011 (actual)—Houston Airport System records. IAH MPU Forecasts—LeighFisher, June 2012. FAA 2011 TAF for Intercontinental—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed January 2012.

3.8 FORECASTS OF PEAK PERIOD DEMAND AND AIRCRAFT FLEET DISTRIBUTION

This chapter summarizes the forecasts of peak period demand for the average day peak month (ADPM) at the Airport for 2016, 2021, 2026, and 2035. The forecasts of ADPM aircraft operations are derived from the annual forecasts of enplaned passengers and aircraft operations presented in Tables 3-24 and 3-25, respectively. In addition, forecasts of aircraft fleet distribution by activity type for the Airport are presented.

3.8.1 Forecast Approach and Methodology

The forecasts of peak period demand and aircraft fleet were based on a 2011 base year distribution of operations by equipment type (e.g., Airbus 319, Boeing 737-800). The 2011 distribution was developed using a combination of source data, including: published passenger airline schedules; HAS airport records, the FAA's databases including the Enhanced Traffic Management System Counts (ETMSC), Operations Network (OPSNET), Air Traffic Activity Data System (ATADS), and ANOMS data for the Airport.

3.8.2 Peak Period Demand Forecasts

Peak period demand forecasts were prepared for the ADPM and the peak hour forecasts of passenger airline aircraft operations for the ADPM.

3.8.2.1 ADPM Forecasts

The peak month for passenger airline activity at IAH is July. In 2011, July accounted for 9.9% of enplaned passengers, 9.0% of passenger airline scheduled departing seats, and 9.2% of passenger airline landings, as shown in Tables 3-15, 3-16, and 3-17 in Section 3. A 5-year average for 2007 through 2011, shows a similar peak month pattern—July accounted for an average of 9.6% of enplaned passengers, 9.0% of passenger airline scheduled departing seats, and 9.0% of passenger airline landings.

As shown in Table 3-23, July accounted for 8.6% of annual total aircraft operations in 2011. From 2007 through 2011, July accounted for the peak share of total aircraft operations at the Airport, with an average of 9.0% of annual operations.

Table 3-32 presents a summary of the ADPM forecasts of enplaned passengers, 2011 through 2035. The peak month shares of annual activity are assumed to represent future peak demand. The ADPM is the mathematical average of peak month activity (i.e., the peak month number of operations divided by 31 days in the peak month). The ADPM level of activity serves as the "control total" for the ADPM flight schedules which are used as input to detailed technical analyses such as facility requirements analysis and demand capacity modeling.

Table 3-32
HISTORICAL AND FORECAST PEAK PERIOD DEMAND – BASELINE
2011 – 2035

	Historical	Baseline forecast				
	2011 *(a)*	2012	2016	2021	2026	2035
Enplaned passengers						
Annual passengers (millions)	20.05	20.25	23.12	26.88	31.31	41.15
Peak month (millions) *(b)*	1.98	1.94	2.22	2.58	3.01	3.95
Peak month percent of annual	9.9%	9.6%	9.6%	9.6%	9.6%	9.6%
Average day peak month (ADPM)	63,840	62,722	71,604	83,226	96,963	127,419
Passenger airline scheduled aircraft operations						
Annual operations	497,384	492,700	560,300	624,500	689,000	797,500
Peak month *(b)*	45,700	44,340	50,430	56,210	62,010	71,780
Peak month percent of annual	9.2%	9.0%	9.0%	9.0%	9.0%	9.0%
Average day peak month (ADPM)	1,474	1,430	1,627	1,813	2,000	2,315
Total aircraft operations *(c)*						
Annual operations	529,964	524,600	594,000	660,100	726,700	839,600
Peak month *(b)*	47,996	47,210	53,460	59,410	65,400	75,560
Peak month percent of annual	9.1%	9.0%	9.0%	9.0%	9.0%	9.0%
Average day peak month (ADPM)	1,548	1,523	1,725	1,916	2,110	2,437

The forecasts presented in this table were prepared using the information and assumptions given in the accompanying text. Inevitably, some of the assumptions used to develop the forecasts will not be realized and unanticipated events and circumstances may occur. Therefore, there are likely to be differences between the forecast and actual results, and those differences may be material.

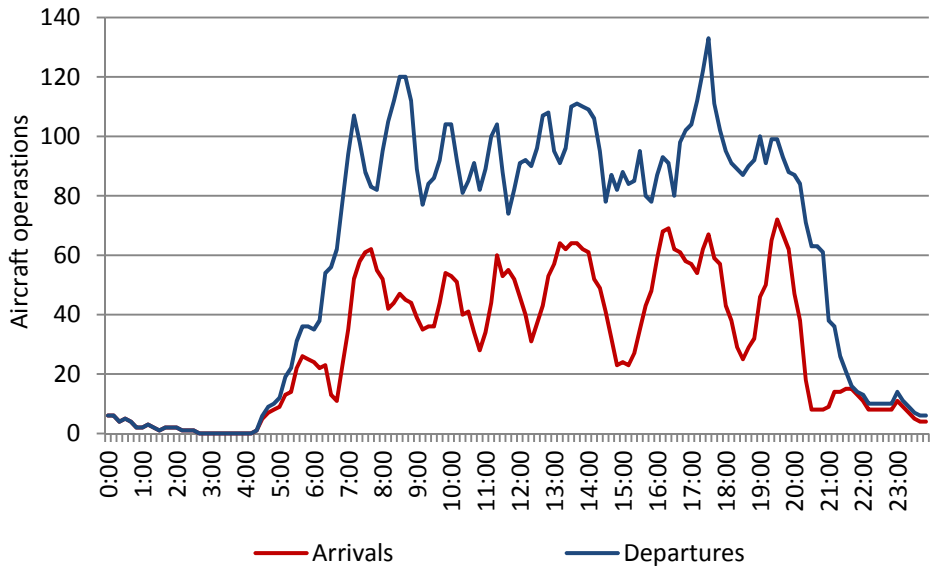
(a) The base year for the forecasts is 2011.
(b) Forecast years estimated using the peak month percent of annual and the annual totals.
(c) Includes passenger, cargo, general aviation, and military operations.

Sources: Historical: Houston Airport System records and Federal Aviation Administration, Air Traffic Activity Data System (ATADS), online database. Forecast: LeighFisher, June 2012.

3.8.2.2 Passenger Airline Peak Hour Forecasts

The peak hour for passenger airline aircraft operations (arrivals and departures) at IAH in July 2012 is during the 60-minute period from 4:30 to 5:30 pm, accounting for approximately 9% of ADPM total passenger airline operations, as shown on Figure 3-39.

Figure 3-39
DISTRIBUTION OF PASSENGER AIRLINE SCHEDULED OPERATIONS BY HOUR IN JULY 2012

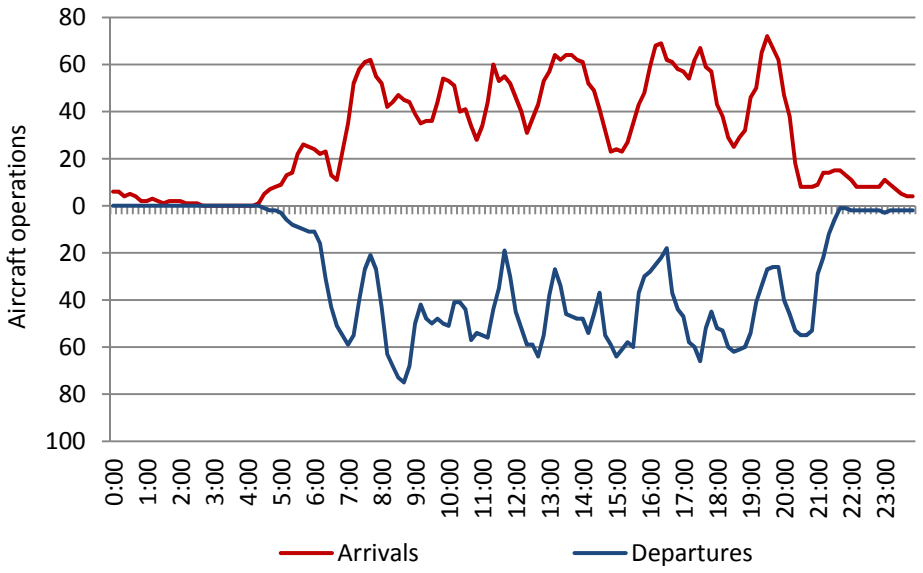


Note: Operations are summarized for a 60-minute rolling hour.

Source: Official Airline Guides, Inc., online database, accessed June 2012.

As shown on Figure 3-40, the peak hour for passenger airline scheduled aircraft arrivals at IAH in July 2012 is during the 60-minute period from 3:20 to 4:20 pm. A similar number of arrivals occur during the 60-minute period from 6:30 to 7:30 pm. The peak hour for aircraft departures at IAH in July 2011 is during the 60-minute period from 7:40 to 8:40 am.

Figure 3-40
ARRIVALS AND DEPARTURES BY HOUR IN JULY 2012

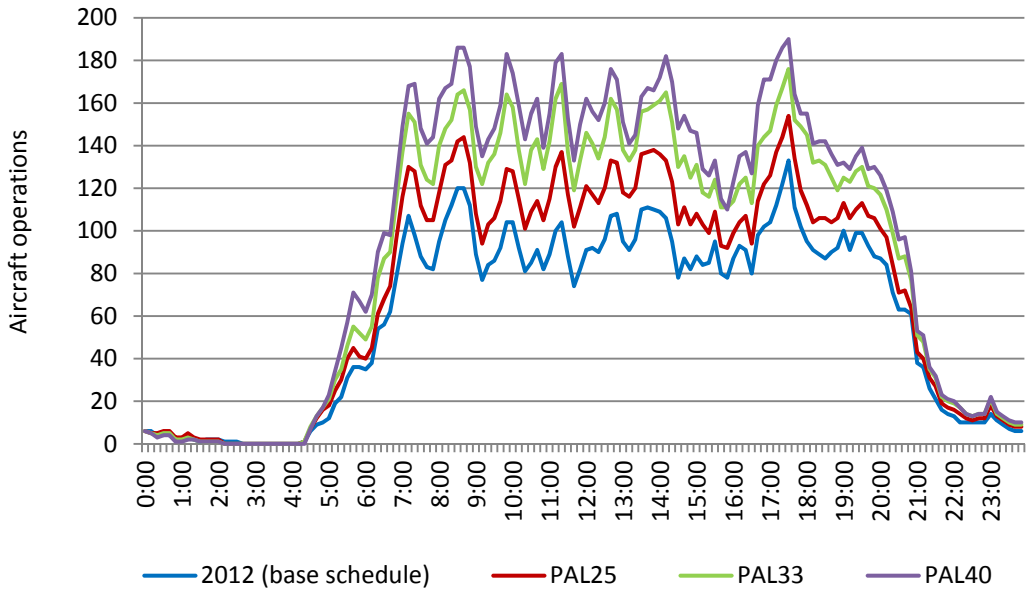


Note: Operations are summarized for a 60-minute rolling hour.

Source: Official Airline Guides, Inc., online database, accessed June 2012.

Future passenger airline schedules were developed using published airline schedules for July 2012. Additional flights (arrivals and departures) were added to the July 2012 schedule to reflect: (1) the ADPM operations for each forecast year (the "control totals" shown in Table 8-1) which relate directly to the annual forecasts, (2) the hourly percentage distribution of arrivals and departures represented by the July 2012 schedule, (3) the fleet mix of the airlines serving IAH and their future fleet plans, and (4) the markets currently served at IAH and the potential for new markets. The hourly distribution of operations from the flight schedules obtained for July 2012 is assumed to remain relatively unchanged during the forecast period. Figure 4-41 summarizes the baseline forecasts of passenger airline scheduled operations (arrivals and departures) for Planning Activity Levels (PAL) 25, 33, and 40 reflecting approximately 25 million annual enplaned passengers, 33 million, and 40 million, respectively.

Figure 3-41
BASELINE FORECAST DISTRIBUTION OF PASSENGER AIRLINE SCHEDULED OPERATIONS BY HOUR

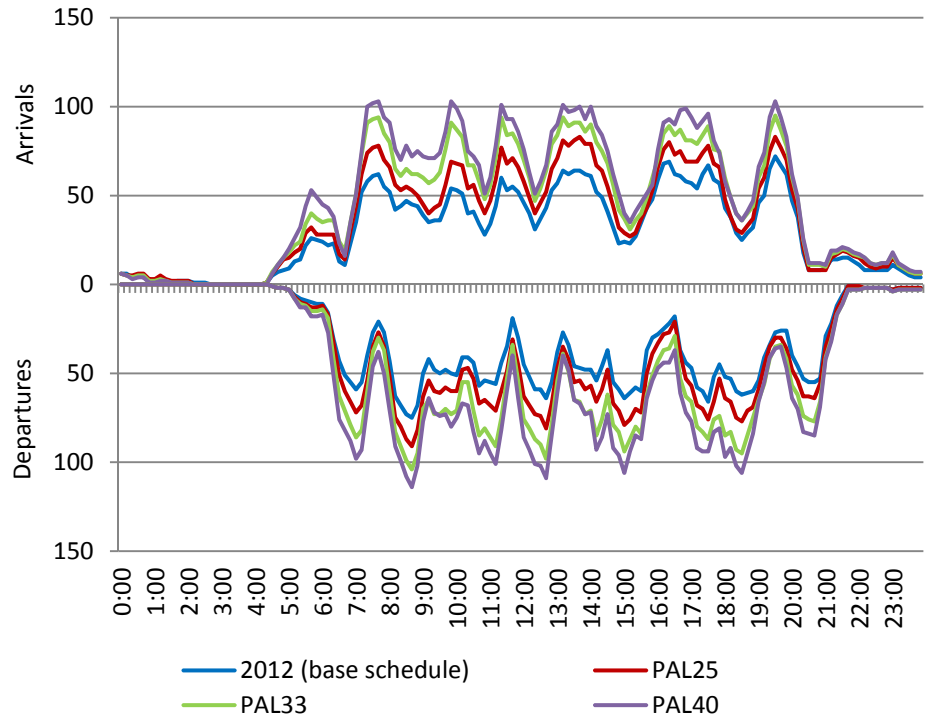


Note: Operations are summarized for a 60-minute rolling hour.
Includes arrivals and departures.

Source: Base schedule: Official Airline Guides, Inc., online database, accessed June 2012.
Forecast: LeighFisher, June 2012.

Figure 3-42 presents the baseline forecast of hourly distribution of arrivals and departures for each of the flight schedules.

Figure 3-42
BASELINE FORECAST DISTRIBUTION OF PASSENGER AIRLINE ARRIVALS AND DEPARTURES BY HOUR



Note: Operations are summarized for a 60-minute rolling hour.

Source: Base schedule: Official Airline Guides, Inc., online database, accessed June 2012.
Forecast: LeighFisher, June 2012.

3.8.3 Aircraft Fleet Forecasts

Table 3-33 presents the ADPM passenger airline fleet mix for 2011 and for the forecast years (2012, 2016, 2021, 2026, and 2035) in terms of the percentage of ADPM passenger airline aircraft operations. The passenger airline fleet mix in the future schedules for PAL25, PAL33, and PAL40 are based on the annual baseline forecasts of fleet mix.

Table 3-33
ADPM PERCENT DISTRIBUTIONS OF PASSENGER AIRLINE AIRCRAFT OPERATIONS – BASELINE
2011 – 2035

		Historical	Baseline forecast				
	Seats	2011	2012	2016	2021	2026	2035
Domestic							
Narrowbody							
A319	124	0.6%	1.3%	1.5%	4.3%	6.0%	6.6%
A320	145	0.4	0.4	5.9	5.2	4.5	2.9
A320neo	145	0.0	0.0	0.0	0.2	1.2	3.1
B737-300/400	138	1.3	1.3	0.0	0.0	0.0	0.0
B737-500	114	3.6	3.0	1.0	0.0	0.0	0.0
B737-700	124	3.2	3.7	3.7	6.1	5.4	4.5
B737-800	157	12.5	12.5	12.5	12.5	12.5	12.9
B737-900	173	5.3	5.3	5.3	5.3	5.3	5.5
B737 MAX	157	0.0	0.0	0.0	0.1	0.6	1.5
B757-200/300	205	3.5	3.1	1.5	0.0	0.0	0.0
DC9	125	0.1	0.0	0.0	0.0	0.0	0.0
MD-80	141	1.3	1.3	0.5	0.0	0.0	0.0
Subtotal – narrowbody		31.8%	31.9%	31.9%	33.8%	35.4%	37.0%
Regional jets							
More than 60 seats							
CRJ-700	70	2.1%	3.9%	6.3%	8.1%	11.0%	12.0%
CRJ-900	76	2.6	1.6	1.6	1.7	1.7	1.5
ERJ-170	73	0.2	0.2	0.9	1.1	1.4	1.5
ERJ-175	78	0.5	0.6	1.4	1.5	1.3	1.2
ERJ-190	99	0.1	0.2	0.2	0.3	0.4	0.4
Subtotal		5.5%	6.5%	10.5%	12.8%	15.8%	16.6%
60 seats or less							
CRJ-100/200	50	4.1%	4.0%	1.8%	0.0%	0.0%	0.0%
ERJ-145	50	30.1	29.7	29.9	27.8	22.8	11.9
Subtotal		34.2%	33.7%	31.7%	27.8%	22.8%	11.9%
Subtotal – regional jets		39.7%	40.2%	42.2%	40.6%	38.6%	28.5%
Turboprop							
Q400	74	3.1%	2.9%	4.4%	4.7%	2.5%	1.5%
Saab 340	34	6.2	5.9	2.3	0.6	0.3	0.0
Subtotal – turboprop		9.3%	8.8%	6.8%	5.3%	2.9%	1.5%
Widebody							
B767-200/300	196	0.3%	0.3%	0.3%	0.3%	0.1%	0.0%
B767-400	235	0.4	0.4	0.4	0.4	0.6	0.3
B777	270	0.1	0.1	0.1	0.0	0.0	0.0
A350	270	0.0	0.0	0.0	0.1	0.1	0.1
B787-8	235	0.0	0.0	0.0	0.2	0.2	0.9
Subtotal – widebody		0.9%	0.9%	0.9%	1.0%	1.0%	1.4%
Subtotal – Domestic		81.6%	81.7%	81.7%	80.6%	77.8%	68.3%

Table 3-33 *(Page 2 of 2)*
ADPM PERCENT DISTRIBUTIONS OF PASSENGER AIRLINE AIRCRAFT OPERATIONS - BASELINE
2011 – 2035

		Historical	Baseline forecast				
	Seats	2011	2012	2016	2021	2026	2035
International							
Narrowbody							
A319	120	0.0%	0.5%	0.7%	0.8%	0.6%	0.2%
A320neo	150	0.0	0.0	0.0	0.0	0.2	1.3
B737-300/400	80	0.2	0.2	0.0	0.0	0.0	0.0
B737-500	114	1.2	1.2	0.4	0.0	0.0	0.0
B737-700	124	1.5	1.5	2.3	3.0	3.5	4.9
B737-800	157	4.1	3.6	3.6	4.0	4.9	8.8
B737-900	173	1.1	1.1	1.1	1.2	1.5	2.6
B737 MAX	157	0.0	0.0	0.0	0.2	0.7	2.4
B757-200/300	211	0.2	0.2	0.2	0.0	0.0	0.0
Subtotal – narrowbody		8.3%	8.3%	8.3%	9.1%	11.3%	20.3%
Regional jets							
More than 60 seats							
CRJ-700	75	1.2%	1.2%	1.2%	1.5%	2.0%	2.9%
ERJ-170	73	0.1	0.1	0.1	0.1	0.1	0.2
ERJ-190	96	0.5	0.5	0.5	0.6	0.8	1.2
Subtotal		1.8%	1.8%	1.8%	2.2%	2.9%	4.3%
60 seats or less							
CRJ-100/200	50	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ERJ-135/140/145	50	5.5%	5.5	5.5	4.9	4.3	2.1
Subtotal		5.5%	5.5%	5.5%	4.9%	4.3%	2.1%
Subtotal – regional jets		7.3%	7.3%	7.3%	7.1%	7.2%	6.4%
Widebody							
A350	250	0.0%	0.0%	0.0%	0.2%	0.3%	0.6%
A380	450	0.0	0.0	0.0	0.1	0.1	0.3
B747-200	278	0.1	0.0	0.0	0.0	0.0	0.0
B747-400	358	0.4	0.2	0.2	0.0	0.0	0.0
B767-200/300	177	0.4	0.6	0.6	0.4	0.3	0.0
B767-400	235	0.6	0.6	0.6	0.6	0.8	1.0
B777	270	1.4	1.4	1.4	0.9	0.8	1.1
B787-8	235	0.0	0.1	0.1	0.9	1.4	1.9
B787-9	270	0.0	0.0	0.0	0.0	0.0	0.1
Subtotal – widebody		2.8%	2.8%	2.8%	3.2%	3.7%	5.0%
Subtotal – International		18.4%	18.3%	18.3%	19.4%	22.2%	31.7%
Total passenger airlines		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

ADPM = Average day peak month
Totals may not add due to rounding.

Sources: Historical—Houston Airport System records and Official Airline Guides, Inc., online database, accessed May 2012. Forecast—LeighFisher, June 2012