

REVISED TECHNICAL MEMORANDUM NO. 3

AVIATION ACTIVITY FORECASTS

Airport Master Plan Update

Detroit Metropolitan Wayne County Airport

Prepared for

Wayne County Airport Authority

Detroit, Michigan

July 2016



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1.0 INTRODUCTION AND SUMMARY

The Technical Memorandum presents forecasts of aviation activity for enplaned passengers, air cargo, and aircraft operations for Detroit Metropolitan Wayne County Airport (the Airport or DTW), including passenger, all-cargo, general aviation, and military operations. Using calendar year 2015 as the base year, annual forecasts were prepared for four future demand years—2020, 2025, 2030, and 2035. Wayne County Airport Authority (WCAA) records (based on data reported by the airlines) were used as the basis for the enplaned passenger, air cargo, and commercial airline aircraft operations forecasts. Federal Aviation Administration (FAA), Air Traffic Activity System (ATADS) data were used as the basis for the total aircraft operations forecasts.

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. The baseline unconstrained forecasts are the “preferred” forecasts recommended for FAA approval.

1.1 Approach

The Airport Master Plan Update forecasts were prepared using a collaborative process which included: (1) a review of previous forecasts prepared for the Airport, including the Master Plan forecasts prepared in 2009 and the FAA 2015 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 DTW and the Detroit Region*, (3) airline input on future passenger traffic at DTW, (4) the development of statistical models to identify historical causal factors, and (5) coordination with representatives of the Airport and the FAA.

1.2 Enplaned Passengers

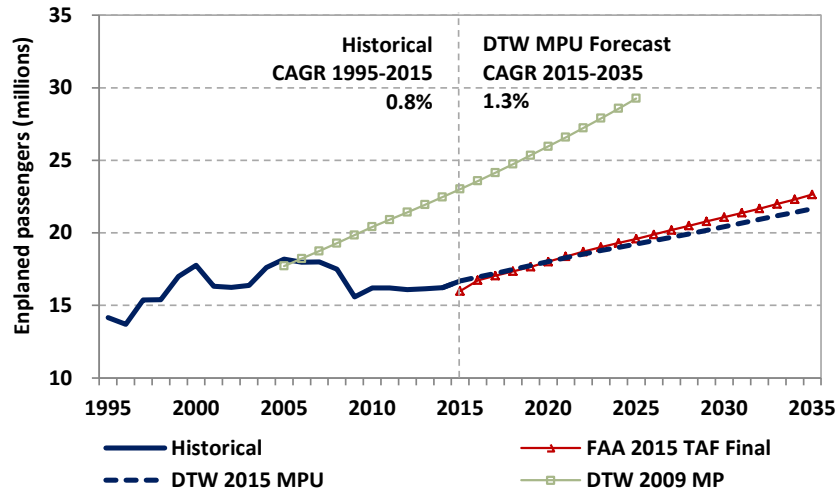
Figure 1-1 presents historical enplaned passengers for 1990 through 2015 and forecasts for 2016 through 2035, compared with the 2009 Master Plan forecasts and the FAA 2015 TAF for the Airport. The Master Plan Update enplaned passenger forecasts are based on 2015 data and are within 0.1% of the FAA 2015 TAF in 2020 and 1.8% in 2025.** The enplaned passenger forecast growth rate of 1.3% per year between 2015 and 2035 is lower than the rate forecast by the FAA in its 2015 TAF for the Airport (an average of 1.8% per year) from Federal Fiscal Year (FFY) 2015 to FFY 2035.*** A detailed comparison of the Master Plan Update enplaned passenger forecasts and the FAA 2015 TAF is presented in Section 7.

*The Detroit Region, also referred to as the Airport service region in this report, includes a primary and secondary area. The primary area consists of 10 counties, including Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. The secondary area includes the adjacent counties and 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.

**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>.

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

Figure 1-1
HISTORICAL AND FORECAST ENPLANED PASSENGERS
 Detroit Metropolitan Wayne County Airport



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.

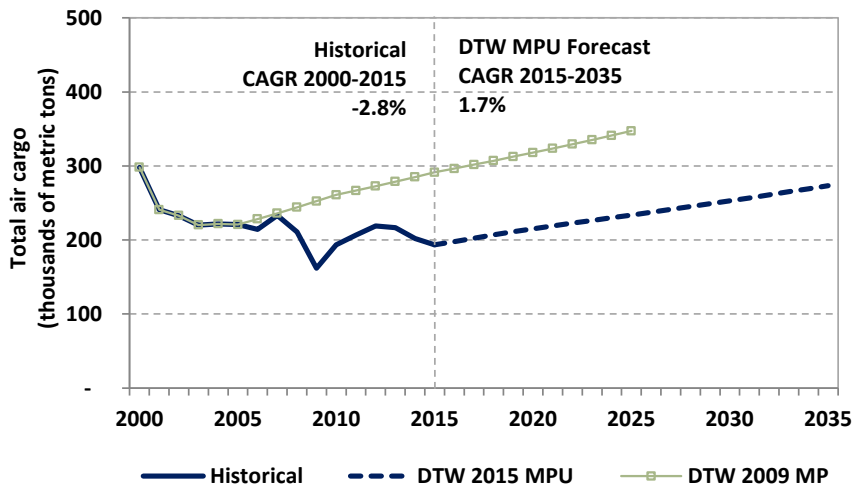
CAGR = Compound annual growth rate

Sources: Historical—Wayne County Airport Authority records.
 DTW 2015 MPU Forecast—LeighFisher, February 2016.
 FAA 2015 TAF Final—Final version provided by U.S. Department of Transportation, Federal Aviation Administration to Wayne County Airport Authority.
 DTW 2009 MP—Jacobsen|Daniels Associates, November 2009.

1.3 Air Cargo

Figure 1-2 presents historical air cargo (in metric tons) for 1990 through 2015 and forecasts for 2016 through 2035. (The FAA does not prepare cargo forecasts for individual airports as part of the TAF.) Since 2000, the cargo industry nationwide and at DTW 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 mail substitutes (e.g., email). Total cargo (enplaned and deplaned air freight and mail) is forecast to increase an average of 1.7% per year between 2015 and 2035 at the Airport as shown on Figure 1-2.

Figure 1-2
HISTORICAL AND FORECAST AIR CARGO
 Detroit Metropolitan Wayne County Airport



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.

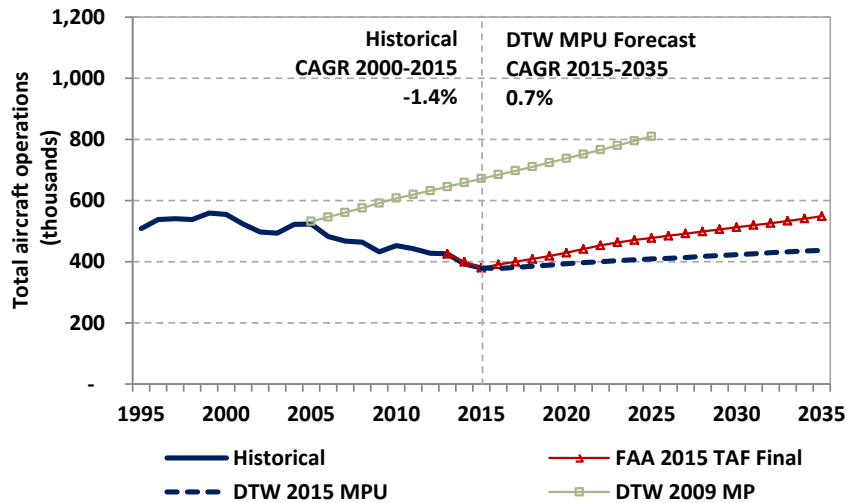
CAGR = Compound annual growth rate

Sources: Historical—Wayne County Airport Authority records.
 DTW 2015 MPU Forecast—LeighFisher, February 2016.
 DTW 2009 MP Forecast—Jacobsen|Daniels Associates, November 2009.

1.4 Aircraft Operations

Figure 1-3 presents historical total aircraft operations for 1990 through 2015 and forecasts for 2016 through 2035, compared with the 2009 Master Plan forecasts and the FAA 2015 TAF for the Airport. Total aircraft operations include air carrier, air taxi and commuter, general aviation, and military takeoffs and landings. The total aircraft operations forecasts are based on 2015 data and are within 8.5% of the FAA 2015 TAF in 2020 and 14.9% in 2025. The forecast average growth rate in total aircraft operations of 0.7% per year between 2015 and 2035 is lower than the rate forecast by the FAA in its 2015 TAF for the Airport (an average of 1.9% per year) from FFY 2015 to FFY 2035. A detailed comparison of the Master Plan Update aircraft operations forecasts and the FAA 2015 TAF is presented in Section 7.

Figure 1-3
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS
 Detroit Metropolitan Wayne County Airport



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 annual growth rate

Sources: Historical—Wayne County Airport Authority records.
 DTW 2015 MPU Forecast—LeighFisher, February 2016.
 FAA 2015 TAF Final—U.S. Department of Transportation, Federal Aviation Administration, www.faa.gov, accessed February 2016.
 DTW 2009 MP Forecast: Jacobsen | Daniels Associates, November 2009.

1.5 Airport Service Region

For the purposes of this study, the region served by the Airport includes a primary and secondary area. The primary area of the Airport service region is defined as the 10-county Detroit-Warren-Ann Arbor Combined Statistical Area (the Detroit Primary Area or Detroit CSA) which includes the Detroit-Warren-Dearborn Metropolitan Statistical Area (MSA), the Ann Arbor MSA, the Flint MSA, the Monroe MSA, and the Adrian Micropolitan Statistical Area. The Detroit Primary Area includes the counties of Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne with a combined population of 5.3 million in 2014, as shown in Table 1-1 and on Figure 1-4. Because economic growth and activity within the primary area stimulate a significant portion of passenger demand at the Airport, statistics for these 10 counties were used to evaluate aviation activity trends at the Airport.

The secondary area served by the Airport, which includes many of the counties surrounding the 10-county primary area, 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. Six airports with commercial passenger airline service are within 100 miles of Detroit and provide limited scheduled airline service (as of July 2016):

- Windsor International Airport, a Canadian airport located 29 road miles east of DTW with an average of 10 daily departures
- Pontiac’s Oakland County Airport, a non-hub airport located 39 road miles north of DTW with an average of 1 daily departure
- Toledo Express Airport, a non-hub airport located 65 road miles southwest of DTW with an average of 4 daily departures
- Flint’s Bishop International Airport, a small-hub airport located 79 road miles northwest of DTW with an average of 15 daily departures
- Lansing’s Capital Region International Airport, a non-hub airport located 98 road miles northwest of DTW with an average of 10 daily departures, including 5 to DTW
- Saginaw International Airport, a non-hub airport located 136 road miles northwest of DTW with an average of 9 daily departures, including 5 to DTW

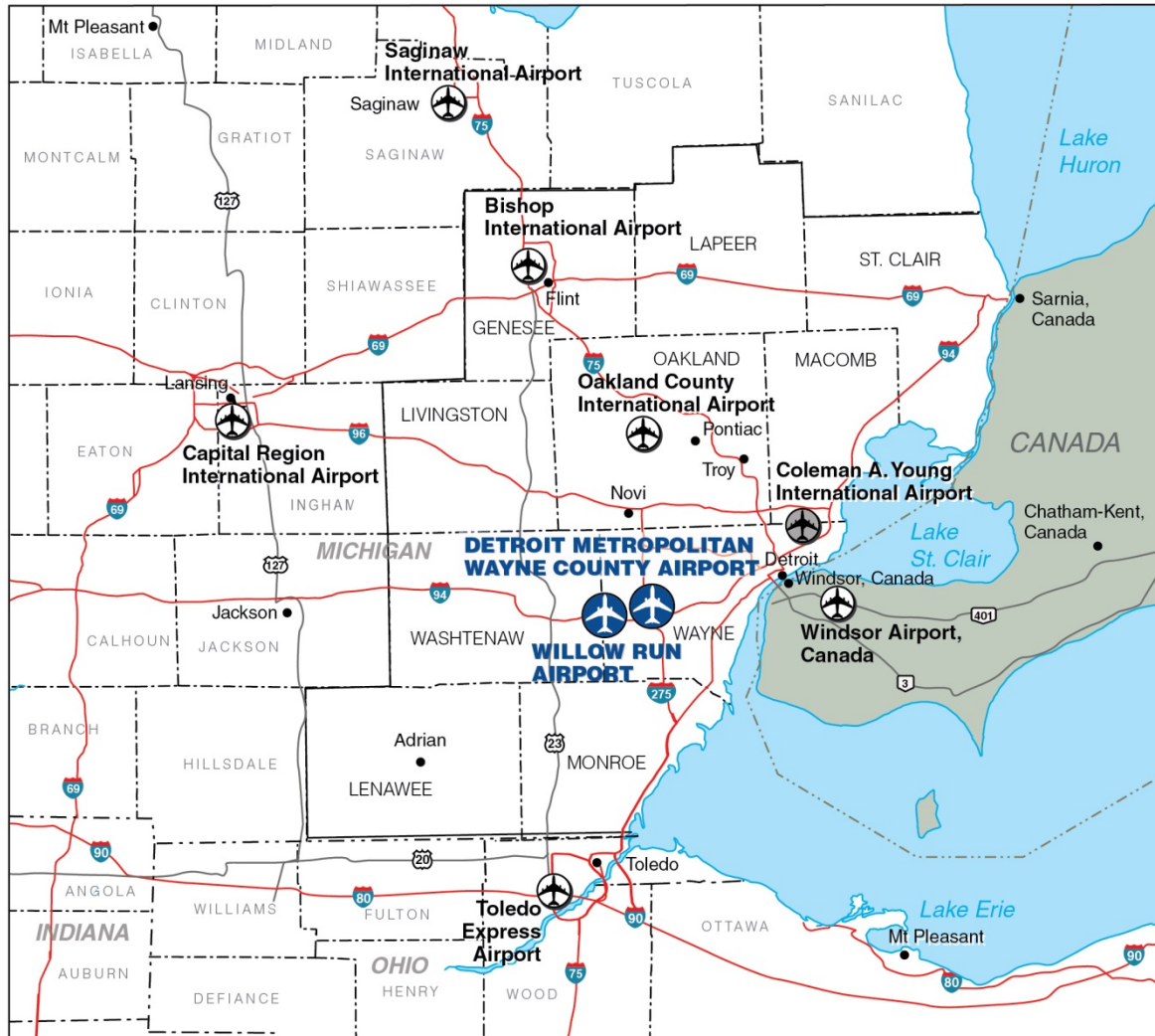
In addition, Fort Wayne International Airport, a non-hub airport with an average of 23 daily departures in July 2016 (including 3 to DTW), is located approximately 162 road miles southwest of DTW. Cleveland-Hopkins International Airport, a medium-hub airport with an average of 145 daily departures in July 2016 (including 4 to DTW), is located approximately 170 road miles southeast of DTW.

**Table 1-1
DETROIT PRIMARY AREA POPULATION IN 2014**

County	Population	Percent of total
Wayne	1,764,804	33.2%
Oakland	1,237,868	23.3
Macomb	860,112	16.2
Genesee	412,895	7.8
Washtenaw	356,874	6.7
Livingston	185,596	3.5
St. Clair	160,078	3.0
Monroe	149,824	2.8
Lenawee	99,047	1.9
Lapeer	<u>88,153</u>	<u>1.710</u>
	5,315,251	100.0%

Source: U.S. Department of Commerce, Bureau of the Census, www.census.gov, accessed December 2015.

Figure 1-4
AIRPORT SERVICE REGION
 Detroit Metropolitan Wayne County Airport



- Primary Area
- Wayne County Airport System Airports
- Other commercial service airport
- Non commercial service airport
- International boundary
- State boundary
- County boundary



Road miles from Detroit Metropolitan Wayne County Airport to:	
Fort Wayne	157
Grand Rapids	147
Cleveland	146
Saginaw	136
Kalamazoo	124
Lansing	98
Flint	79
Toledo	65
Pontiac	39
Windsor	29

Note: Road miles shown are from DTW to the airports located in each city listed.
 Source: Google Maps, www.google.com.

1.6 Airport Role

The role of an airport is important in evaluating the domestic and international components of aviation activity and preparing forecasts. DTW has an important role in the global, national, State, and local air transportation systems and is the 17th busiest airport in the United States, in terms of 2014 total passengers (enplaned plus deplaned). The importance of the Airport is reflected in its large origin-destination (O&D) passenger base, its role as the primary connecting hub in Delta's system, and its role as mid-Continental gateway for Delta Air Lines.

1.6.1 *Airport's Role as an Origin-Destination Airport*

The Airport's large O&D passenger base is related to the strength of the Airport service region's economy and supports the continued service development by Delta and other airlines at the Airport. In 2015, an estimated 8.9 million outbound O&D passengers boarded flights at the Airport (i.e., these O&D passengers did not connect with another flight at the Airport).

1.7.2 *Airport's Role as a Connecting Hub*

The Airport serves as an important connecting hub in the route system of Delta Air Lines. The Airport is the third busiest airport in Delta's system in 2015, with 7.5% of total scheduled departing seats. Atlanta's Hartsfield - Jackson International Airport ranked first in Delta's system with 23.4% of total scheduled departing seats in 2015, followed by Minneapolis-St. Paul International Airport with 7.7%. Delta accounted for approximately 95% of all passengers connecting at the Airport in 2015.

1.7.3 *Airport's Role as an International Gateway*

The Airport's role as a developing international gateway is related to the economy of the Detroit Primary Area and the location of global companies, particularly those related to the automotive industry. The Airport is the third busiest international gateway in Delta's system in 2015, with 10.7% of international scheduled departing seats, as shown in Table 1-2. DTW's role as a major international gateway in Delta's system compliments its domestic connecting hub at the Airport, with approximately 80% of its international passengers connecting at DTW in 2015. DTW accounted for the largest share of Delta's seats to destinations in Asia and the South Pacific in 2015, with 24.1%. Delta accounted for approximately 84.3% of all international enplaned passengers at the Airport in 2015, with the remaining 15.7% provided by one U.S. airline (Spirit) and five foreign-flag airlines (Air Canada, Air France, Lufthansa, Royal Jordanian, and Virgin Atlantic). In 2015, approximately 65% of the international passengers enplaned at the Airport by airlines other than Delta were O&D passengers. Delta is the principal U.S. airline in the SkyTeam Alliance which currently has 20 full members with service to 177 countries in Africa, the Americas, Asia, Europe, and the Pacific.

Table 1-2
DELTA AIR LINES' INTERNATIONAL GATEWAYS IN THE UNITED STATES

U.S. gateway	Schedule departing seats from U.S. airports by international region						Percent of total
	Africa/ Middle East	Asia/Southw est Pacific	Europe	Latin America/ Caribbean	Canada	Total	
Atlanta	269,846	106,506	1,307,817	3,691,887	336,210	5,712,266	36.1%
New York (JFK)	169,395	102,432	1,571,800	1,365,571	201,955	3,411,153	21.5%
Detroit	--	515,596	691,616	262,138	227,236	1,696,586	10.7%
Minneapolis/St. Paul	--	101,457	460,383	180,870	504,755	1,247,465	7.9%
Los Angeles (LAX)	--	336,651	55,952	554,492	53,492	1,000,587	6.3%
Seattle	--	<u>451,401</u>	<u>310,172</u>	<u>7,938</u>	<u>168,909</u>	<u>938,420</u>	<u>5.9%</u>
U.S. gateways	439,241	1,614,043	4,397,740	6,062,896	1,492,557	14,006,477	88.4%
Other U.S. airports	--	<u>523,086</u>	<u>818,592</u>	<u>286,825</u>	<u>201,374</u>	<u>1,829,877</u>	<u>11.6%</u>
Total seats	439,241	2,137,129	5,216,332	6,349,721	1,693,931	15,836,354	100.0%
	Percent of total						
Atlanta	61.4%	5.0%	25.1%	58.1%	19.8%	36.1%	
New York (JFK)	38.6%	4.8%	30.1%	21.5%	11.9%	21.5%	
Detroit	--	24.1%	13.3%	4.1%	13.4%	10.7%	
Minneapolis/St. Paul	--	4.7%	8.8%	2.8%	29.8%	7.9%	
Los Angeles (LAX)	--	15.8%	1.1%	8.7%	3.2%	6.3%	
Seattle	--	<u>21.1%</u>	<u>5.9%</u>	<u>0.1%</u>	<u>10.0%</u>	<u>5.9%</u>	
U.S. gateways	100.0%	75.5%	84.3%	95.5%	88.1%	88.4%	
Other U.S. airports	<u>0.0%</u>	<u>24.5%</u>	<u>15.7%</u>	<u>4.5%</u>	<u>11.9%</u>	<u>11.6%</u>	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Source: OAG Aviation Worldwide Ltd, OAG Analyser database, accessed July 2016.

2.0 ECONOMIC BASIS FOR AIRLINE TRAFFIC

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 O&D passenger demand. In 2015, approximately 53% of the Airport’s passengers were O&D passengers; the remaining 47% were connecting passengers.

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 Detroit Primary Area, comparative unemployment rates, and conventions and tourism. Also provided is a summary of the economic outlook for world regions, the United States, Michigan, and the Detroit Primary Area.

2.1 Population

Historically, population growth in the Detroit Primary Area and the State has lagged growth in the nation. From 1990 to 2015, population in the Detroit Primary Area and Michigan increased an average of 0.1% and 0.3% per year, respectively, while population in the nation increased an average of 1.0% per year, as shown in Table 2-1. The Southeast Michigan Council of Governments (SEMCOG)* projects population in the Detroit Primary Area to increase an average of less than 0.1% per year between 2015 and 2035, compared with forecast increases of less than 0.1% per year than in the State and 0.8% per year in the nation.

2.2 Employment

From 2000 to 2010, nonagricultural employment in the Detroit Primary Area decreased an average of 2.2% per year, reflecting the effects of two national economic recessions, the financial credit crisis, and the bankruptcies of two major Detroit auto manufacturers, as shown in Table 2-1. Since the end of the recession in 2009, nonagricultural employment growth in the Detroit Primary Area has returned, with an average increase of 1.3% per year between 2010 and 2015. SEMCOG projects nonagricultural employment in the Detroit Primary Area to increase an average of 0.3% per year between 2015 and 2035, compared with forecast increases of 0.4% per year than in the State and 0.7% per year in the nation.

2.3 Income

From 1990 to 2014 (the most recent year available), per capita personal income in the Detroit Primary Area increased an average of 0.6% per year, slower than that for the State (an average of 0.7% per year) and the nation (an average of 1.1% per year), as shown in Table 2-1. Similar to employment trends, per capita income growth in the Detroit Primary Area has returned since the end of the 2009 recession, with an average increase of 1.7% per year between 2010 and 2015, faster than that for the State (an average of 1.6% per year) and the nation (an average of 1.3% per year). SEMCOG projects per capita personal income in the Detroit Primary Area to increase an average of 1.7% per year between 2014 and 2035.

2.4 Unemployment Rates

In addition to the employment trends discussed earlier, the unemployment rate is also indicative of general economic conditions. Table 2-2 shows comparative annual unemployment rates in the Detroit Primary Area, the State, and the nation as a whole for 2000 through 2015. Unemployment rates in the Detroit Primary Area have generally followed but remained higher than national trends since 2001.

*SEMCOG region includes the counties of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

Table 2-1
HISTORICAL AND PROJECTED SOCIOECONOMIC DATA

	Population (thousands)			Nonagricultural employment (thousands)			Per capita income (2014 dollars)		
	Detroit Primary Area	State of Michigan	United States	Detroit Primary Area	State of Michigan	United States	Detroit Primary Area	State of Michigan	United States
Historical									
1990	5,187	9,295	248,791	1,284	3,944	109,527	37,744	34,322	35,485
2000	5,457	9,939	281,425	1,326	4,676	132,024	46,029	41,275	42,071
2010	5,319	9,884	308,746	1,060	3,864	130,361	40,761	38,214	43,727
2011	5,309	9,877	311,719	1,076	3,952	131,932	41,962	39,301	44,679
2012	5,312	9,887	314,103	1,093	4,034	134,175	42,782	39,854	45,643
2013	5,315	9,901	316,427	1,103	4,110	136,381	42,639	39,833	45,159
2014	5,315	9,916	318,907	1,115	4,182	138,958	43,662	40,740	46,049
2015	n.a.	9,923	321,419	1,130	4,244	141,865	n.a.	n.a.	n.a.
Projected									
2020	5,284	10,013	334,818	1,144	4,379	148,304	50,142	46,695	50,637
2025	5,286	10,030	348,413	1,161	4,448	152,639	54,018	50,304	54,140
2030	5,320	10,012	362,516	1,179	4,518	157,117	57,906	54,192	57,723
2035	5,354	9,993	377,191	1,197	4,589	161,727	62,689	58,380	61,505
	Compound annual percent increase (decrease)								
Historical									
1990-2000	0.5%	0.7%	1.2%	0.3%	1.7%	1.9%	2.0%	1.9%	1.7%
2000-2010	(0.3)	(0.1)	0.9	(2.2)	(1.9)	(0.1)	(1.2)	(0.8)	0.4
2010-2015	(0.0) (a)	0.1	0.8	1.3	1.9	1.7	1.7 (a)	1.6 (a)	1.3 (a)
1990-2015	0.1 (a)	0.3	1.0	(0.5)	0.3	1.0	0.6 (a)	0.7 (a)	1.1 (a)
Projected									
2015-2020	(0.1) (a)	0.2	0.8	0.3	0.6	0.9	2.3 (a)	2.3 (a)	1.6 (a)
2020-2025	0.0	0.0	0.8	0.3	0.3	0.6	1.5	1.5	1.3
2025-2030	0.1	0.0	0.8	0.3	0.3	0.6	1.4	1.5	1.3
2030-2035	0.1	0.0	0.8	0.3	0.3	0.6	1.6	1.5	1.3
2015-2035	0.0 (a)	0.0	0.8	0.3	0.4	0.7	1.7 (a)	1.7 (a)	1.4 (a)

Note: The Detroit Primary Area includes Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties.

(a) Represents the increase from 2014.

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, www.bea.gov, accessed January 2016. Adjusted to constant 2014 dollars using the U.S. Department of Labor, Consumer Price Index for Urban Consumers (1982-84 = 100), www.bls.gov. Historical growth rates for income are through 2014, the latest year available.

Projected—Southeast Michigan Council of Governments (SEMCOG), *Retrenchment and Renewal, The Economic and Demographic Outlook for Southeast Michigan through 2040*, March 2012. University of Michigan, Institute for Research on Labor, Employment, and the Economy, *The Economic and Demographic Outlook for Michigan through 2040*, March 2012. U.S. Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2015 to 2025*, August 2015, www.cbo.gov. Projections for 2035 were extrapolated by LeighFisher based on projected growth rates between 2020 and 2025. U.S. Census Bureau, Population Division, *Table 1. Projections of the Population and Components of Change for the United States: 2015 to 2060*, December 2014, www.census.gov.

Table 2-2
COMPARATIVE UNEMPLOYMENT RATES

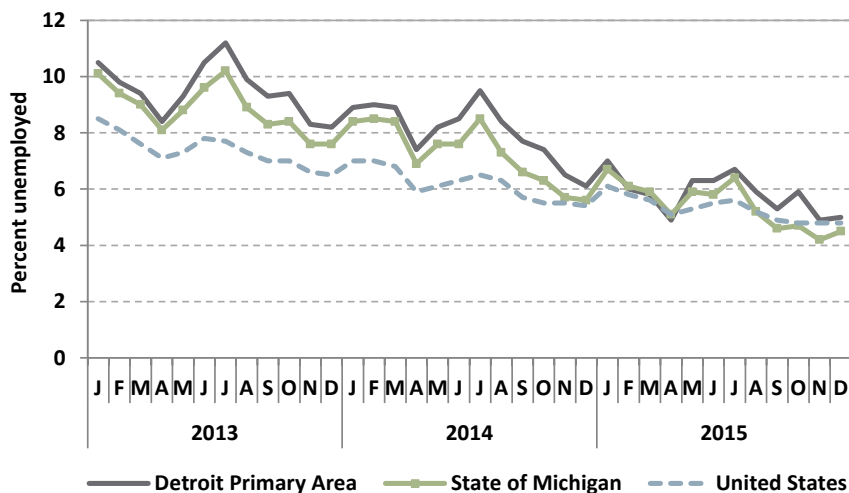
	Detroit Primary Area	State of Michigan	United States
2000	3.4%	3.6%	4.0%
2001	5.0	5.2	4.7
2002	6.2	6.3	5.8
2003	7.1	7.2	6.0
2004	7.1	7.0	5.5
2005	6.8	6.8	5.1
2006	7.0	7.0	4.6
2007	7.1	7.0	4.6
2008	8.2	8.0	5.8
2009	14.6	13.7	9.3
2010	13.4	12.6	9.6
2011	11.0	10.4	8.9
2012	9.7	9.1	8.1
2013	9.5	8.8	7.4
2014	8.0	7.3	6.2
2015	5.8	5.4	5.3

Note: Unemployment rates are not seasonally adjusted.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed March 2016.

Since the end of the recession in June 2009, monthly unemployment rates in the Detroit Primary Area, the State of Michigan, and the United States have decreased, as shown on Figure 2-1. In December 2015, the unemployment rate (unadjusted) for the Detroit Primary Area was 5.0%, higher than the State (4.5%) and the nation (4.8%).

Figure 2-1
MONTHLY UNEMPLOYMENT TRENDS



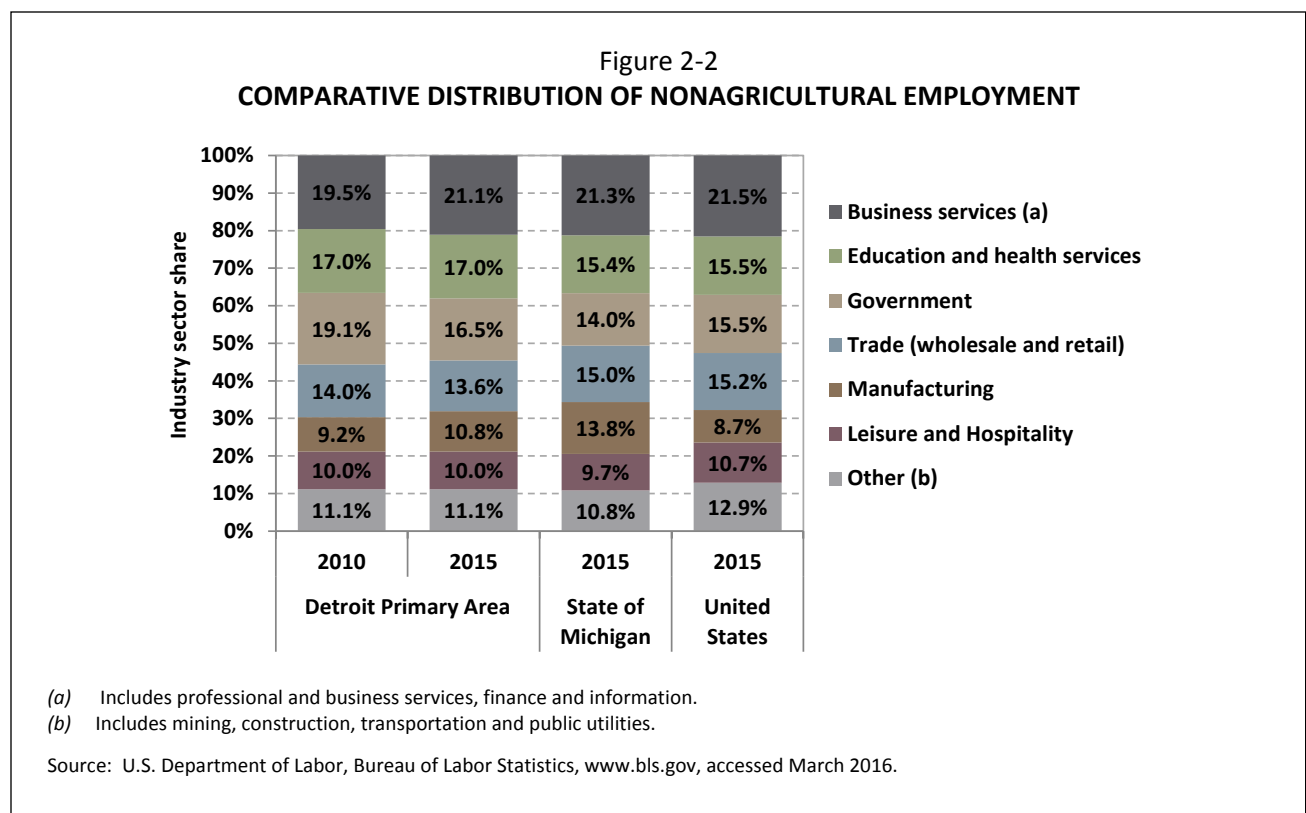
Note: Unemployment rates are not seasonally adjusted.

Source: U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed March 2016.

2.5 Nonagricultural Employment by Sector

Figure 2-2 shows a comparative distribution of nonagricultural employment by industry sector for the Detroit Primary Area in 2010 and in 2015, and for the State and the nation in 2015.

- Business Services.** Business services in the Detroit Primary Area accounted for the largest share of nonagricultural employment, with 19.5% in 2010 and 21.1% in 2015. From 2010 to 2015, the Detroit Primary Area’s employment in business services increased an average of 2.8% per year, with the strongest growth in professional, business, finance, and information services.*
- Education and Health Services.** Employment in education and health services in the Detroit Primary Area increased an average of 1.2% per year between 2010 and 2015. The share of education and health services employment in the Detroit Primary Area maintained a market share of 17.0% in 2010 and 2015.
- Government.** Employment by federal, state and local government agencies** accounted for the third largest share of nonagricultural employment and decreased an average of 1.7% per year between 2010 and 2015. The share of government employment in the Detroit Primary Area decreased from 19.1% in 2010 to 16.5% in 2015.



*Information services includes traditional, Internet, and software publishing; the motion picture and sound recording industries; the broadcasting industries; the telecommunications industries; Web search portals, data processing industries; and the information services industries.

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

- **Trade.** Trade is comprised of wholesale and retail trade. From 2010 to 2015, the Detroit Primary Area's employment in trade increased an average of 0.6% per year, reflecting growth in both wholesale and retail trade. The share of trade employment in the Detroit Primary Area decreased from 14.0% in 2010 to 13.6% in 2015.
- **Manufacturing.** Manufacturing employment in the Detroit Primary Area experienced the strongest employment growth of any industry sector between 2010 and 2015—an average increase of 4.5% per year, reflecting the recovery of the regional economy and automotive industry. The share of manufacturing employment in the Detroit Primary Area increased from 9.2% in 2010 to 10.8% in 2015.
- **Leisure and Hospitality Services.** The Detroit Primary Area's employment in leisure and hospitality services increased an average of 1.2% per year between 2010 and 2015. Leisure and hospitality services in the Detroit Primary Area maintained a market share of 10.0% in 2010 and 2015.
- **Other Activities.** Other employment in the Detroit Primary Area increased an average of 1.3% per year between 2010 and 2015. The share of other employment in the Detroit Primary Area remained unchanged with 11.1% in 2010 and 2015.

2.6 Industry Clusters

The economy of the Detroit Primary Area is driven by companies that export goods and services nationally and globally, bringing in new investment and jobs that support economic growth as well as air service development. Companies that make up industry clusters, also referred to as the "traded sector," tend to *cluster* because they draw competitive advantage from their proximity to competitors, to a skilled workforce, to specialized suppliers, and to a shared base of sophisticated knowledge about their industry.

The Detroit Regional Chamber identifies five industry clusters in the Detroit Primary Area.

- **Automotive.** The Detroit Primary Area is recognized as the center of the global automotive industry. As home to the Big Three automakers—General Motors, Ford, and Chrysler (FCA US), the Detroit Primary Area is a center for the trade of automotive imports and exports, auto-related research and development, and supporting industries such as motor vehicle parts manufacturers and tool and die companies. In addition, Detroit attracts a highly skilled workforce with a high concentration of industrial and mechanical engineers that support the auto industry. According to the Michigan Department of Treasury, Michigan motor vehicle production increased 11.2% between November 2014 and November 2015 (the most recent data available) and accounted for more than 19.5% of U.S. vehicle production.*
- **Defense.** In 2015, the Detroit Region was home to 3,307 businesses serving the defense industry which together support over 94,000 jobs, with annual average wages of more than \$90,000. The Detroit region is a central site for military research and development facilities and purchasing centers, including the Tank Automotive Research, Development and Engineering Center (TARDEC), TACOM Life Cycle Management Command, Selfridge Air National Guard Base, and the Michigan Defense Center.
- **Healthcare.** According to Detroit Regional Chamber, the health care industry in the Detroit Primary Area includes more than 13,000 health care-related businesses which provide 366,000 jobs in the region and has an overall economic impact of \$36 billion annually. The Detroit Region's healthcare industry is supported by the research conducted at Michigan State University, Oakland University,

*Michigan Department of Treasury, *Michigan Economic Update*, November 2015, www.michigan.gov/treasury.

Wayne State University, the University of Detroit-Mercy, and the University of Michigan and the clinical trials performed at the Detroit Medical Center, Henry Ford, and Beaumont hospitals.

- **Information Technology.** The information technology sector in the Detroit Primary Area provided more than 61,000 jobs in 2014 with an average salary of \$92,000, according to Detroit Regional Chamber. Major information technology companies in the Detroit Region include Compuware, Syntel, and Tata Technologies.
- **Global Logistics.** The Detroit Primary Area’s transportation, distribution and logistics infrastructure is extensive, including nine intermodal assets, three marine ports, eight rail yards, nine airports and air fields, and interstates that reach from Canada to Mexico via Detroit. According to the Detroit Regional Chamber, good exports from the State of Michigan supported over 270,000 jobs, nearly 75% of which are in the Detroit Primary Area.

2.7 Major Employers

Table 2-3 lists the 10 largest employers in the Detroit Region in 2014 (the most recent year available). The three largest employers—Ford Motor Company, General Motors Corporation, and Fiat Chrysler Automobiles—together accounted for 113,000 employees. Although the auto industry continues to be an important employer in the Detroit Primary Area, the Detroit economy has become increasingly diverse and less affected by changes in the auto industry. As noted in section 2.5, business services and education and healthcare sectors account for 38.1% of total employment in the Detroit Primary Area with approximately 430,000 jobs in 2015.

Table 2-3
MAJOR EMPLOYERS IN THE DETROIT REGION

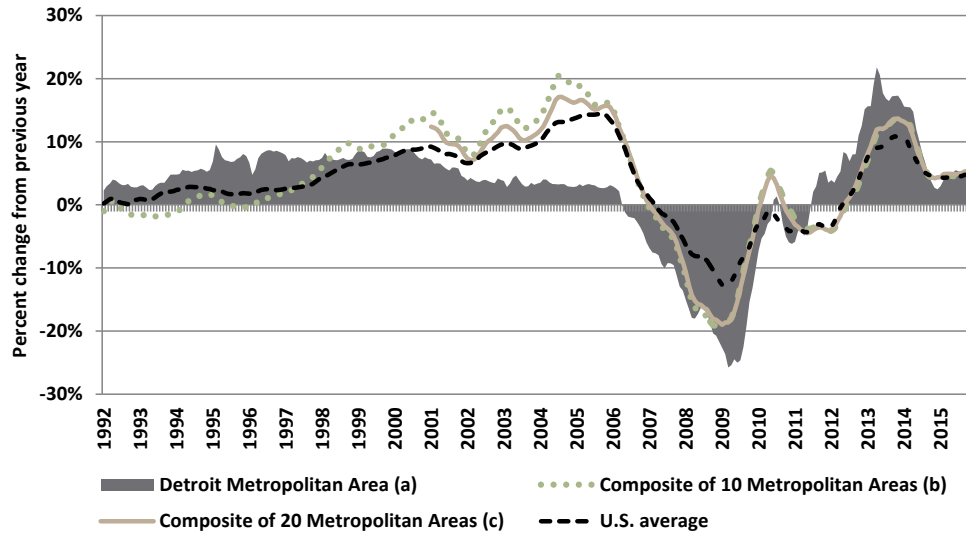
Rank	Company	Regional headquarters	Number of employees
1	Ford Motor Company	Dearborn	42,750
2	General Motors Corporation	Detroit	39,561
3	Fiat Chrysler Automobiles (FCA)	Auburn Hills	30,579
4	University of Michigan	Ann Arbor	29,855
5	U.S. Government	Detroit	19,010
6	Henry Ford Health System	Detroit	17,949
7	Beaumont Health System	Royal Oak	16,456
8	Trinity Health	Livonia	13,687
9	Detroit Medical Center	Detroit	11,868
10	U.S. Postal Service	Detroit	11,600

Source: Crain's Detroit Business as reported by the Detroit Regional Chamber, www.detroitchamber.com.

2.8 Regional Housing Market

Figure 2-3 presents the percent change in home prices for Detroit and composites for 10 and 20 selected metropolitan areas from January 1992 through December 2015, based on the Standard & Poor’s/Case-Shiller Home Price Index. Between 2000 and 2005, home prices in Detroit increased an average of approximately 5%, less than the 10% to 15% gains recorded in other U.S. metropolitan areas. Home prices in Detroit began to decrease in May 2006, before the start of the economic recession in December 2007, and continued to decrease through June 2011. Since then, Detroit housing prices have increased each month, with slower but continued growth since August 2014.

Figure 2-3
PERCENT CHANGE IN HOME PRICES
 Detroit and Selected Metropolitan Areas



Note: Data begins in 1991 for Detroit and in 2011 for the composite of 20 metropolitan areas.

- (a) Includes data for the Detroit MSA.
- (b) Includes Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, D.C.
- (c) Includes Atlanta, Charlotte, Cleveland, Dallas, Detroit, Minneapolis, Phoenix, Portland, Seattle, and Tampa in addition to the areas mentioned above.

Source: Standard & Poor's/Case-Shiller Home Price Indices, www.standardandpoors.com, accessed March 2016.

2.9 Conventions and Tourism

Conventions and tourism represent an increasingly important source of economic activity in the Detroit Primary Area. The leisure and hospitality sector in the Detroit Primary Area provided 113,000 jobs in 2015. Detroit points of interest include the Henry Ford Museum, the North American International Auto Show, Detroit's Cultural Center, the Motown Museum, Sea Life Michigan Aquarium, the Detroit Zoo, the Michigan Science Center, and sporting venues at Comerica Park and Ford Field. In 2014 (the most recent year available), the State of Michigan hosted more than 113 million visitors with total spending of \$22.8 billion (3.8% more than in 2013).*

The Detroit Primary Area is an increasingly popular location for meetings and conventions. According to the Detroit Metro Convention and Visitors Bureau, more than 1.3 million people attended conventions at the Cobo Center in 2015. The Cobo Convention Center, a 2.4 million square foot complex with 725,000 square feet of exhibition space and 75 meeting rooms, is located on the bank of the Detroit River and is the centerpiece of downtown Detroit's civic center.

2.10 Economic Outlook

The economic outlook for the United States, the State of Michigan, and the Detroit Primary Area forms a basis for anticipated growth in airline traffic at the Airport. Economic activity in the Detroit Primary Area

*Tourism Economics, *The Economic Impact of Travel in Michigan*, Tourism Satellite Account, Calendar Year 2014.

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 and among the regional, State, national, and global economies. The economic and other assumptions underlying the forecasts of enplaned passengers are based on a review of global, national, State, and regional economic outlooks as well as an analysis of historical socioeconomic trends and airline traffic trends, as presented in the section titled “Historical Passenger Airline Traffic.”

2.10.1 Global Economy

Globalization of the world economy has created linkages between national economies that relate not only to trade but also to air travel. The Detroit Primary Area and the State have strong linkages to the global economy through its primary industry sectors, particularly the automotive industry, and the five world regions (Asia, Canada, Europe, Latin America, and the Middle East) that are currently served at the Airport. 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 are shown in Table 2-4. Continued growth in the economies of the world regions most closely aligned with the Detroit economy and airline service at the Airport are expected to contribute to continued growth in passenger traffic at the Airport.

**Table 2-4
HISTORICAL AND PROJECTED GDP GROWTH BY WORLD REGION**

World region	Average annual percent increase (decrease) in GDP (constant U.S. dollars)		
	Historical		Forecast
	1990-2000	2000-2014	2014-2035
Asia	n.a.	4.8%	4.3%
Canada	1.9%	1.6	1.5
Europe (a)	(1.2) (b)	2.5	2.4
Latin America	3.6	3.2	3.4
United States	3.4	1.8	2.4
World	1.8	3.3	3.1

n.a. = not available

(a) Data are for the countries that have adopted the Euro.

(b) Percent change between 1991 and 2000.

Source: Global Insight as reported in U.S. Department of Transportation, Federal Aviation Administration, *FAA Aerospace Forecasts, Fiscal Years 2015-2035*, March 2015.

2.10.2 U.S. Economy

The U.S. economy has grown at a slow to moderate pace since the 2008-2009 economic recession. In January 2016, the Congressional Budget Office (CBO) projected U.S. economic growth, as measured by U.S. GDP in constant dollars, to increase 2.5% in 2016 and 2.6% in 2017, and then settle into a longer-term 2.0% rate of growth through 2026. The CBO projects that the unemployment rate will decrease to 4.7% in 2016 and 4.4% in 2017, then increase to 4.6% in 2017, 4.8% in 2018, and average 5.0% through FY 2021.*

*Congressional Budget Office, *Economic Outlook: Fiscal Years 2016-2026*, January 2016, www.cbo.gov.

2.10.3 Michigan Economy

In its January 2016 economic and revenue outlook, the Michigan Department of Treasury forecast continued economic growth for the State of Michigan through 2018.* In particular:

- Michigan wage and salary employment is forecast to increase 1.3% in 2016, 1.4% in 2017 and 1.0% in 2018
- The Michigan unemployment rate is forecast to continue to decrease each year with the rate falling to 4.9% in 2016, 4.7% in 2017 and 4.6% in 2018
- Michigan wages and salaries are forecast to increase 4.7% in 2016, 4.0% in 2017, and 3.8% in 2018

Long-term economic forecasts for the State of Michigan are presented in Table 2-1.

2.10.4 Detroit Economy

In March 2012, SEMCOG completed its long-range regional economic forecast through 2040.** SEMCOG's forecasts are used for land-use and transportation planning. SEMCOG expects that future economic growth in southeast Michigan will be affected by the U.S. economy, the automotive industry, and investments in education and training to promote the diversification of the regional economy. In addition, SEMCOG expects that regional demographic trends will be important in the future, in terms of the size and growth of the labor force in supporting economic activity and influencing the level of consumer purchases. SEMCOG forecasts slow economic growth for the Detroit Primary Area between 2015 and 2035, including:

- Population growth of less than 0.1% per year, reflecting a continuation through 2030 of the outmigration trends experience since 2000
- Nonagricultural employment growth of 0.3% per year, with the strongest growth expected in education and healthcare services
- Per capita income growth, in constant dollars, of 1.7% per year

2.10.5 Economic Basis for Forecast Aviation Demand

The economic outlook for world regions, the United States, the State of Michigan, and the Detroit Primary Area form a basis for anticipated growth in aviation demand at the Airport. Employment and income projections for the Detroit Primary Area and the State of Michigan are for slow to moderate economic growth, particularly in the automotive industry, defense sector, education and health care services, information technology, and global logistics. Factors expected to contribute to economic growth in the Detroit Primary Area 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 Detroit 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 6.

*Michigan Department of Treasury, *Economic and Revenue Outlook*, January 2016, www.michigan.gov/treasury.

**Southeast Michigan Council of Governments (SEMCOG), *Retrenchment and Renewal, The Economic and Demographic Outlook for Southeast Michigan through 2040*, March 2012.

3.0 HISTORICAL PASSENGER AIRLINE TRAFFIC

Historical and future passenger airline traffic is influenced by a number of factors including (1) the diversity of airline service at an airport, (2) the passenger market shares of the airlines providing service, (3) trends in national and international passenger traffic, and (4) passenger traffic at other airports in the region.

3.1 Airlines Serving the Airport

The Airport is served by 25 passenger airlines, including 4 network airlines, 12 regional affiliates of which four are associated with more than one network airline, 4 low-cost carriers, and 5 foreign-flag airlines, as shown in Table 3-1.

Table 3-1
PASSENGER AIRLINES
Detroit Metropolitan Wayne County Airport

Network airlines	Regional airlines (affiliation)	Low cost carriers	Foreign-flag airlines
Alaska Airlines	Air Wisconsin (American)	Frontier Airlines (a)	Air Canada
American Airlines (b)	Compass (Delta)	JetBlue Airways	Air France
Delta Air Lines (c)	Endeavor (Delta)	Southwest Airlines (d)	Lufthansa Airlines
United Airlines (e)	Envoy (American)	Spirit Airlines	Royal Jordanian
	ExpressJet (Delta)		Virgin Atlantic Airways
	GoJet (Delta, United)		
	Mesa (United)		
	PSA (American)		
	Republic (American, United)		
	Shuttle America (Delta, United)		
	SkyWest (American, Delta, United)		
	TransStates (American)		

(a) Frontier was acquired by Indigo Partners LLC in December 2013 and restructured its fares in 2014 to that of an “ultra” LCC, i.e., a low cost airline with a simplified fare structure and a la carte pricing.
 (b) American completed its merger with US Airways on December 9, 2013.
 (c) Delta completed its merger with Northwest on October 29, 2008.
 (d) Southwest completed its merger with AirTran on May 2, 2011.
 (e) United completed its merger with Continental on October 1, 2010.

Sources: Wayne County Airport Authority records and OAG Worldwide Aviation Ltd, OAG Analyser database, accessed March 2016.

3.2 Enplaned Passengers

Between 2000 and 2015, the number of enplaned passengers at the Airport decreased an average of 0.2% per year, with annual variations, as shown in Table 3-2 and on Figure 3-1. DTW passenger traffic remained relatively unchanged between 2000 and 2005 (an average increase of 0.1% per year). Between 2005 and 2010, the period including the 2008-2009 recession, and bankruptcies in the Detroit Region auto industry, the number of passengers at the Airport decreased an average increase of 2.2% per year. Between 2010 and 2015, passenger traffic growth returned, increasing an average of 0.6% per year, including a 2.9% increase between 2014 and 2015, reflecting a 2.5% in scheduled departing seats, including additional service by Spirit, Southwest, and JetBlue and new service by Virgin Atlantic.

Table 3-2
HISTORICAL ENPLANED PASSENGERS BY AIRLINE TYPE
 Detroit Metropolitan Wayne County Airport

Year	Domestic			Total	International		Total enplaned passengers	
	Network airlines (a)	Regional airlines (b)	Low cost carriers		U.S. airlines (a)	Foreign-flag airlines (a)		
2000	12,877,089	1,526,582	1,107,780	15,511,451	1,311,695	310,004	17,133,150	
2001	11,601,799	1,459,004	1,079,659	14,140,462	1,234,861	163,110	15,538,433	
2002	11,172,821	1,556,481	1,101,851	13,831,153	1,160,045	192,027	15,183,225	
2003	11,379,368	2,405,075	1,265,513	15,049,956	1,145,187	164,522	16,359,665	
2004	12,147,390	2,726,408	1,311,106	16,184,904	1,275,716	147,493	17,608,113	
2005	11,984,318	3,413,539	1,236,508	16,634,365	1,333,528	184,540	18,152,433	
2006	11,640,695	3,353,817	1,519,673	16,514,185	1,278,299	183,365	17,975,849	
2007	11,643,718	3,272,350	1,549,850	16,465,918	1,321,921	217,511	18,005,350	
2008	10,723,333	3,931,625	1,323,102	15,978,060	1,277,775	240,035	17,495,870	
2009	8,903,022	4,389,107	1,098,210	14,390,339	1,038,615	164,121	15,593,075	
2010	8,393,468	5,309,385	1,174,233	14,877,086	1,175,072	152,518	16,204,676	
2011	7,695,168	5,887,780	1,317,350	14,900,298	1,140,724	161,651	16,202,673	
2012	7,388,202	5,950,905	1,369,473	14,708,580	1,209,304	161,148	16,079,032	
2013	7,611,193	5,672,378	1,449,645	14,733,216	1,254,707	160,249	16,148,172	
2014	8,047,705	5,116,245	1,620,529	14,784,479	1,262,445	166,810	16,213,734	
2015	8,555,457	4,799,655	1,924,013	15,279,125	1,214,182	192,778	16,686,085	
	Percent increase (decrease)							
2010-2011	(8.3%)	10.9%	12.2%	0.2%	(2.9%)	6.0%	(1.9%)	0.0%
2012-2013	3.0	(4.7)	5.9	0.2	3.8	(0.6)	3.2	0.4
2013-2014	5.7	(9.8)	11.8	0.3	0.6	4.1	1.0	0.4
2014-2015	6.3	(6.2)	18.7	3.3	(3.8)	15.6	(1.6)	2.9
	Compound annual percent increase (decrease)							
2000-2005	(0.1%)	1.5%	0.2%	0.1%	0.0%	(0.9%)	(0.1%)	0.1%
2005-2010	(6.9)	9.2	(1.0)	(2.2)	(2.5)	(3.7)	(2.6)	(2.2)
2010-2015	0.4	(2.0)	10.4	0.5	0.7	4.8	1.2	0.6
2000-2015	(2.7)	7.9	3.7	(0.1)	(0.5)	(3.1)	(0.9)	(0.2)

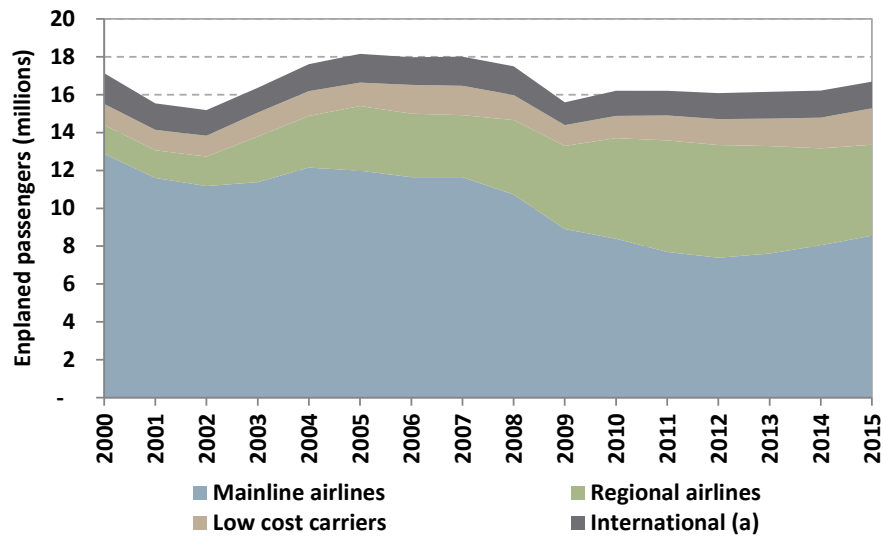
(a) Includes passengers enplaned on charter airlines.

(b) Includes passengers enplaned on Canadian airlines (pre-cleared and counted as domestic).

Sources: 2000-2002—U.S. Department of Transportation, Schedule T100, online database, accessed March 2016.

2003-2015—Wayne County Airport Authority records.

Figure 3-1
HISTORICAL ENPLANED PASSENGERS
 Detroit Metropolitan Wayne County Airport



Note: Data are for domestic enplaned passengers, except as noted. See Table 3-2.

(a) Includes U.S. and foreign-flag airline enplaned passengers.

Sources: 2000-2002—U.S. Department of Transportation, Schedule T100, online database, accessed March 2016.
 2003-2015—Wayne County Airport Authority records.

3.2.1 Enplaned Passengers by Airline Type

Passenger traffic of network airlines such as American, Delta, and United at the Airport has decreased since 2000 (an average decrease of 2.7% per year between 2000 and 2015), reflecting the increasing use of regional affiliates, as shown in Table 3-2. Although regional airlines experienced the strongest growth in passenger traffic at the Airport between 2000 and 2015 (an average increase of 7.9% per year), the number of regional airline passengers has decreased since 2012 with the retirement of 50-seat regional jets and increases in network airline passengers. Low cost carrier passengers at the Airport increased an average of 3.7% per year between 2000 and 2015, with stronger growth between 2010 and 2015 (an average of 10.4% per year). International enplaned passengers on U.S. and foreign-flag airlines increased an average of 1.2% per year between 2010 and 2015, following decreases between 2000 and 2010.

3.2.2 Enplaned Passengers by Terminal

As shown in Table 3-3, the McNamara Terminal accounted for 76.1% of enplaned passengers at the Airport in 2015, with the North Terminal accounting for the remaining 23.9%. Delta Air Lines and its regional affiliates accounted for 99.2% of McNamara Terminal enplaned passengers in 2015, with two foreign-flag airlines—Air France* and Virgin Atlantic Airways—accounting for the remaining 0.8%. In the North Terminal, domestic enplaned passengers accounted for 97.1% of total in 2015, with low cost carriers ranking first with 48.2%, followed by network airlines (28.8%), and regional airlines (20.2%). International enplaned passengers accounted for the remaining 2.9% of North Terminal passengers in 2015.

*Delta Skyteam airline partner.

Table 3-3
HISTORICAL ENPLANED PASSENGERS BY TERMINAL
 Detroit Metropolitan Wayne County Airport

Terminal	Enplaned passengers			Percent of total		
	2013	2014	2015	2013	2014	2015
McNamara Terminal						
Domestic						
Delta Airlines						
Network	6,633,247	6,911,702	7,406,571	51.5%	54.9%	58.3%
Regional affiliates	<u>4,942,833</u>	<u>4,386,236</u>	<u>3,996,183</u>	<u>38.4%</u>	<u>34.8%</u>	<u>31.5%</u>
Subtotal--Domestic	11,576,080	11,297,938	11,402,754	89.9%	89.7%	89.8%
International						
Delta Airlines	1,219,736	1,224,721	1,186,390	9.5%	9.7%	9.3%
Foreign-flag airlines	<u>77,185</u>	<u>74,429</u>	<u>104,829</u>	<u>0.6%</u>	<u>0.6%</u>	<u>0.8%</u>
Subtotal--International	<u>1,296,921</u>	<u>1,299,150</u>	<u>1,291,219</u>	<u>10.1%</u>	<u>10.3%</u>	<u>10.2%</u>
McNamara Terminal Total	12,873,001	12,597,088	12,693,973	100.0%	100.0%	100.0%
North Terminal						
Domestic						
Airlines other than Delta Airlines						
Network (a)	977,946	1,136,003	1,148,886	29.9%	31.4%	28.8%
Regional affiliates (b)	729,545	730,009	803,472	22.3%	20.2%	20.1%
Low cost carriers	<u>1,449,645</u>	<u>1,620,529</u>	<u>1,924,013</u>	<u>44.3%</u>	<u>44.8%</u>	<u>48.2%</u>
Subtotal--Domestic	3,157,136	3,486,541	3,876,371	96.4%	96.4%	97.1%
International						
U.S. airlines other than Delta Airlines (a)	34,971	37,724	27,792	1.1%	1.0%	0.7%
Foreign-flag airlines	<u>83,064</u>	<u>92,381</u>	<u>87,949</u>	<u>2.5%</u>	<u>2.6%</u>	<u>2.2%</u>
Subtotal--International	<u>118,035</u>	<u>130,105</u>	<u>115,741</u>	<u>3.6%</u>	<u>3.6%</u>	<u>2.9%</u>
North Terminal Total	3,275,171	3,616,646	3,992,112	100.0%	100.0%	100.0%
Total Airport						
McNamara Terminal	12,873,001	12,597,088	12,693,973	79.7%	77.7%	76.1%
North Terminal	<u>3,275,171</u>	<u>3,616,646</u>	<u>3,992,112</u>	<u>20.3%</u>	<u>22.3%</u>	<u>23.9%</u>
Total Airport	16,148,172	16,213,734	16,686,085	100.0%	100.0%	100.0%

(a) Includes passengers enplaned on charter airlines.

(b) Includes passengers enplaned on Canadian airlines (pre-cleared and counted as domestic).

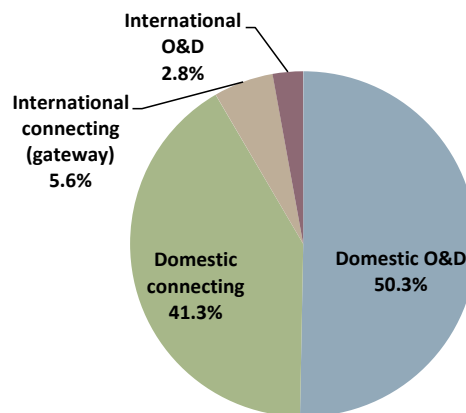
Source: Wayne County Airport Authority records.

3.3 Origin-Destination and Connecting Passengers

Table 3-4 presents the estimated distribution of enplaned passengers between outbound O&D passengers (i.e., residents of and visitors to the Detroit Region on outbound flights from the Airport) and passengers connecting between flights at the Airport. Between 2000 and 2015, the number of connecting passengers decreased an average of 0.8% per year and averaged 8.4 million during this period. The number of origin-destination passengers increased an average of 0.5% per year between 2000 and 2015, with stronger growth between 2010 and 2015 (an average increase of 1.8% per year).

In 2015, O&D passengers accounted for an estimated 53.1% of total, including 50.3% domestic O&D passengers and 2.8% international O&D passengers. Connecting passengers accounted for an estimated 46.9% of total, including 41.3% domestic connecting passengers and 5.6% international connecting passengers. Delta Air Lines accounted for 97% of all connecting passengers at the Airport in 2015, reflecting the role of the Airport as one of Delta’s four primary connecting hubs and an international gateway.

Figure 3-2
PERCENT OF ORIGIN-DESTINATION AND CONNECTING PASSENGERS IN 2015
 Detroit Metropolitan Wayne County Airport



Note: Calculated by subtracting connecting passengers from total enplaned passengers. Includes domestic and international O&D passengers traveling on U.S. and foreign-flag airlines as well as any passengers making connections between two international flights and non-revenue passengers.

Sources: Wayne County Airport Authority records and U.S. Department of Transportation, *Origin Destination Survey of Airline Passenger Traffic, Domestic*, online database, accessed July 2016.

Table 3-4
ORIGIN-DESTINATION AND CONNECTING PASSENGERS
 Detroit Metropolitan Wayne County Airport

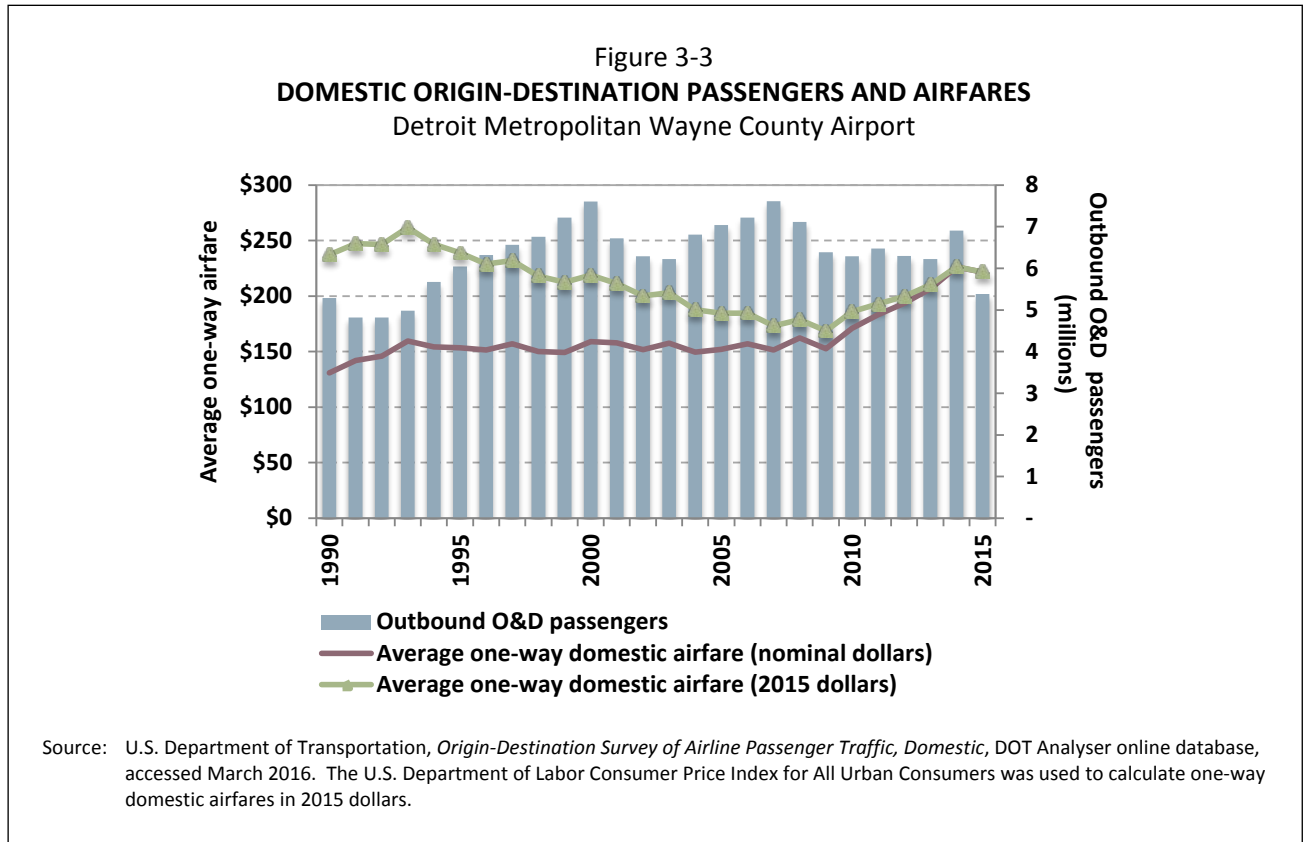
Year	Origin-Destination (a)			Connecting			Total enplaned passengers			Percent of total	
	Domestic	International	Total	Domestic	International	Total	Domestic	International	Total	O&D	Connecting
2000	7,941,240	603,837	8,545,077	7,510,810	1,353,350	8,864,160	15,452,050	1,957,187	17,409,237	49.1%	50.9%
2001	6,887,986	522,210	7,410,196	7,249,490	1,172,170	8,421,660	14,137,476	1,694,380	15,831,856	46.8%	53.2%
2002	6,384,421	444,324	6,828,745	7,478,430	1,174,750	8,653,180	13,862,851	1,619,074	15,481,925	44.1%	55.9%
2003	7,326,796	191,739	7,518,535	7,723,160	1,117,970	8,841,130	15,049,956	1,309,709	16,359,665	46.0%	54.0%
2004	8,037,664	190,059	8,227,723	8,147,240	1,233,150	9,380,390	16,184,904	1,423,209	17,608,113	46.7%	53.3%
2005	8,363,725	220,578	8,584,303	8,270,640	1,297,490	9,568,130	16,634,365	1,518,068	18,152,433	47.3%	52.7%
2006	8,553,685	216,294	8,769,979	7,960,500	1,245,370	9,205,870	16,514,185	1,461,664	17,975,849	48.8%	51.2%
2007	9,112,258	262,782	9,375,040	7,353,660	1,276,650	8,630,310	16,465,918	1,539,432	18,005,350	52.1%	47.9%
2008	8,960,470	261,460	9,221,930	7,017,590	1,256,350	8,273,940	15,978,060	1,517,810	17,495,870	52.7%	47.3%
2009	7,398,499	273,036	7,671,535	6,991,840	929,700	7,921,540	14,390,339	1,202,736	15,593,075	49.2%	50.8%
2010	7,720,426	373,550	8,093,976	7,156,660	954,040	8,110,700	14,877,086	1,327,590	16,204,676	49.9%	50.1%
2011	7,862,388	300,735	8,163,123	7,037,910	1,001,640	8,039,550	14,900,298	1,302,375	16,202,673	50.4%	49.6%
2012	7,856,710	326,402	8,183,112	6,851,870	1,044,050	7,895,920	14,708,580	1,370,452	16,079,032	50.9%	49.1%
2013	8,345,666	434,086	8,779,752	6,387,550	980,870	7,368,420	14,733,216	1,414,956	16,148,172	54.4%	45.6%
2014	8,046,329	398,235	8,444,564	6,738,150	1,031,020	7,769,170	14,784,479	1,429,255	16,213,734	52.1%	47.9%
2015	8,392,881	474,770	8,867,651	6,886,244	932,190	7,818,434	15,279,125	1,406,960	16,686,085	53.1%	46.9%
Compound annual percent increase (decrease)											
2000-2005	0.9%	(3.8%)	0.8%	1.9%	(0.8%)	1.5%	1.4%	(1.3%)	1.2%		
2005-2010	(1.6)	11.1	(1.2)	(2.9)	(6.0)	(3.3)	(2.2)	(2.6)	(2.2)		
2010-2015	1.7	4.9	1.8	(0.8)	(0.5)	(0.7)	0.5	1.2	0.6		
2000-2015	0.3	3.9	0.5	(0.6)	(2.5)	(0.8)	(0.1)	(0.9)	(0.2)		

(a) Calculated by subtracting connecting passengers from total enplaned passengers. Includes domestic and international O&D passengers traveling on U.S. and foreign-flag airlines as well as any passengers making connections between two international flights and non-revenue passengers.

Source: Wayne County Airport Authority records and U.S. Department of Transportation, *Origin Destination Survey of Airline Passenger Traffic, Domestic*, online database, accessed March 2016. Data for 2015 connecting passengers are estimated based on data for January through September 2015.

3.4 Domestic Origin-Destination Passengers and Airfares

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 2015, the number of domestic outbound O&D passengers at DTW increased an average of 0.1% per year while nominal average domestic airfares increased (an average increase of 2.1% per year) and inflation-adjusted domestic airfares decreased slightly (an average decrease of 0.3% per year), as shown on Figure 3-3.



3.5 Airline Market Shares

The market shares for the passenger airlines serving the Airport are shown in Table 3-5 and Figure 3-4. In 2015, Delta Air Lines had the largest market share of enplaned passengers (75.4%) at the Airport, followed by America Airlines (6.9%), Spirit (6.9%), Southwest Airlines (4.8%), United Airlines (2.9%), and JetBlue (0.7%).

Table 3-5
AIRLINE MARKET SHARES OF ENPLANED PASSENGERS
Detroit Metropolitan Wayne County Airport
Ranked by 2015 passengers

Airline	Enplaned passengers			Percent of total		
	2010	2014	2015	2010	2014	2015
Domestic						
Delta Air Lines (a)	11,907,139	11,297,938	11,402,754	80.0%	76.4%	74.6%
American Airlines (a) (b)	973,652	1,120,039	1,156,860	6.5	7.6	7.6
Spirit Airlines	602,488	922,896	1,127,606	4.0	6.2	7.4
Southwest Airlines (c)	773,515	820,749	796,407	5.2	5.6	5.2
United Airlines (a)	480,729	407,496	487,775	3.2	2.8	3.2
JetBlue Airways	-	65,967	122,420	0.0	0.4	0.8
Frontier Airlines	126,018	106,674	101,475	0.8	0.7	0.7
Other (d)	<u>13,545</u>	<u>42,720</u>	<u>83,828</u>	<u>0.1</u>	<u>0.3</u>	<u>0.5</u>
Subtotal--domestic	14,877,086	14,784,479	15,279,125	100.0%	100.0%	100.0%
International						
Delta Air Lines (a)	1,142,850	1,224,721	1,186,390	86.1%	85.7%	84.3%
Lufthansa	66,058	78,184	74,869	5.0	5.5	5.3
Air France	71,459	74,429	74,006	5.4	5.2	5.3
Virgin Atlantic Airways	-	-	30,823	0.0	0.0	2.2
Spirit Airlines	14,447	23,790	21,353	1.1	1.7	1.5
Royal Jordanian	15,001	14,197	12,487	1.1	1.0	0.9
Southwest Airlines (c)	8,078	10,223	-	0.6	0.7	0.0
Other (e)	<u>17,775</u>	<u>13,934</u>	<u>7,032</u>	<u>1.3</u>	<u>1.0</u>	<u>0.5</u>
Subtotal--international	1,327,590	1,429,255	1,406,960	100.0%	100.0%	100.0%
Total Airport						
Delta Air Lines (a)	13,049,989	12,522,659	12,589,144	80.5%	77.2%	75.4%
American Airlines (a) (b)	973,652	1,120,039	1,156,860	6.0	6.9	6.9
Spirit Airlines	616,935	946,686	1,148,959	3.8	5.8	6.9
Southwest Airlines (c)	781,593	830,972	796,407	4.8	5.1	4.8
United Airlines (a)	480,729	407,496	487,775	3.0	2.5	2.9
JetBlue Airways	-	65,967	122,420	0.0	0.4	0.7
Frontier Airlines	126,018	106,674	101,475	0.8	0.7	0.6
Other (d) (e) (f)	<u>175,760</u>	<u>213,241</u>	<u>283,045</u>	<u>1.1</u>	<u>1.3</u>	<u>1.7</u>
Total Airport	16,204,676	16,213,734	16,686,085	100.0%	100.0%	100.0%

(a) Includes regional affiliates.

(b) Includes US Airways passengers; American Airlines and US Airways merged in 2013.

(c) Merged with AirTran in 2011.

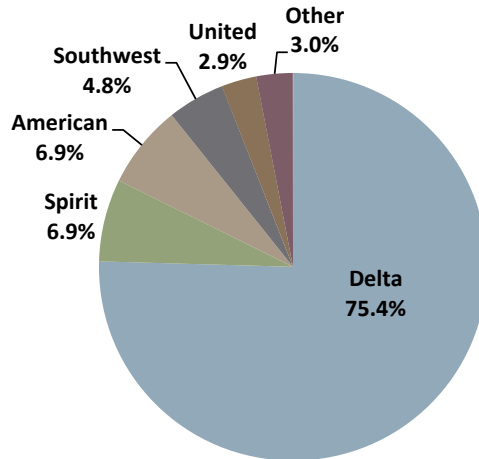
(d) Includes passengers enplaned on Alaska Airlines, Air Canada (pre-cleared and counted as domestic), and charter airlines.

(e) Includes passengers enplaned on American, Frontier, Icelandair, and charter airlines.

(f) Includes foreign-flag airlines.

Source: Wayne County Airport Authority records.

Figure 3-4
AIRLINE SHARES OF ENPLANED PASSENGERS IN 2015
 Detroit Metropolitan Wayne County Airport



Note: Other includes passengers enplaned on Alaska Airlines, Air Canada (pre-cleared and counted as domestic), Frontier, JetBlue, foreign-flag, and charter airlines.

Source: Wayne County Airport Authority records.

3.6 Origin-Destination Markets and Airline Service

In 2015, approximately 53% of the Airport’s passengers were O&D passengers; the remaining 47% were connecting passengers. This section presents a summary of the busiest domestic and international O&D markets at DTW as well as the airline service provided to each market.

3.6.1 Domestic Origin-Destination Markets and Airline Service

For the 12-month period ended September 2015, the top 25 domestic passenger markets at DTW accounted for 77.2% of total domestic O&D passengers, as shown in Table 3-6. The New York area is the largest O&D market with 6.9% of domestic O&D passengers, followed by Miami with 6.0%, Orlando (5.2%), Los Angeles (4.9%), and Las Vegas (4.8%).

In July 2016, each of the top 25 domestic passenger markets has daily nonstop service at the Airport, as shown in Table 3-6. The Airport has an average of 504 daily domestic scheduled flights in July 2016, including 269 to the top 25 domestic passenger markets. Network airlines, such as American, Delta, and United, account for 453 daily domestic scheduled departures in July 2016 (90% of total) and low cost carriers accounting for the remaining 51.

Table 3-6
DOMESTIC PASSENGER ORIGIN-DESTINATION PATTERNS AND AIRLINE SERVICE
 Detroit Metropolitan Wayne County Airport

2015 Rank	Origin-destination market	Air miles from DTW	Percent of domestic O&D passengers (a)	Average daily domestic departures in July 2016		
				Network	Low cost carrier	Total
1	New York (b)	507	6.9%	29	2	31
2	Miami (c)	1,147	6.0	8	3	11
3	Orlando	958	5.2	6	3	9
4	Los Angeles (d)	1,973	4.9	6	1	7
5	Las Vegas	1,744	4.8	5	4	9
6	Washington, D.C. (e)	382	4.7	21	4	25
7	Atlanta	594	3.7	10	5	15
8	Tampa	984	3.7	4	1	5
9	Chicago (f)	233	3.4	24	5	29
10	Denver	1,119	3.3	5	4	9
11	Dallas/Fort Worth (g)	985	3.2	11	2	13
12	Fort Myers	1,085	3.2	2	--	2
13	San Francisco (h)	2,073	3.1	5	--	5
14	Boston	630	2.9	7	4	11
15	Phoenix	1,666	2.8	7	3	10
16	Houston (i)	1,074	2.4	9	1	10
17	Seattle	1,921	1.9	8	--	8
18	Nashville	456	1.7	5	2	7
19	Minneapolis/St. Paul	526	1.6	8	1	9
20	San Diego	1,951	1.6	4	--	4
21	Philadelphia	452	1.3	12	1	13
22	St. Louis	439	1.2	5	2	6
23	New Orleans	926	1.2	3	1	4
24	Kansas City	626	1.2	4	1	5
25	Charlotte	500	<u>1.2</u>	<u>13</u>	<u>--</u>	<u>13</u>
	Markets listed		77.2%	221	48	269
	Other markets		<u>22.8</u>	<u>232</u>	<u>3</u>	<u>235</u>
	All markets		100.0%	453	51	504

- (a) Data are for October 2014 through September 2015.
- (b) LaGuardia, John F. Kennedy International, and Newark Liberty International.
- (c) Miami International and Fort Lauderdale International.
- (d) Los Angeles, Burbank, Long Beach, Ontario, and Orange County airports.
- (e) Reagan, Dulles, and Baltimore Thurgood Marshall.
- (f) O'Hare and Midway airports.
- (g) Dallas/Fort Worth International Airport and Love Field.
- (h) San Francisco, Oakland, and San Jose airports.
- (i) George Bush Intercontinental and William P. Hobby airports.

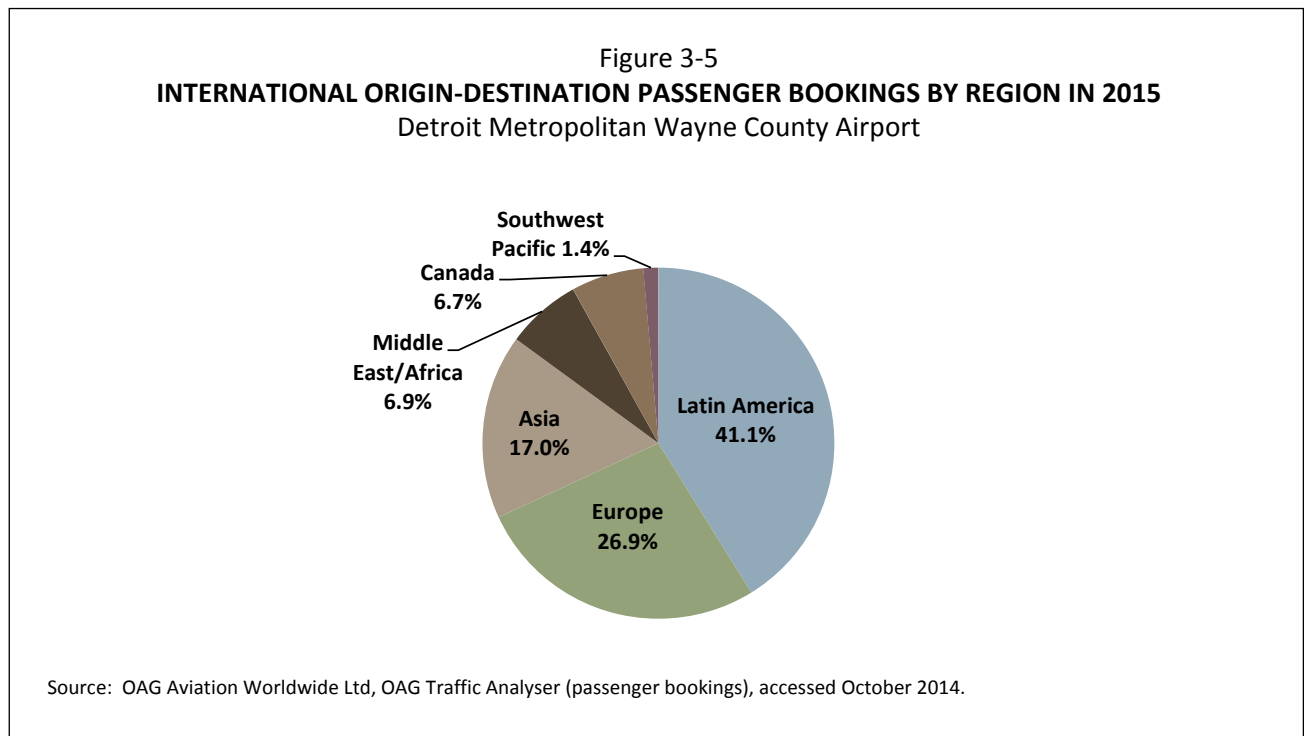
Sources: U.S. Department of Transportation, *Origin Destination Survey of Airline Passenger Traffic, Domestic*, online database and OAG Aviation Worldwide Ltd, OAG Analyser database, accessed March 2016.

3.6.2 International Origin-Destination Markets and Airline Service

In 2015, the top 25 international passenger markets at DTW accounted for 51.8% of the total international O&D passenger bookings*, as shown in Table 3-7. Cancun, Mexico is the largest O&D market with 8.7% of international O&D passenger bookings, followed by Punta Cana in the Dominican Republic with 3.6%, London, United Kingdom (3.5%), Frankfurt, Germany (3.4%), and Mexico City, Mexico (2.9%).

Of the top 25 international passenger markets, 20 had weekly nonstop service at the Airport in July 2016, as shown in Table 3-7. The Airport had an average of 241 weekly international scheduled flights in July 2016 (an average of approximately 34 daily flights), including 227 to the top 25 international passenger markets.

As shown on Figure 3-5, Latin America accounted for the largest share of DTW passenger airline bookings in 2015, with 41.1%, followed by Europe (26.9%), Asia (17.0%), Middle East/Africa (6.9%), Canada (6.7%), and the South Pacific (1.4%).



*As defined by the International Air Transport Association (IATA), a passenger airline “booking”, equivalent to the term “reservation”, means the allotment in advance of seating accommodation for a passenger. IATA, *Passenger Glossary of Terms*, www.iata.org.

Table 3-7
INTERNATIONAL PASSENGER ORIGIN-DESTINATION PATTERNS AND AIRLINE SERVICE
 Detroit Metropolitan Wayne County Airport

2015 Rank	Origin-destination market	Country	Nonstop miles from DTW	Percent of international O&D bookings (a)	Average weekly nonstop scheduled departures (b)
1	Cancun	Mexico	1,475	8.7%	5
2	Punta Cana	Dominican Republic	1,854	3.6	1
3	London (c)	United Kingdom	3,755	3.5	14
4	Frankfurt	Germany	4,149	3.4	14
5	Mexico City (d)	Mexico	1,820	2.9	7
6	Montego Bay	Jamaica	1,667	2.7	1
7	Shanghai (e)	China	7,120	2.6	7
8	Monterrey	Mexico	1,480	2.1	7
9	Tokyo (f)	Japan	6,381	1.9	7
10	Toronto (g)	Canada	214	1.6	60
11	San Jose Cabo	Mexico	2,004	1.5	--
12	Amsterdam	Netherlands	3,927	1.5	27
13	Seoul (h)	Korea	6,618	1.4	7
14	Paris (i)	France	3,949	1.4	14
15	Montreal	Canada	529	1.3	26
16	Nassau	Bahamas	1,232	1.3	--
17	Beirut	Lebanon	5,909	1.3	--
18	Sao Paulo (j)	Brazil	5,105	1.3	3
19	Puerto Vallarta	Mexico	1,983	1.2	--
20	Nagoya	Japan	6,535	1.2	5
21	Aruba	Aruba	2,197	1.2	--
22	Vancouver (k)	Canada	1,956	1.1	1
23	Rome	Italy	4,612	1.1	7
24	Beijing	China	6,614	0.9	7
25	Munich	Germany	4,333	0.9	7
	Marks listed			51.8%	227
	Other markets			48.2	14
	All markets			100.0%	241

(a) Data are for calendar year 2015.

(b) Data are for July 2016.

(c) London Heathrow, London Gatwick, London City, and London Stansted airports.

(d) Mexico City Juarez International and Mexico City Toluca airports.

(e) Shanghai Pudong and Shanghai Hongqiao international airports.

(f) Tokyo Narita International and Tokyo Haneda airports.

(g) Toronto Lester B Pearson International, Toronto Kitchener/Waterloo Regional, and Toronto City Centre airports.

(h) Seoul Incheon and Seoul Gimpo international airports.

(i) Paris Charles de Gaulle and Paris Orly airports.

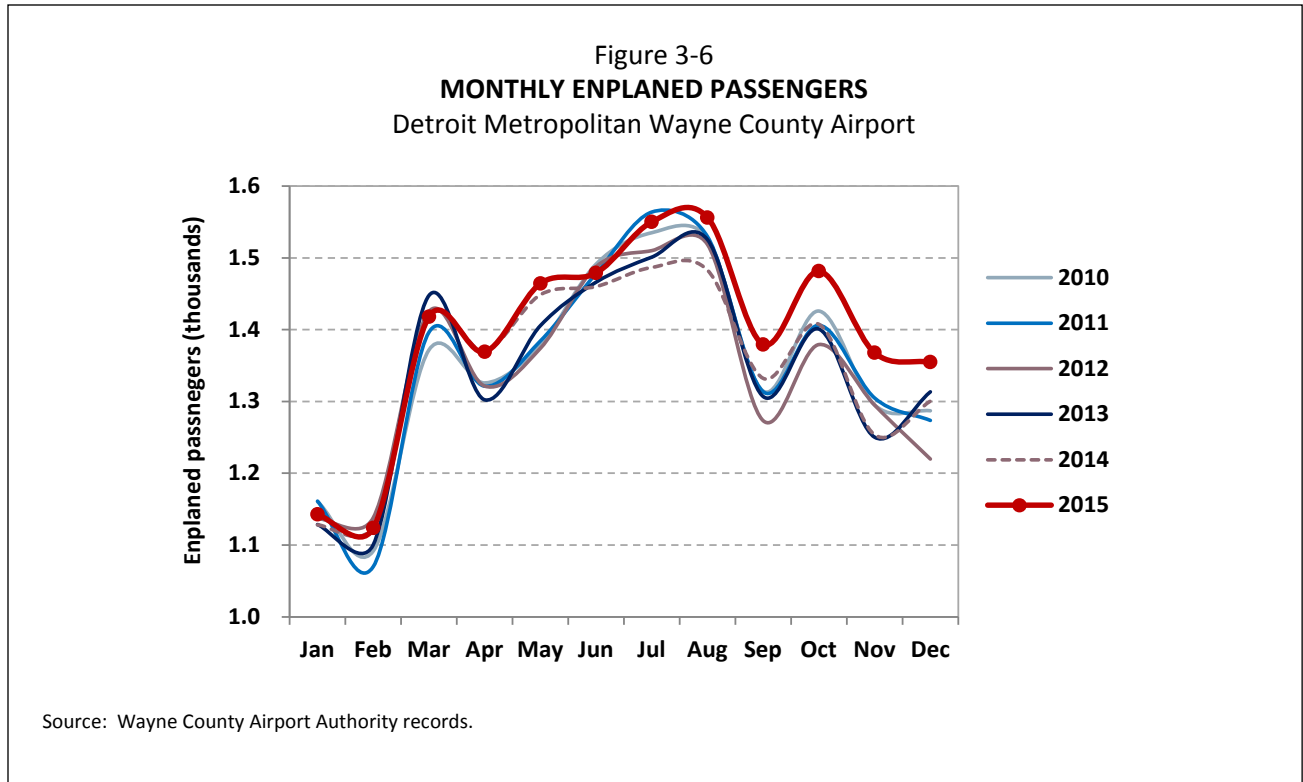
(j) Congonhas, Guarulhos, and Viracopos airports.

(k) Vancouver International and Coal Harbour airports.

Sources: OAG Aviation Worldwide Ltd, OAG Traffic Analyser (passenger bookings) and OAG Analyser database, accessed March 2016. Bookings data were used to represent international origin-destination patterns because the U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, does not include data for foreign-flag airlines and is therefore incomplete.

3.7 Monthly Enplaned Passengers

Figure 3-6 presents monthly enplaned passenger data for the Airport for January 2010 through December 2015. The monthly data show the seasonal variation in enplaned passenger traffic, with peak levels occurring in July and August and the lowest monthly activity occurring from November through February.



4.0 HISTORICAL AIR CARGO AND MAIL

Historical and future air cargo and mail activity is influenced by a number of factors including (1) the diversity of cargo airline service at an airport, (2) the cargo market shares of the airlines providing service, and (3) trends in national and international cargo traffic. This section summarizes historical trends in air cargo at DTW. Appendix B provides a summary of historical and forecast air cargo in the Detroit Region.

4.1 Airlines Providing Cargo Service at the Airport

Cargo service is provided by both the all-cargo airlines and passenger airlines serving the Airport. All-cargo airline scheduled service at DTW is provided primarily by FedEx and United Parcel Service, both integrated cargo airlines. Non-scheduled all-cargo airline service is also provided by Atlas Air and Air Transport International. Of the 25 passenger airlines serving the Airport, 15 carried belly cargo in 2015.

4.2 Historical Air Cargo

As shown on Figure 4-1 and in Table 4-1, total air cargo (freight and mail) at the Airport decreased an average of 2.8% per year between 2000 and 2015. Total air cargo remained relatively unchanged between 2010 and 2015, with growth in international air cargo (an average increase of 3.4% per year) offsetting continued decreases in domestic air cargo (an average decrease of 1.6% per year). In 2015, domestic air cargo accounted for 64% of total air cargo at the Airport, down from 77% in 2000 while the percent of international air cargo increased from 23% in 2000 to 36% in 2015.

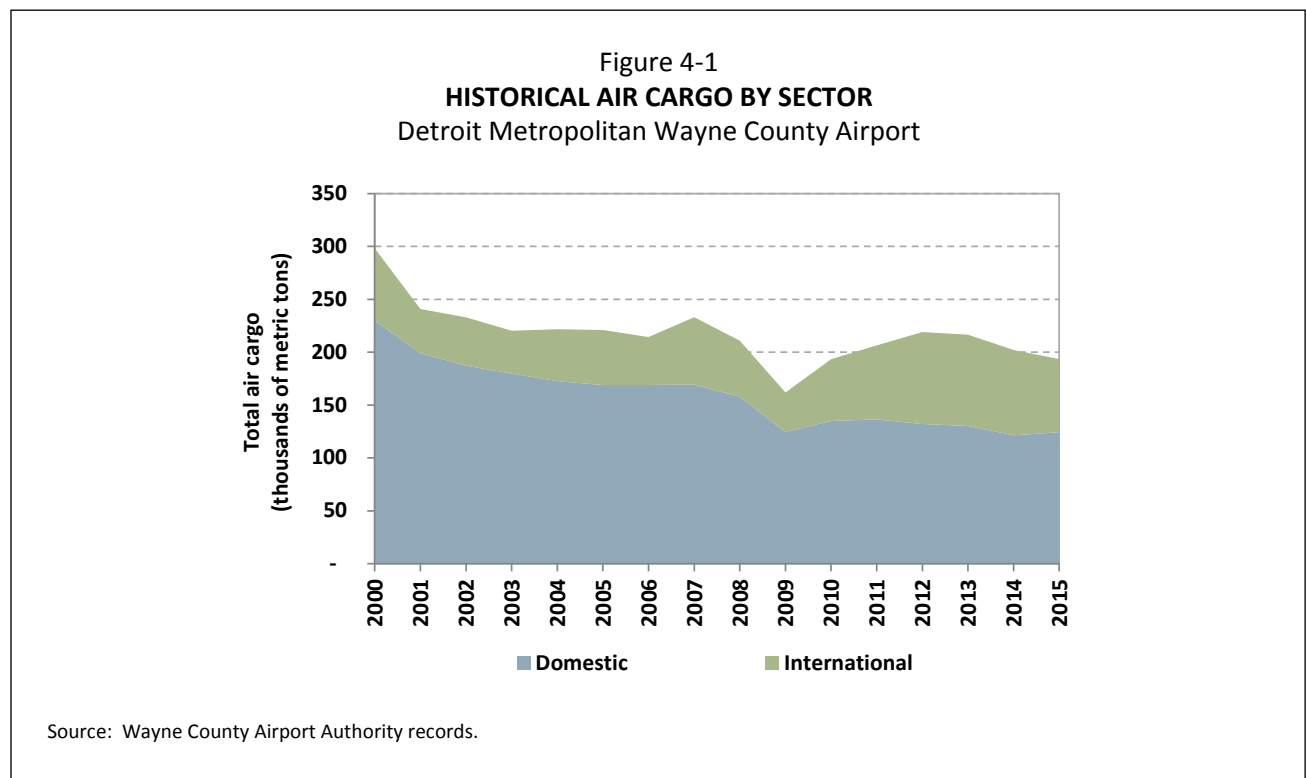


Table 4-1
HISTORICAL AIR CARGO BY SECTOR
 Detroit Metropolitan Wayne County Airport
In metric tons

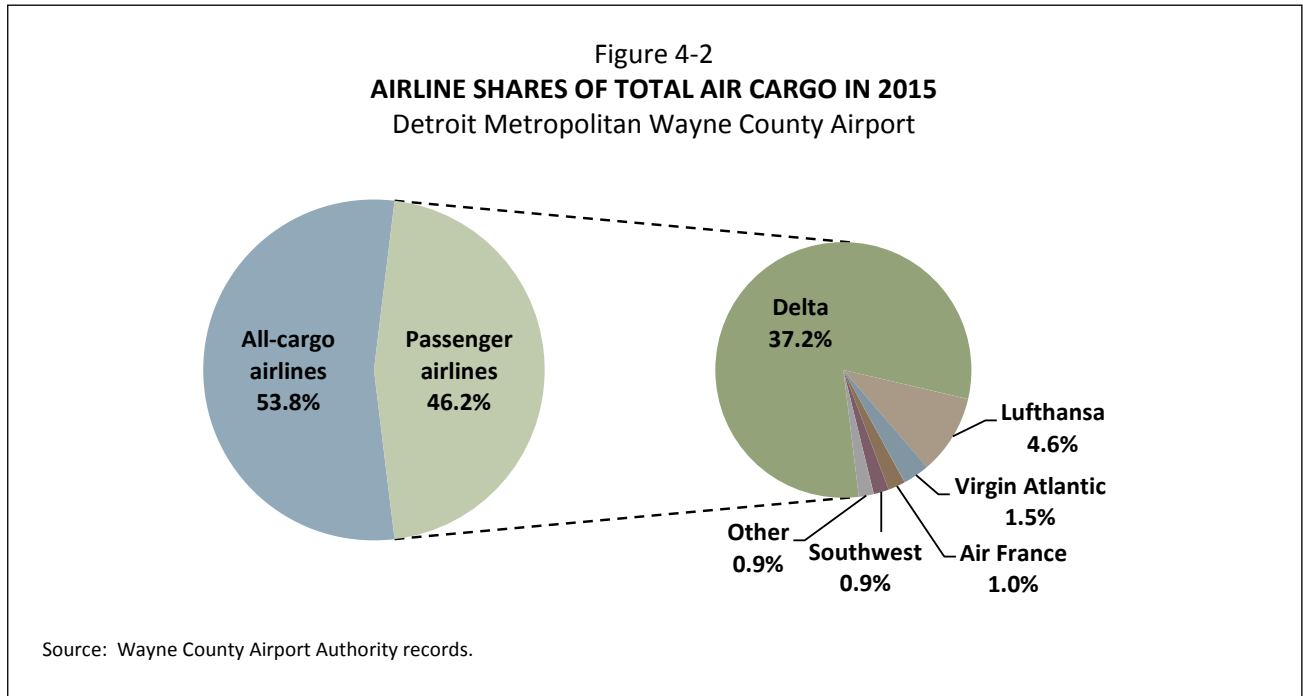
Year	Domestic			International			Total		
	Air freight	Air mail	Total	Air freight	Air mail	Total	Air freight	Air mail	Total
2000	151,852	78,315	230,168	66,305	1,672	67,976	218,157	79,987	298,144
2001	139,618	59,311	198,930	40,340	1,541	41,881	179,958	60,853	240,811
2002	154,383	32,928	187,311	44,951	668	45,619	199,334	33,596	232,930
2003	155,532	24,177	179,709	40,211	327	40,538	195,742	24,504	220,246
2004	162,956	9,671	172,627	48,587	478	49,065	211,543	10,148	221,691
2005	162,213	6,732	168,945	51,279	706	51,984	213,492	7,438	220,930
2006	163,089	5,896	168,985	45,047	264	45,311	208,136	6,160	214,296
2007	164,562	4,804	169,366	62,945	723	63,668	227,507	5,528	233,035
2008	149,630	8,194	157,825	52,407	622	53,029	202,037	8,816	210,854
2009	116,327	8,206	124,533	36,733	620	37,353	153,060	8,826	161,886
2010	127,630	7,311	134,941	57,262	1,143	58,404	184,891	8,454	193,345
2011	126,735	9,676	136,411	68,354	1,661	70,015	195,089	11,337	206,426
2012	120,312	11,761	132,073	84,787	2,122	86,909	205,099	13,883	218,982
2013	117,031	13,204	130,235	82,830	3,467	86,297	199,861	16,671	216,532
2014	111,295	10,129	121,424	75,810	4,798	80,608	187,105	14,927	202,032
2015	112,585	11,723	124,308	63,881	5,262	69,143	176,466	16,985	193,451
	Percent increase (decrease)								
2010-2011	(0.7%)	32.3%	1.1%	19.4%	45.3%	19.9%	5.5%	34.1%	6.8%
2012-2013	(2.7)	12.3	(1.4)	(2.3)	63.4	(0.7)	(2.6)	20.1	(1.1)
2013-2014	(4.9)	(23.3)	(6.8)	(8.5)	38.4	(6.6)	(6.4)	(10.5)	(6.7)
2014-2015	1.2	15.7	2.4	(15.7)	9.7	(14.2)	(5.7)	13.8	(4.2)
	Compound annual percent increase (decrease)								
2000-2005	0.1%	(4.4%)	(0.6%)	(0.5%)	(1.6%)	(0.5%)	0.0%	(4.2%)	(0.5%)
2005-2010	(4.7)	1.7	(4.4)	2.2	10.1	2.4	(2.8)	2.6	(2.6)
2010-2015	(2.5)	9.9	(1.6)	2.2	35.7	3.4	(0.9)	15.0	0.0
2000-2015	(2.0)	(11.9)	(4.0)	(0.2)	7.9	0.1	(1.4)	(9.8)	(2.8)

Note: Includes enplaned and deplaned air cargo.

Source: Wayne County Airport Authority records.

4.3 Airline Market Shares

The market shares for the passenger airlines serving the Airport are shown on Figure 4-2 and in Table 4-2. In 2015, all-cargo airlines accounted for 53.8% of total air cargo; passenger airlines accounted for the remaining 46.2%. FedEx accounted for the largest share of total air cargo in 2015, with 37.8%, followed by Delta Air Lines with 37.2%.



4.4 Air Cargo Imports and Exports

Figure 4-3 summarizes foreign trade statistics for the top 10 commodities shipped by air at DTW in 2015 in terms of the value of imports and exports. In 2015, imports accounted for 58% of the value of imports and exports at the Airport; exports accounted for the remaining 42%.

Appendix B provides additional information on imports and exports in the Detroit Region.

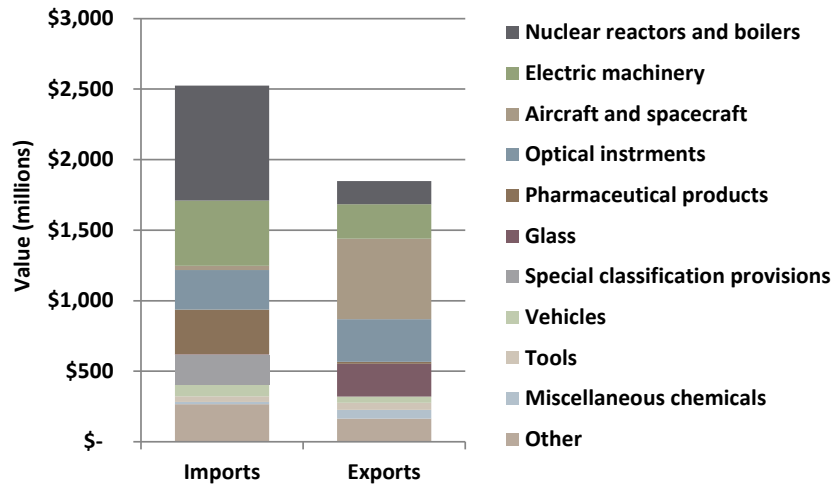
Table 4-2
AIRLINE MARKET SHARES OF TOTAL AIR CARGO
 Detroit Metropolitan Wayne County Airport
Ranked by 2015 total air cargo

Airline	Total air cargo (metric tons)			
	2000	2005	2010	2015
All-cargo airlines				
FedEx	64,639	97,869	85,748	73,114
United Parcel Service	34,908	31,577	28,355	27,839
Other	<u>17,966</u>	<u>9,925</u>	<u>--</u>	<u>3,208</u>
Total—all-cargo airlines	117,513	139,371	114,103	104,161
Passenger airlines				
Delta (a)	138,868	60,123	57,374	71,950
Lufthansa	--	--	9,221	8,979
Virgin Atlantic	--	--	-	2,982
Air France	--	1,895	6,462	1,947
Southwest	1,713	3,822	1,937	1,739
British Airways	9,435	7,220	--	--
KLM	8,416	--	--	--
Other	<u>22,199</u>	<u>8,499</u>	<u>4,249</u>	<u>1,693</u>
Total--passenger airlines	<u>180,631</u>	<u>81,559</u>	<u>79,243</u>	<u>89,290</u>
Total air cargo	298,144	220,930	193,345	193,451
Percent of total				
All-cargo airlines				
Federal Express	21.7%	44.3%	44.3%	37.8%
United Parcel Service	11.7	14.3	14.7	14.4
Other	<u>6.0</u>	<u>4.5</u>	<u>0.0</u>	<u>1.7</u>
Total—all-cargo airlines	39.4%	63.1%	59.0%	53.8%
Passenger airlines				
Delta (a)	46.6%	27.2%	29.7%	37.2%
Lufthansa	0.0	0.0	4.8	4.6
Virgin Atlantic	0.0	0.0	0.0	1.5
Air France	0.0	0.9	3.3	1.0
Southwest	0.6	1.7	1.0	0.9
British Airways	3.2	3.3	0.0	0.0
KLM	2.8	0.0	0.0	0.0
Other	<u>7.4</u>	<u>3.8</u>	<u>2.2</u>	<u>0.9</u>
Total--passenger airlines	<u>60.6%</u>	<u>36.9%</u>	<u>41.0%</u>	<u>46.2%</u>
Total air cargo	100.0%	100.0%	100.0%	100.0%

(a) Includes regional affiliates.

Source: Wayne County Airport Authority records.

Figure 4-3
AIR CARGO IMPORTS AND EXPORTS
 Detroit Metropolitan Wayne County Airport

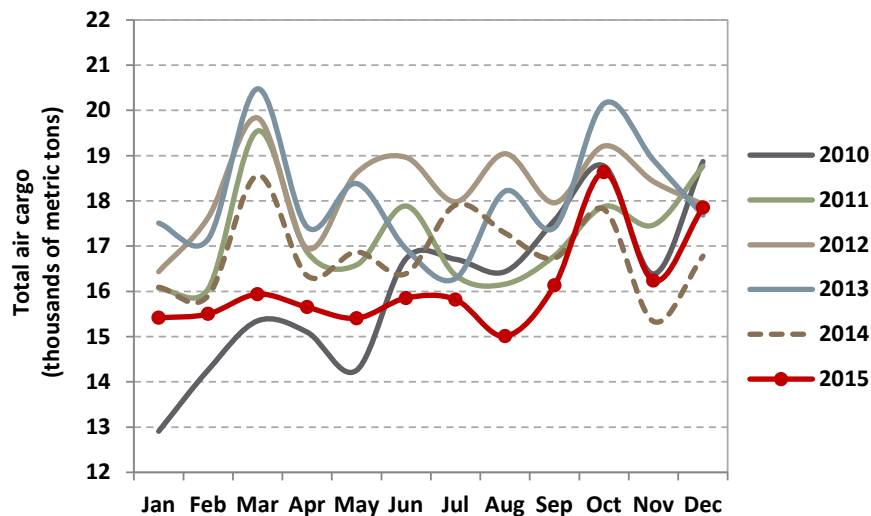


Source: U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, www.census.gov/foreign-trade, accessed February 2015.

4.5 Monthly Air Cargo

Figure 4-4 presents monthly air cargo data for the Airport for January 2010 through December 2015. The monthly data show the seasonal variation in total air cargo which is not as consistent as the monthly trends in enplaned passengers. Except for 2010 and 2015, the peak levels tend to occur in March and October.

Figure 4-4
MONTHLY TOTAL AIR CARGO
 Detroit Metropolitan Wayne County Airport



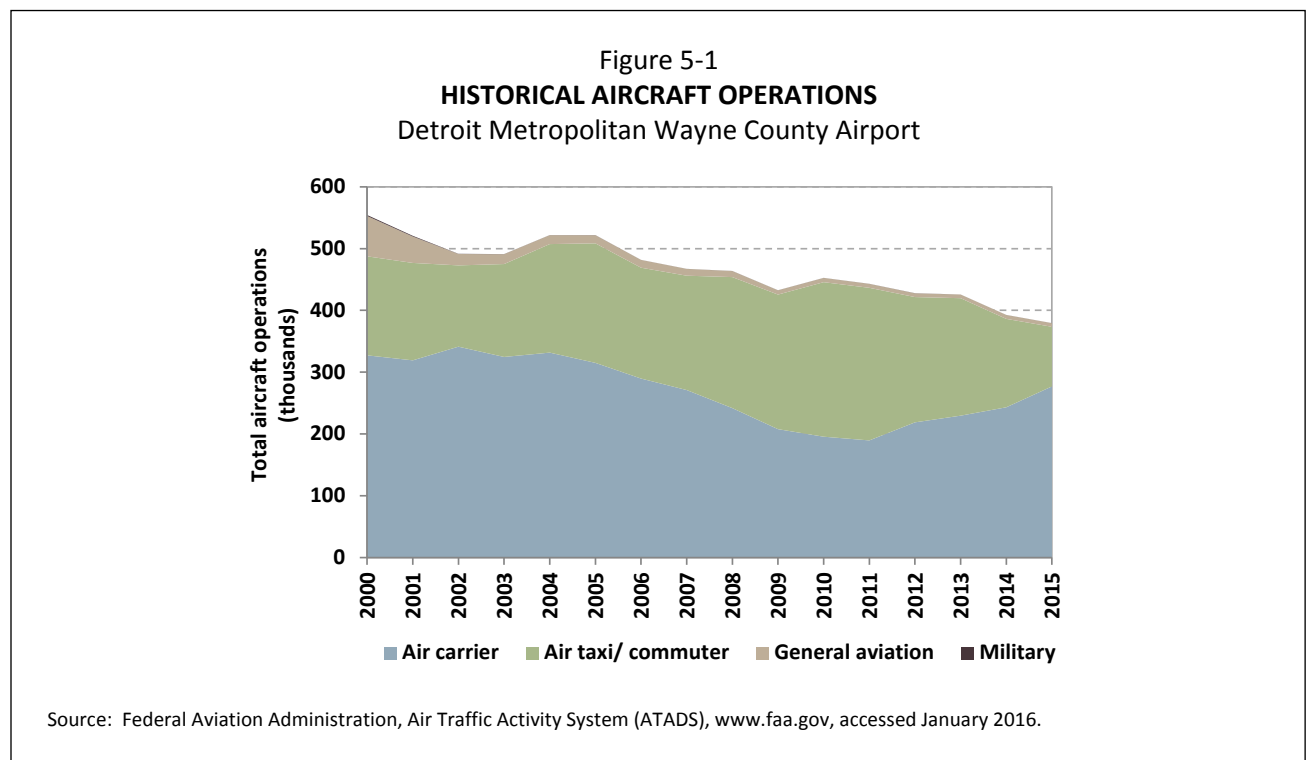
Source: Wayne County Airport Authority records.

5.0 HISTORICAL AIRCRAFT OPERATIONS

This section summarizes historical total aircraft operations at the Airport from 2000 through 2015. 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. Figure 5-1 and Table 5-1 present a summary of total aircraft operations at DTW by type.

5.1 Total Aircraft Operations

From 2000 to 2015, the number of total aircraft operations at the Airport decreased an average of 2.5% per year, reflecting increased load factors, the densification of aircraft (i.e., putting more seats on existing aircraft), and overall reductions in airline system capacity as a result of the spike in fuel prices in 2008, and the 2008-2009 economic recession and financial crisis.



5.2 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 7210.3Z), even if the aircraft is conducting air freight operations.* As shown in Table 5-1, air carrier aircraft operations decreased an average of 1.1% per year between 2000 and 2015. Between 2000 and 2005, air carrier operations decreased an average of 9.1% per year, reflecting increases in average passenger load factors and the increasing use of 50-seat regional aircraft in markets previously served with narrowbody aircraft. Since 2010, the number of air carrier operations has increased—an average of 7.2%

*U.S. Department of Transportation, Federal Aviation Administration, Order JO 7210.3Z, November 10, 2015, http://www.faa.gov/air_traffic/publications.

per year between 2010 and 2015, reflecting, in part, the fuel price spike in 2008 that led to the replacement of 50-seat regional jets with regional jets with more than 60 seats (classified as air carrier operations).

5.3 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 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 5-1, air taxi and commuter aircraft operations increased between 2000 and 2010. Since 2010, air taxi and commuter operations have decreased significantly—an average decrease of 17.3% per year between 2010 and 2015, reflecting the increased use of larger regional aircraft, increasing fuel costs, and the comparatively higher cost of operating small regional jet aircraft. In 2015, passenger and cargo airlines accounted for approximately 98% of air taxi and commuter operations at the Airport; nonscheduled air taxi and business aviation accounted for the remaining 2%.

5.4 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 5-1, general aviation aircraft operations decreased an average of 14.9% per year between 2000 and 2015. According to the FAA 2015 TAF, a total of seven jet engine general aviation aircraft were based at the Airport in 2015.

5.5 Military

Military aircraft operations at the Airport have averaged approximately 300 operations per year from 2000 through 2015. In 2015, military operations totaled 102, less than the 16-year average. Historically, military operations have varied with geopolitical trends.

Table 5-1
HISTORICAL AIRCRAFT OPERATIONS
 Detroit Metropolitan Wayne County Airport

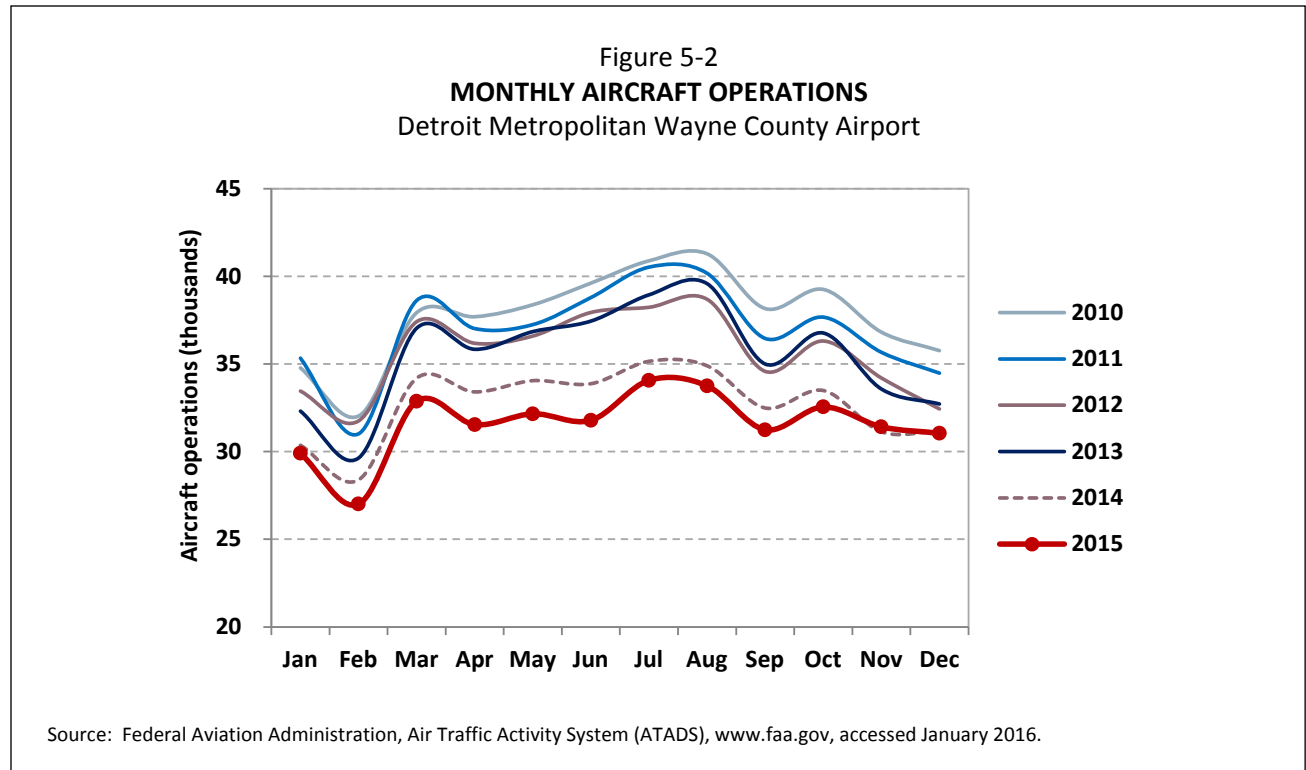
Year	Commercial operations			General aviation	Military	Total aircraft operations	Percent increase (decrease)
	Air carrier	Air taxi/ commuter	Total				
2000	327,207	160,313	487,520	65,303	1,586	554,409	(0.9%)
2001	319,118	157,689	476,807	42,771	1,138	520,716	(6.1)
2002	341,244	131,586	472,830	18,477	290	491,597	(5.6)
2003	324,615	150,391	475,006	15,902	211	491,119	(0.1)
2004	331,629	175,694	507,323	14,435	150	521,908	6.3
2005	315,031	193,480	508,511	13,180	208	521,899	0.0
2006	289,637	179,458	469,095	12,539	106	481,740	(7.7)
2007	271,034	185,105	456,139	11,000	95	467,234	(3.0)
2008	241,757	212,129	453,886	9,733	165	463,784	(0.7)
2009	207,711	217,873	425,584	6,876	129	432,589	(6.7)
2010	195,506	250,145	445,651	6,849	116	452,616	4.6
2011	189,493	247,041	436,534	6,363	131	443,028	(2.1)
2012	218,736	202,822	421,558	6,033	223	427,814	(3.4)
2013	229,560	190,178	419,738	5,930	64	425,732	(0.5)
2014	243,117	143,122	386,239	6,264	132	392,635	(7.8)
2015	276,898	96,533	373,431	5,843	102	379,376	(3.4)
Compound annual percent increase (decrease)							
2000-2005	(0.8%)	3.8%	0.8%	(27.4%)	(33.4%)	(1.2%)	
2005-2010	(9.1)	5.3	(2.6)	(12.3)	(11.0)	(2.8)	
2010-2015	7.2	(17.3)	(3.5)	(3.1)	(2.5)	(3.5)	
2000-2015	(1.1)	(3.3)	(1.8)	(14.9)	(16.7)	(2.5)	

Note: Includes arrivals and departures.

Source: Federal Aviation Administration, Air Traffic Activity System (ATADS), www.faa.gov, accessed January 2016.

5.6 Monthly Aircraft Operations

Table 5-2 presents monthly total aircraft operations data for the Airport for January 2010 through December 2015. The monthly data show the seasonal variation in total aircraft operations, with July and August each accounting for 9.0% and 8.9%, respectively, of annual operations in 2015. From 2010 through 2015, July and August accounted for the peak share of annual aircraft operations at the Airport, with an average of approximately 9% of annual operations.

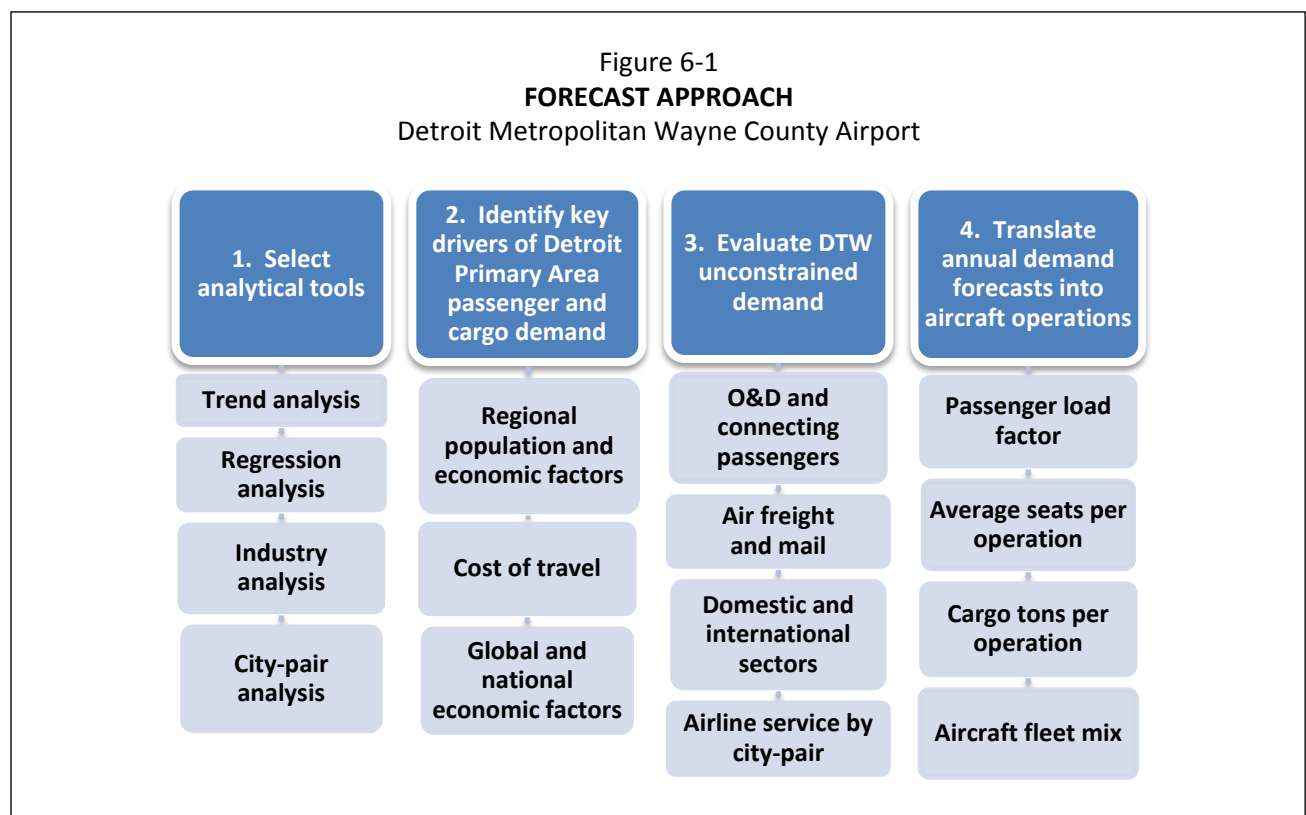


6.0 AVIATION ACTIVITY FORECASTS

This section summarizes unconstrained forecasts of enplaned passengers, air cargo, and total aircraft operations for DTW, 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. 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 2015 as the base year, annual forecasts were prepared for four future demand years—2020, 2025, 2030, and 2035.

6.1 Forecast Approach

As shown in Figure 6-1, the forecast approach incorporated a multi-tiered approach to evaluate passenger traffic in the Detroit Primary Area.



WCAA records (based on data reported by the airlines) were used as the basis for the enplaned passenger (revenue and non-revenue), air cargo, and commercial airline aircraft operations forecasts. Data from the U.S. Department of Transportation O&D Survey was used as a basis for the evaluation of O&D and connecting passengers. FAA, Air Traffic Activity System (ATADS) data were used as the basis for the total aircraft operations forecasts.

It was recognized that no one approach would provide input on all of the key factors that affect passenger and cargo activity in the Detroit Primary Area. For example, an econometric analysis would provide input on the relationships between historical 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) new service development at the Airport. Input on these factors is important to the development of reliable forecasts that can serve as the basis for planning efforts at the Airport.

6.2 Enplaned Passenger Forecasts

Domestic O&D passengers accounted for 50.3% of enplaned passengers at the Airport in 2015, followed by domestic connecting passengers with 41.0%, international O&D (2.8%), and international connecting passengers using DTW as their international gateway (5.9%). The forecast approach and results for these four key components of passenger demand at the Airport are described in the following sections.

6.2.1 Domestic Origin-Destination Passengers

The forecasts of domestic O&D passengers at the Airport are based on an econometric model 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 6-2, the historical trend in domestic O&D passengers at DTW relates strongly to regional economic activity. Single variable regression models which included economic variables such as total income, per capita personal income, or employment in the Detroit Primary Area explained as much as 80% of the historical variation (i.e., the year to year percent change) in domestic O&D passengers.

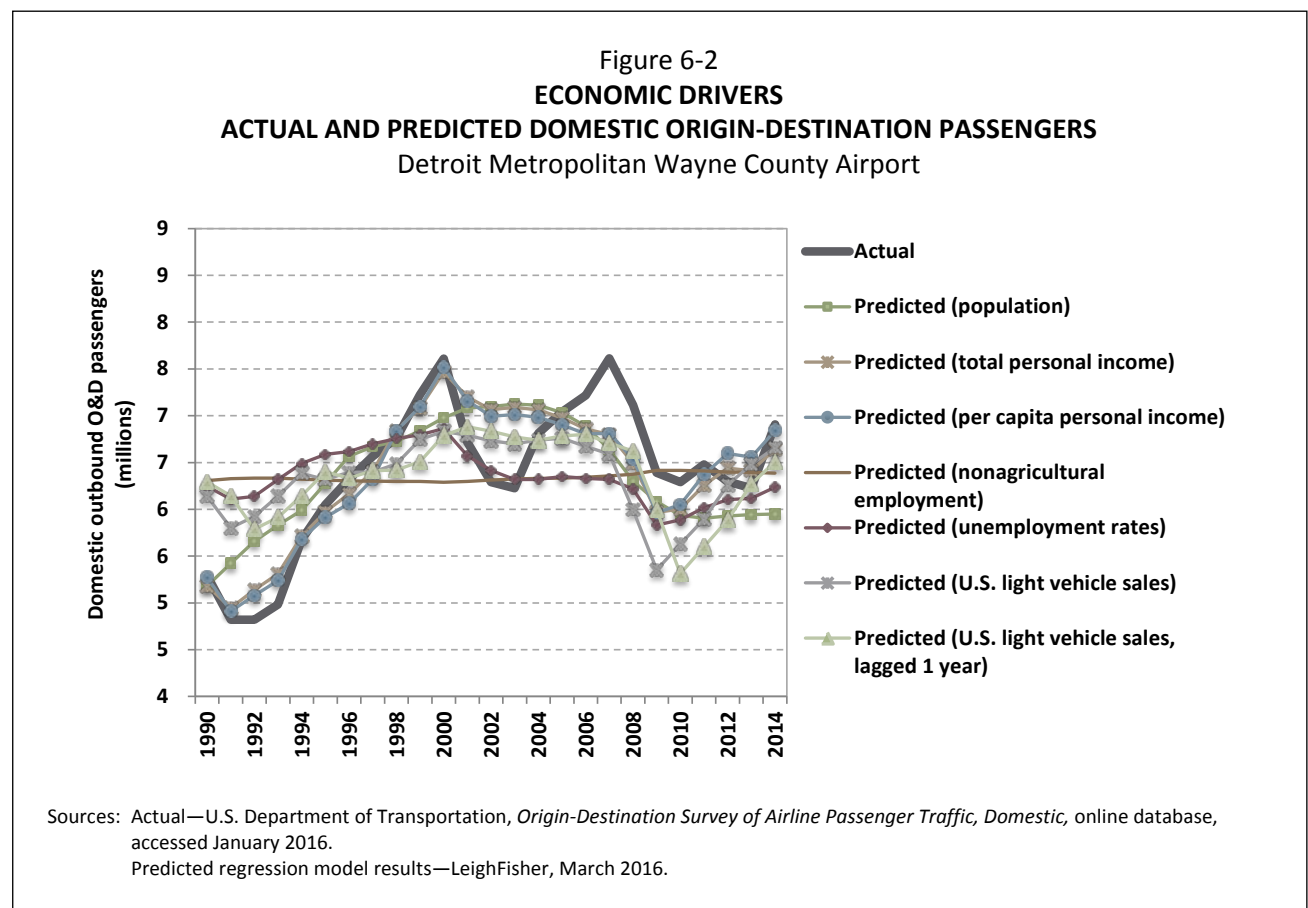
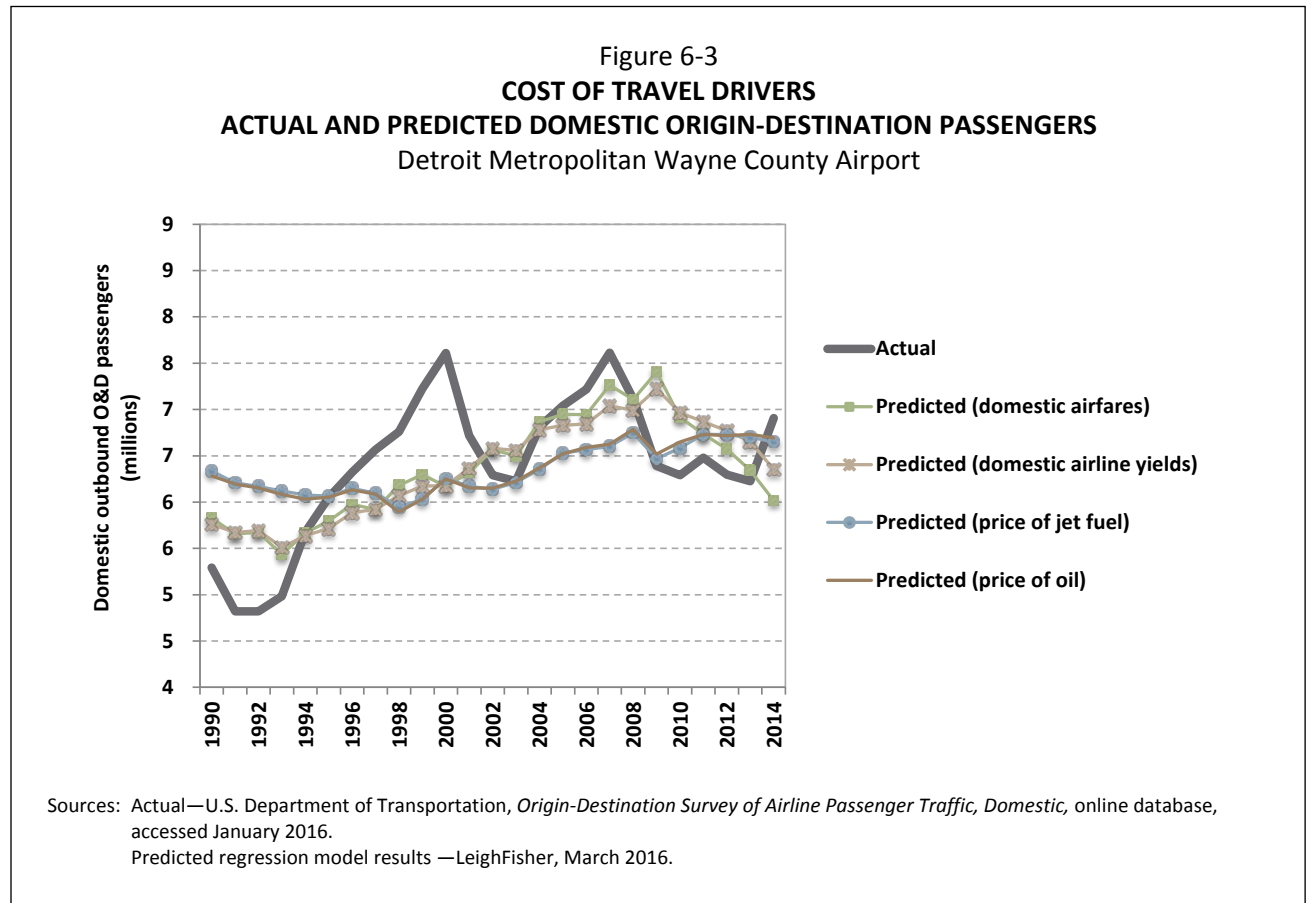


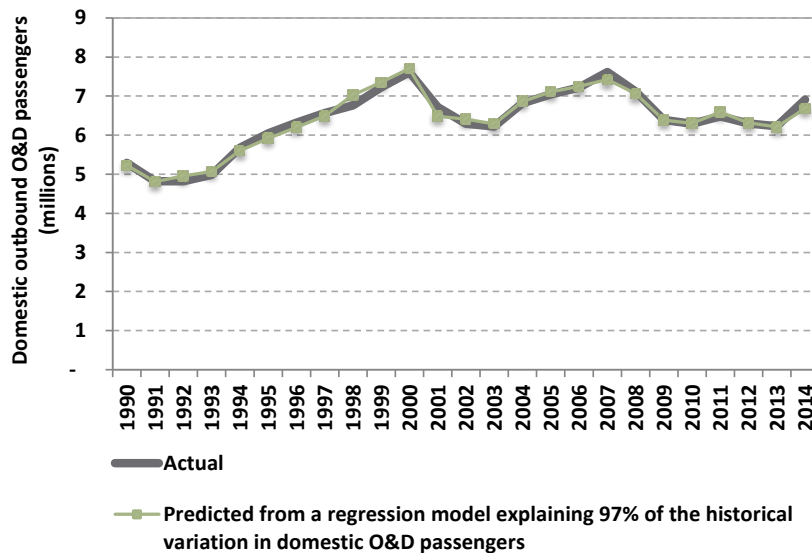
Figure 6-3 presents single variable regression models which included cost of travel variables such as airfare and airline yield (i.e., the airfare paid to transport one passenger one mile) at DTW or the price of jet fuel and oil explained as much as 40% of the historical variation in domestic O&D passengers.



A representative regression model which includes an income variable and a cost of travel variable is shown on Figure 6-4. The historical trend in domestic O&D passengers at DTW relates strongly to the predicted values from a regression model which includes per capita income in the Detroit Primary Area (in 2014 dollars), unemployment rates in the Detroit Primary Area, and airline yields at DTW (in 2014 dollars). The forecasts of domestic O&D passengers at DTW were based on projections of per capita income in the Detroit Primary Area prepared by SEMCOG, presented in Table 2-1, and projections of DTW airline yields and airfares based on the growth rates in the FAA’s national forecasts of airline yield.* Independent forecasts of unemployment rates in the Detroit Primary Area were not available; it was assumed that unemployment rates would stabilize but remain above U.S. unemployment rates, consistent with historical trends. Appendix A provides a summary of the predictive model used as the basis for the forecasts of domestic O&D passengers.

*Federal Aviation Administration, *FAA Aerospace Forecasts, Fiscal Years 2016-2036*, March 2016, www.faa.gov.

Figure 6-4
REPRESENTATIVE MODEL
ACTUAL AND PREDICTED DOMESTIC ORIGIN-DESTINATION PASSENGERS
 Detroit Metropolitan Wayne County Airport



Source: Actual—U.S. Department of Transportation, *Origin-Destination Survey of Airline Passenger Traffic, Domestic*, online database, accessed January 2016.
 Predicted regression model results —LeighFisher, March 2016.

Domestic O&D passengers at the Airport are forecast to increase an average of 2.0% per year between 2015 and 2035, with faster growth in the near-term—an average increase of 2.5% between 2015 and 2020, as shown in Table 6-1. The percent of domestic O&D passengers at the Airport is forecast to increase from 50.3% in 2015 to 57.4% in 2035, reflecting the forecasts of economic growth for the Detroit Primary Area.

6.2.2 Domestic Connecting Passengers

The success and development of an airline connecting hub airport is based on a number of factors, including:

- The number of the O&D passengers in the region served by an airport which help to maintain load factors and support connecting banks of flights
- The geographical location of a hub in relation to population centers and other hubs in an airline’s network
- The mix of domestic and international operations at an airport and the potential for airlines to provide service to high yield business and international markets
- The cost of airline operations at an airport

**Table 6-1
HISTORICAL AND FORECAST ORIGIN-DESTINATION AND CONNECTING ENPLANED PASSENGERS
Detroit Metropolitan Wayne County Airport**

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
Domestic						
Origin-destination	8,046,329	8,388,644	9,468,600	10,422,900	11,356,000	12,420,500
Connecting	<u>6,738,150</u>	<u>6,886,244</u>	<u>7,060,100</u>	<u>7,238,400</u>	<u>7,421,200</u>	<u>7,514,400</u>
Domestic total	14,784,479	15,274,888	16,528,700	17,661,300	18,777,200	19,934,900
International						
Origin-destination	398,235	474,177	536,600	593,000	646,100	706,700
Connecting	<u>1,031,020</u>	<u>932,190</u>	<u>953,700</u>	<u>975,800</u>	<u>998,500</u>	<u>1,010,300</u>
International total	1,429,255	1,406,367	1,490,300	1,568,800	1,644,600	1,717,000
Airport Total						
Origin-destination	8,444,564	8,862,821	10,005,200	11,015,900	12,002,100	13,127,200
Connecting	<u>7,769,170</u>	<u>7,818,434</u>	<u>8,013,800</u>	<u>8,214,200</u>	<u>8,419,700</u>	<u>8,524,700</u>
Airport total	16,213,734	16,681,255	18,019,000	19,230,100	20,421,800	21,651,900
	Percent of total					
Domestic						
Origin-destination	49.6%	50.3%	52.5%	54.2%	55.6%	57.4%
Connecting	<u>41.6</u>	<u>41.3</u>	<u>39.2</u>	<u>37.6</u>	<u>36.3</u>	<u>34.7</u>
Domestic total	91.2%	91.6%	91.7%	91.8%	91.9%	92.1%
International						
Origin-destination	2.5%	2.8%	3.0%	3.1%	3.2%	3.3%
Connecting	<u>6.4</u>	<u>5.6</u>	<u>5.3</u>	<u>5.1</u>	<u>4.9</u>	<u>4.7</u>
International total	8.8%	8.4%	8.3%	8.2%	8.1%	7.9%
Airport Total						
Origin-destination	52.1%	53.1%	55.5%	57.3%	58.8%	60.6%
Connecting	<u>47.9</u>	<u>46.9</u>	<u>44.5</u>	<u>42.7</u>	<u>41.2</u>	<u>39.4</u>
Airport total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Compound annual percent change					
		2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Domestic						
Origin-destination		2.5%	1.9%	1.7%	1.8%	2.0%
Connecting		0.5	0.5	0.5	0.2	0.4
Domestic total		1.6	1.3	1.2	1.2	1.3
International						
Origin-destination		2.5	2.0	1.7	1.8	2.0
Connecting		0.5	0.5	0.5	0.2	0.4
International total		1.2	1.0	0.9	0.9	1.0
Airport Total						
Origin-destination		2.5	1.9	1.7	1.8	2.0
Connecting		0.5	0.5	0.5	0.2	0.4
Airport total		1.6	1.3	1.2	1.2	1.3

Notes: The forecasts presented in this table were prepared using the information and assumptions described 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.

Totals may not add due to rounding.

Sources: Historical—Wayne County Airport Authority records and U.S. Department of Transportation.
Forecast—LeighFisher, March 2016.

DTW is a mature airline connecting hub, with hub operations started by Republic Airlines in 1984, expanded in 1986 with the merger of Republic and Northwest Airlines, and continued since 2008 with the merger of Northwest and Delta Air Lines. In 2015, Delta accounted for approximately 97% of passengers connecting at the Airport. DTW handled 7.8 million connecting passengers in 2015, similar to that for Delta's connecting hubs at Minneapolis (8.1 million) and Los Angeles (8.0 million). The forecasts of domestic connecting passengers at the Airport is based on:

- Input from interviews with network planners at Delta Air Lines regarding the continued role of DTW as a primary connecting hub in Delta's system
- An analysis of the historical trends in connecting passengers at the Airport and at Delta's other connecting hubs
- A large population and O&D passenger base to support connecting hub operations
- Professional judgement based on similar analyses for other U.S. connecting hub airports

From 2000 to 2016, Delta's hub at DTW has been the second or third busiest airport in its system in terms of scheduled departing seats. Although DTW is approximately 500 miles from Delta's hub at Minneapolis/St. Paul, the Airport is the third busiest in the airline's network in 2015 (after Minneapolis/St. Paul) and serves a population base of 5.3 million. In comparison, Delta's hub at Minneapolis/St. Paul serves a population base of 3.9 million.

Domestic connecting passengers at the Airport are forecast to increase an average of 0.4% per year between 2015 and 2035, with slightly faster growth in the near-term—an average increase of 0.5% between 2015 and 2020, as shown in Table 6-1. The percent of domestic connecting passengers at the Airport is forecast to decrease from 41.3% in 2015 to 34.7% in 2035, reflecting faster forecast growth in domestic origin-destination passengers (an average increase of 2.0% per year between 2015 and 2035).

6.2.3 International Origin-Destination Passengers

The number of international O&D passengers at the Airport is related to the strength of the Detroit Primary Area economy and the location of global companies and strong international communities of interest in the Detroit Primary Area. In addition, the level of international service provided at the Airport is supported by the role of the DTW as a primary connecting hub and international gateway in Delta's system. The forecasts of international O&D passengers are based on:

- An analysis of DTW international passengers by airline and city-pair market
- Input from interviews with network planners at Delta Air Lines regarding the potential for additional international nonstop service at DTW
- Socioeconomic forecasts presented in Table 2-1
- A review of industry forecasts of passenger traffic growth by international region prepared by Airbus, The Boeing Corporation, and the FAA, as shown in Table 6-2
- Professional judgement based on similar analyses for other U.S. international gateway airports

It is important to note that U.S. Department of Transportation (DOT) data for DTW international O&D passengers do not include foreign-flag airline activity and are incomplete. Therefore, there is no reliable historical data series of international O&D passenger data to use in developing a regression model. As a

result of the incomplete data series, international O&D passengers for DTW are derived by subtracting U.S. DOT data for international connecting passengers from DTW international enplaned passengers.

Table 6-2
COMPARATIVE INDUSTRY FORECASTS

International region	Compound annual growth rate: 2014-2034		
	Airbus	Boeing	FAA
Asia/Pacific	5.7%	6.1%	3.8%
Europe	3.6%	3.8%	3.7%
North America	2.5%	3.1%	2.2%
Middle East	6.7%	6.2%	--
Latin America and Caribbean	5.5%	6.0%	4.0%
Commonwealth of Independent States	4.9%	3.7%	--
Africa	5.3%	5.7%	--
Rest of World	--	7.8%	--
World	4.6%	4.9%	3.8%

Note: Market categories differ for each industry forecast.
 Airbus and Boeing forecasts are for revenue passenger kilometers.
 FAA forecasts are for total passenger traffic to and from the United States by U.S. and foreign-flag airlines.

Sources: Airbus, Global Market Forecast, 2015-2034, 2015, www.airbus.com.
 The Boeing Corporation, Current Market Outlook, 2015-2034, 2015, www.boeing.com.
 U.S. Department of Transportation, FAA Aerospace Forecast, Fiscal Years 2015-2040, March 2016, www.faa.gov.

As shown in Table 6-1, international O&D passengers at the Airport are forecast to increase an average of 2.0% per year between 2015 and 2035, with faster growth in the near-term—an average increase of 2.5% between 2015 and 2020. The percent of international O&D passengers at the Airport is forecast to increase from 2.8% in 2015 to 3.3% in 2035, reflecting the continued expansion of international service and growth in the numbers of international passengers.

6.2.4 International Connecting Passengers

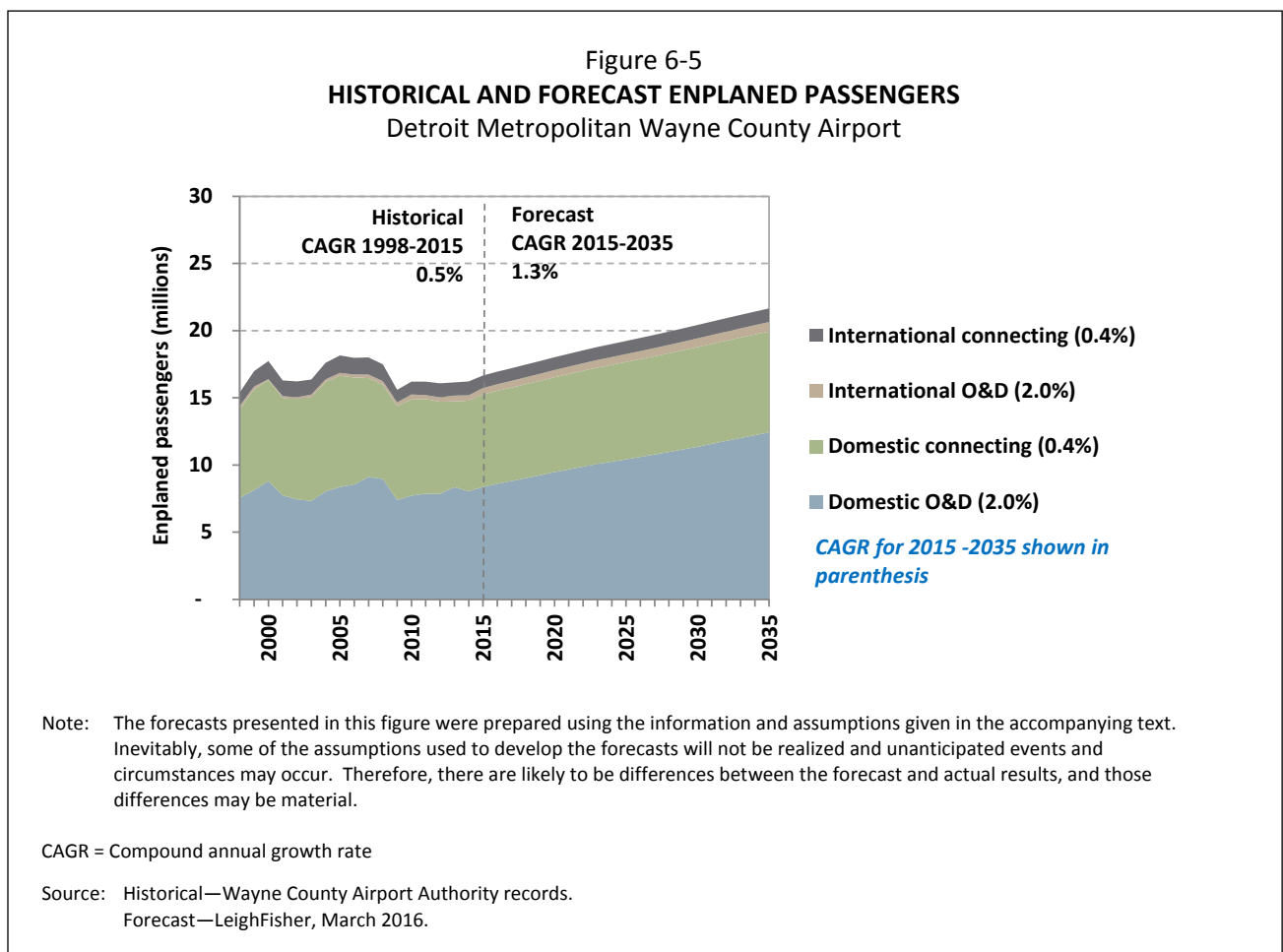
The number of international connecting passengers at the Airport is related to the role of the Airport as an airline connecting hub in Delta’s system and the development of the Airport as an international gateway by Delta and foreign-flag airlines. The forecasts of international connecting passengers at the Airport is based on:

- Input from interviews with network planners at Delta Air Lines regarding the continued role of DTW as a primary connecting hub and international gateway in Delta’s system
- An analysis of the historical trends in connecting passengers at the Airport and at Delta’s other connecting hubs
- Professional judgement based on similar analyses for other U.S. connecting hub airports

As shown in Table 6-1, international connecting passengers at the Airport are forecast to increase an average of 0.4% per year between 2015 and 2035, with faster growth in the near-term—an average increase of 0.4% between 2015 and 2020. Similar to the trend in domestic connecting passengers, the percent of international connecting passengers at the Airport is forecast to decrease from 5.6% in 2015 to 4.7% in 2035, reflecting faster forecast growth in International origin-destination passengers (an average increase of 2.0% per year between 2015 and 2035).

6.2.5 Total Enplaned Passengers

As shown on Figure 6-5 and in Table 6-3, the number of total enplaned passengers at the Airport is forecast to increase from 16.7 million passengers in 2015 to 21.7 million in 2035, increasing an average of 1.3% per year. The number of domestic passengers at the Airport is forecast to increase an average of 1.3% per year between 2015 and 2035, compared with an average increase of 1.0% in international passenger traffic.



**Table 6-3
HISTORICAL AND FORECAST ENPLANED PASSENGERS BY TERMINAL
Detroit Metropolitan Wayne County Airport**

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
McNamara Terminal						
Domestic						
Delta Airlines						
Network	6,911,702	7,406,571	8,014,500	8,563,700	9,104,800	9,666,200
Regional affiliates	<u>4,386,236</u>	<u>3,996,183</u>	<u>4,324,200</u>	<u>4,620,600</u>	<u>4,912,500</u>	<u>5,215,300</u>
Subtotal--Domestic	11,297,938	11,402,754	12,338,700	13,184,300	14,017,300	14,881,500
International	<u>1,299,150</u>	<u>1,291,219</u>	<u>1,368,300</u>	<u>1,440,400</u>	<u>1,509,900</u>	<u>1,576,400</u>
McNamara Terminal Total	12,597,088	12,693,973	13,707,000	14,624,700	15,527,200	16,457,900
North Terminal						
Domestic						
Airlines other than Delta Airlines						
Network (a)	837,308	923,566	999,400	1,067,900	1,135,300	1,205,300
Regional affiliates (b)	732,947	800,660	866,400	925,800	984,200	1,044,900
Low cost carriers	<u>1,916,286</u>	<u>2,147,908</u>	<u>2,324,200</u>	<u>2,483,500</u>	<u>2,640,400</u>	<u>2,803,200</u>
Subtotal--Domestic	3,486,541	3,872,134	4,190,000	4,477,200	4,759,900	5,053,400
International	<u>130,105</u>	<u>115,148</u>	<u>122,000</u>	<u>128,600</u>	<u>134,700</u>	<u>140,600</u>
North Terminal Total	3,616,646	3,987,282	4,312,000	4,605,800	4,894,600	5,194,000
Total Airport						
McNamara Terminal	12,597,088	12,693,973	13,707,000	14,624,700	15,527,200	16,457,900
North Terminal	<u>3,616,646</u>	<u>3,987,282</u>	<u>4,312,000</u>	<u>4,605,800</u>	<u>4,894,600</u>	<u>5,194,000</u>
Total Airport	16,213,734	16,681,255	18,019,000	19,230,500	20,421,800	21,651,900

Compound annual percent change

	2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
McNamara Terminal					
Domestic					
Delta Airlines					
Network		1.6%	1.3%	1.2%	1.3%
Regional affiliates		1.6	1.3	1.2	1.3
Subtotal--Domestic		1.6	1.3	1.2	1.3
International		1.2	1.0	0.9	1.0
McNamara Terminal Total		1.5	1.3	1.2	1.3
North Terminal					
Domestic					
Airlines other than Delta Airlines					
Network (a)		1.6	1.3	1.2	1.3
Regional affiliates (b)		1.6	1.3	1.2	1.3
Low cost carriers		1.6	1.3	1.2	1.3
Subtotal--Domestic		1.6	1.3	1.2	1.3
International		1.2	1.1	0.9	1.0
North Terminal Total		1.6	1.3	1.2	1.3
Total Airport		1.6	1.3	1.2	1.3

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

Totals may not add due to rounding.

Sources: Historical—Wayne County Airport Authority records and U.S. Department of Transportation.
Forecast—LeighFisher, March 2016.

As shown in Table 6-3, the McNamara Terminal accounted for 12.7 million enplaned passengers at the Airport in 2015 (76% of total) and is forecast to account for 16.5 million in 2035. The number of domestic passengers at the Airport is forecast to increase an average of 1.3% per year between 2015 and 2035, compared with an average increase of 1.0% in international passenger traffic.

6.2.6 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. 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 Detroit Primary Area 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 2016 through FY 2035, it was assumed that:

- The U.S. economy will increase an average of 2.0% to 2.5% per year during the forecast period (see Table 2-5).
- The economy of the Detroit Primary Area (as measured by employment and per capita income) will increase at slower rates compared with the U.S. as a whole (see Table 2-1).
- DTW will continue to be the primary commercial service airport for the Detroit Primary Area, the primary connecting hub and international gateway for Delta Air Lines.
- A generally stable international political environment and enhanced passenger and baggage screening procedures will maintain airline traveler confidence in aviation security without imposing unreasonable inconvenience.
- There will be no material disruption of airline service or passenger travel behavior as a result of international hostilities, terrorist acts or threats, or global safety or health concerns.
- 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.

6.3 Air Cargo Forecasts

Domestic air cargo accounted for 64.3% of total air cargo at the Airport in 2015; international air cargo accounted for the remaining 35.7%. As mentioned earlier, the analysis and forecasts of air cargo for the Airport were based on an analysis of air cargo for the Detroit Region, as summarized in Appendix B. The forecast results for the domestic and international components of air cargo demand at the Airport are described in the following sections.

6.3.1 Domestic Air Cargo

Since 2000, domestic air cargo at the Airport and in the nation as a whole* has decreased—an average decrease of 4.0% and 1.0% per year, respectively, between 2000 and 2015, reflecting, in part, increases in air cargo shipping costs related to increased oil prices and the availability of less expensive alternative shipping modes.

The preparation of domestic air cargo forecasts is limited by the continuing decreasing trend in domestic air cargo at DTW which does not correlate with economic variables such as employment and income which generally have an increasing trend. In addition, in recent years, particularly since the oil price spike in 2008, an increasing amount of cargo that was transported by air has been handled by trucks due to lower ground transport costs. To evaluate the shift in domestic cargo from air to ground transport and the potential for future domestic air cargo growth, a complete dataset for the volume and value of domestic cargo carried by other modes, particularly by truck, is needed to evaluate the future role of the Airport in handling domestic air cargo. However, such a dataset at the regional level is not available.

Historically, DTW domestic air cargo has followed national trends. As noted in the FAA’s Aerospace Forecasts published in March 2015, the forecasts of domestic air cargo for the nation as a whole “are based on several assumptions specific to the cargo industry. First, security restrictions on air cargo transportation will remain in place. Second, most of the shift from air to ground transportation has occurred. Finally, long-term cargo activity will be tied to economic growth.” ** Therefore, given comparable trends in DTW and national domestic air cargo, it is assumed that domestic air cargo growth at the Airport will approximate the growth rate forecast by the FAA for the nation as a whole—an average increase of 1.0% per year.

As shown in Table 6-4, domestic air cargo at the Airport is forecast to increase from 124,308 metric tons in 2015 to 151,700 metric tons in 2035—an average increase of 1.0% per year. The percent of domestic air cargo at the Airport is forecast to decrease from 64.3% in 2015 to 55.5% in 2035, reflecting faster forecast growth in international air cargo (an average increase of 2.9% per year between 2015 and 2035).

6.3.2 International Air Cargo

The forecasts of international air cargo at the Airport are based on an econometric model relating international air cargo trends in the Detroit Region to economic and airline industry metrics, including an evaluation of imports and exports, as summarized in Appendix B. As shown in Table 6-4, international air cargo at the Airport is forecast to increase from 69,143 metric tons in 2015 to 121,700 metric tons in 2035—an average increase of 2.9% per year. The percent of international air cargo at the Airport is forecast to increase from 35.7% in 2015 to 45.5% in 2035, reflecting continued U.S. economic growth, as measured by U.S. GDP, the strength of the U.S. dollar, and the continued growth in international airline service.

*In terms of revenue tons miles as reported by the FAA.

**Federal Aviation Administration, *FAA Aerospace Forecast, Fiscal Years 2015-2035*, March 2015, www.faa.gov.

6.3.3 Total Air Cargo

Total air cargo at the Airport is forecast to increase from 193,451 metric tons in 2015 to 273,400 metric tons in 2035—an average rate of 1.7% per year, as shown on Figure 6-6 and in Table 6-4. Enplaned air cargo at DTW is forecast to account for approximately 45% of total air cargo through 2035, with deplaned air cargo accounting for the remaining 55%. Passenger airlines are forecast to account for an increasing share of total air cargo—increasing from 48% in 2015 to 55% in 2035, reflecting the increasing use of belly cargo, particularly in international service.

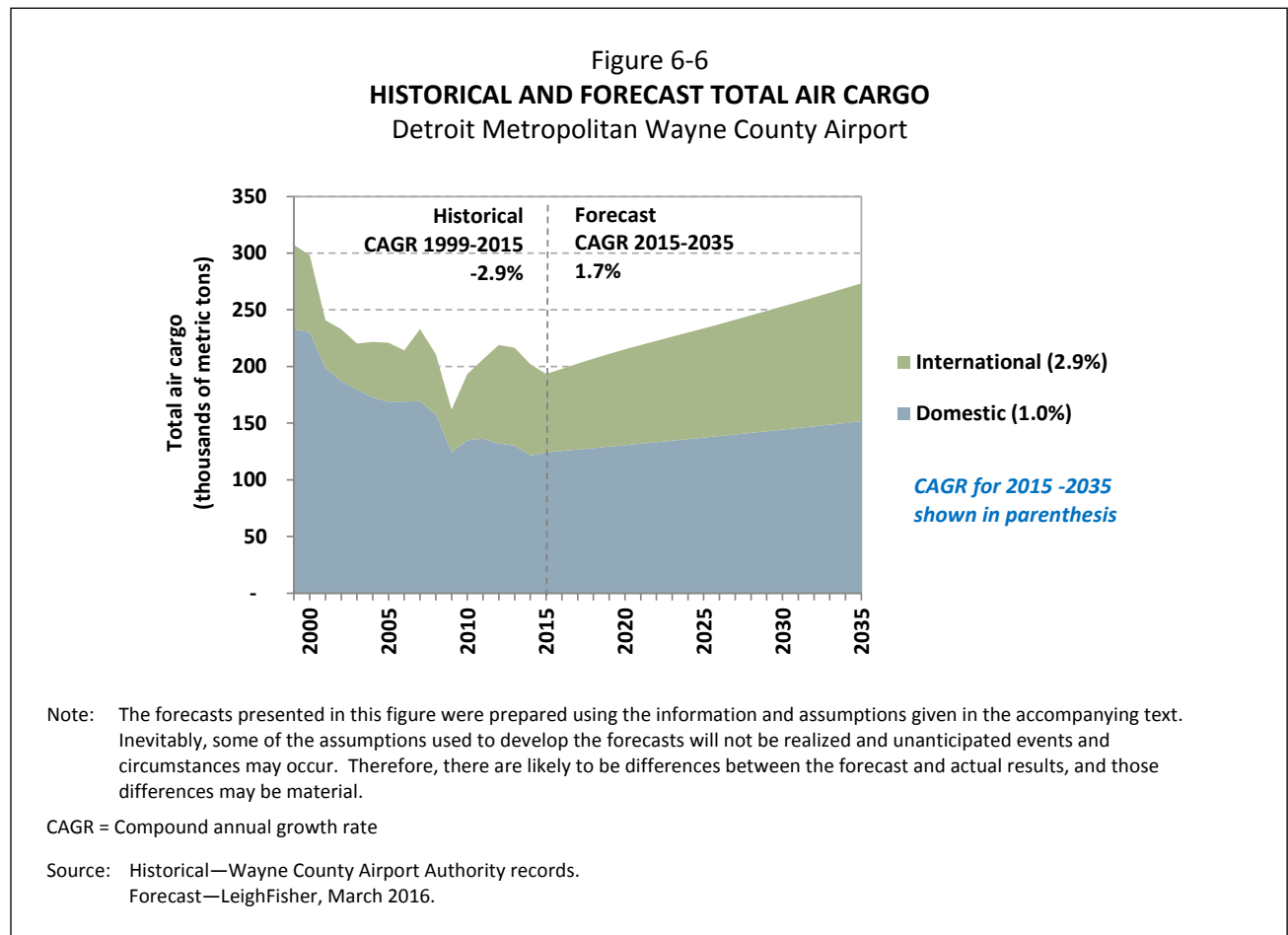


Table 6-4
HISTORICAL AND FORECAST DOMESTIC AND INTERNATIONAL TOTAL AIR CARGO
 Detroit Metropolitan Wayne County Airport
In metric tons

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
Air freight						
Domestic	111,295	112,585	118,300	124,400	130,700	137,400
International	<u>75,810</u>	<u>63,881</u>	<u>79,000</u>	<u>90,500</u>	<u>102,600</u>	<u>115,300</u>
Air freight total	187,105	176,466	197,300	214,900	233,300	252,700
Air mail (a)						
Domestic	10,129	11,723	12,300	12,900	13,600	14,300
International	<u>4,798</u>	<u>5,262</u>	<u>5,600</u>	<u>5,800</u>	<u>6,100</u>	<u>6,400</u>
Air mail total	14,927	16,985	17,900	18,700	19,700	20,700
Total air cargo						
Domestic	121,424	124,308	130,600	137,300	144,300	151,700
International	<u>80,608</u>	<u>69,143</u>	<u>84,600</u>	<u>96,300</u>	<u>108,700</u>	<u>121,700</u>
Air cargo total	202,032	193,451	215,200	233,600	253,000	273,400
Enplaned and deplaned air cargo						
Enplaned	90,757	87,869	97,400	106,000	114,100	122,600
Deplaned	<u>111,275</u>	<u>105,582</u>	<u>117,800</u>	<u>127,600</u>	<u>138,900</u>	<u>150,800</u>
Airport total	202,032	193,451	215,200	233,600	253,000	273,400
Total air cargo by all-cargo and passenger airlines						
All-cargo airline	101,714	100,953	106,200	111,600	117,400	123,400
Passenger airlines	<u>100,317</u>	<u>92,498</u>	<u>109,000</u>	<u>122,000</u>	<u>135,600</u>	<u>150,000</u>
Airport total	202,032	193,451	215,200	233,600	253,000	273,400
	Compound annual percent change					
		2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Air freight						
Domestic		1.0%	1.0%	1.0%	1.0%	1.0%
International		4.3	2.8	2.5	2.4	3.0
Air freight total		2.3	1.7	1.7	1.6	1.8
Air mail (a)						
Domestic		1.0	1.0	1.1	1.0	1.0
International		1.3	0.7	1.0	1.0	1.0
Air mail total		1.1	0.9	1.0	1.0	1.0
Total air cargo						
Domestic		1.0	1.0	1.0	1.0	1.0
International		4.1	2.6	2.5	2.3	2.9
Air cargo total		2.2	1.7	1.6	1.6	1.7
Enplaned and deplaned air cargo						
Enplaned		2.1	1.7	1.5	1.4	1.7
Deplaned		2.2	1.6	1.7	1.7	1.8
Airport total		2.2	1.7	1.6	1.6	1.7
Total air cargo by all-cargo and passenger airlines						
All-cargo airline		1.0	1.0	1.0	1.0	1.0
Passenger airlines		3.3	2.3	2.1	2.0	2.4
Airport total		2.2	1.7	1.6	1.6	1.7

(a) Includes small packages.

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

Totals may not add due to rounding.

Sources: Historical—Wayne County Airport Authority records and U.S. Department of Transportation.
 Forecast—LeighFisher, March 2016.

6.4 Aircraft Operations

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

6.4.1 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.
- 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.

Table 6-5 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 cargo tonnage per cargo airline operation.

6.4.2 Passenger Airline Aircraft Operations

Passenger aircraft operations include total departures and arrivals performed by network and regional affiliate aircraft in the service of transporting passengers, as shown in Table 6-6. Passenger airline aircraft operation forecasts were calculated by dividing the enplaned passenger forecasts by sector (e.g., domestic and international) and category (e.g., network and regional affiliate carrier) by the estimated number of passengers enplaned per departure. In 2015, the estimated average number of passengers enplaned per departure for the Airport as a whole was 92.2 and is derived by multiplying the load factor by the average seats per departure (e.g., 83.9% x 109.9 = 92.2). 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 approximately 102.0 in 2035. Dividing the enplaned passenger forecasts by the forecast number of passengers enplaned per departure yields passenger airline aircraft departure forecasts. Passenger airline aircraft departures at DTW are forecast to increase from 183,729 in 2015 to 212,200 operations in 2035, an average increase of 0.7% per year, as shown in Table 6-6.

Table 6-5
COMMERCIAL AIRLINE AIRCRAFT OPERATIONS FORECAST ASSUMPTIONS
 Detroit Metropolitan Wayne County Airport

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
Seat per operation						
Domestic						
Network airlines	154.9	151.9	152.7	153.4	154.2	155.0
Low cost carriers	148.7	153.8	154.5	155.3	156.1	156.9
Regional airlines	59.4	62.6	65.7	68.9	72.2	75.7
Domestic total	97.9	104.4	107.3	110.2	113.2	116.2
International	238.4	222.3	223.4	224.5	225.7	226.8
Airport total	103.6	109.9	112.6	115.5	118.4	121.3
Load factor						
Domestic						
Network airlines	86.1%	86.2%	86.2%	86.2%	86.2%	86.2%
Low cost carriers	84.8%	83.1%	83.1%	83.1%	83.1%	83.1%
Regional airlines	81.1%	83.1%	83.1%	83.1%	83.1%	83.1%
Domestic total	84.1%	84.8%	84.8%	84.8%	84.8%	84.8%
International	78.9%	75.7%	76.2%	76.7%	77.2%	77.7%
Airport total	83.6%	83.9%	84.0%	84.0%	84.1%	84.2%
Air cargo per operation by all-cargo airlines (metric tons)	28.14	26.64	26.83	27.23	27.64	28.08
Compound annual percent change						
		2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Seat per operation						
Domestic		0.1%	0.1%	0.1%	0.1%	0.1%
Network airlines		0.1	0.1	0.1	0.1	0.1
Low cost carriers		1.0	1.0	1.0	1.0	1.0
Regional airlines		0.5	0.5	0.5	0.5	0.5
Domestic total		0.1	0.1	0.1	0.1	0.1
International		0.5	0.5	0.5	0.5	0.5
Airport total		0.1	0.1	0.1	0.1	0.1
Load factor						
Domestic						
Network airlines		0.0	0.0	0.0	0.0	0.0
Low cost carriers		0.0	0.0	0.0	0.0	0.0
Regional airlines		0.0	0.0	0.0	0.0	0.0
Domestic total		0.0	0.0	0.0	0.0	0.0
International		0.1	0.1	0.1	0.1	0.1
Airport total		0.0	0.0	0.0	0.0	0.0
Total air cargo per operation (metric tons)		0.1	0.3	0.3	0.3	0.3

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

Totals may not add due to rounding.

Sources: Historical—Wayne County Airport Authority records and OAG Worldwide Aviation Ltd, online database, accessed March 2016.

Forecast—LeighFisher, March 2016.

**Table 6-6
HISTORICAL AND FORECAST COMMERCIAL AIRLINE DEPARTURES BY SECTOR
Detroit Metropolitan Wayne County Airport**

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
Passenger airlines						
Domestic						
Network airlines	58,270	62,930	68,470	72,800	77,010	81,350
Low cost carriers	15,460	16,986	18,100	19,240	20,360	21,510
Regional airlines	<u>108,724</u>	<u>95,621</u>	<u>95,150</u>	<u>96,980</u>	<u>98,350</u>	<u>99,590</u>
Domestic total	182,454	175,537	181,720	189,020	195,720	202,450
International	<u>7,397</u>	<u>8,192</u>	<u>8,760</u>	<u>9,110</u>	<u>9,440</u>	<u>9,750</u>
Subtotal—passenger airlines	189,851	183,729	190,480	198,130	205,160	212,200
All-cargo airlines	<u>1,807</u>	<u>1,895</u>	<u>1,980</u>	<u>2,050</u>	<u>2,120</u>	<u>2,200</u>
Airport total	191,658	185,624	192,460	200,180	207,280	214,400
	Compound annual percent change					
		<u>2015-2020</u>	<u>2020-2025</u>	<u>2025-2030</u>	<u>2030-2035</u>	<u>2015-2035</u>
Passenger airlines						
Domestic						
Network airlines		1.7%	1.2%	1.1%	1.1%	1.3%
Low cost carriers		1.3	1.2	1.1	1.1	1.2
Regional airlines		-0.1	0.4	0.3	0.3	0.2
Domestic total		0.7	0.8	0.7	0.7	0.7
International		1.3	0.8	0.7	0.6	0.9
Subtotal—passenger airlines		0.7	0.8	0.7	0.7	0.7
All-cargo airlines		0.9	0.7	0.7	0.7	0.7
Airport total		0.7	0.8	0.7	0.7	0.7

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

Totals may not add due to rounding.

Sources: Historical—Wayne County Airport Authority records and U.S. Department of Transportation.
Forecast—LeighFisher, March 2016.

6.4.3 All-Cargo Airline Aircraft Operations

Cargo airline operations at DTW include the flight activity by airlines dedicated exclusively to the transportation of freight, including integrated carriers such as FedEx and all-cargo airlines such as Atlas Air that operate freighter aircraft. Air carrier size aircraft that perform all-cargo operations at the airport include widebody (e.g., Airbus A-300, DC-10, and MD-11) and narrowbody (e.g., Boeing 757) aircraft.

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 integrated airlines such as FedEx was then divided by an estimated cargo tons per operation ratio for integrated airlines to yield cargo operations for integrated airlines. For example, all-cargo airlines carried an estimated average of 26.64 metric tons per operation in 2015, as shown in Table 6-5. 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.

All-cargo airline aircraft departures at DTW are forecast to increase an average of 0.7% per year from 1,895 in 2015 to 2,200 in 2035, as shown in Table 6-6.

6.4.4 General Aviation Aircraft Operations

General aviation activity includes all flight operations by aircraft other than scheduled or charter passenger aircraft and military aircraft. General aviation 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 avionics instrument requirements. The 2008-2009 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 general aviation 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. Since 2009, itinerant operations have accounted for all general aviation operations at the Airport. In 2015, a total of 5,843 itinerant general aviation operations were performed at the Airport, as shown in Table 6-7.

The total number of general aviation operations is forecast to average 5,800 operations between 2015 and 2035, consistent with historical trends since 2010.

In 2015, a total of 7 jet aircraft were based at the Airport. The total number of based aircraft at the Airport is forecast to remain unchanged through 2035.

6.4.5 Military Aircraft Operations

The number of military operations at the Airport averaged approximately 130 operations per year between 2010 and 2015. In 2015, a total of 102 military operations were performed at the Airport, approximating the 6-year average. Military operations are expected remain at a level of about 100 operations through 2035, as shown in Table 6-7.

Table 6-7
HISTORICAL AND FORECAST AIRCRAFT OPERATIONS
 Detroit Metropolitan Wayne County Airport

	Historical		Forecast			
	2014	2015	2020	2025	2030	2035
Commercial operations						
Air carrier (a)	243,117	276,898	301,190	315,020	328,010	341,120
Air taxi (a)	<u>143,122</u>	<u>96,533</u>	<u>86,230</u>	<u>87,850</u>	<u>89,060</u>	<u>90,160</u>
Total	386,239	373,431	387,420	402,870	417,070	431,280
General aviation						
Local	--	--	--	--	--	--
Itinerant	<u>6,264</u>	<u>5,843</u>	<u>5,800</u>	<u>5,800</u>	<u>5,800</u>	<u>5,800</u>
Total	6,264	5,843	5,800	5,800	5,800	5,800
Military						
Local	--	--	--	--	--	--
Itinerant	<u>132</u>	<u>102</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
Total	<u>132</u>	<u>102</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
Total Airport	392,635	379,376	393,320	408,770	422,970	437,180
Compound annual percent change						
		2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Commercial operations						
Air carrier (a)		1.7%	0.9%	0.8%	0.8%	1.0%
Air taxi (a)		-2.2	4.0	0.3	0.2	-0.3
Total		0.7	0.8	0.7	0.7	0.7
General aviation						
Local		--	--	--	--	--
Itinerant		-0.1	0.0	0.0	0.0	0.0
Total		-0.1	0.0	0.0	0.0	0.0
Military						
Local		--	--	--	--	--
Itinerant		-0.4	0.0	0.0	0.0	0.0
Total		-0.4	0.0	0.0	0.0	0.0
Total Airport		0.7	0.8	0.7	0.7	0.7

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

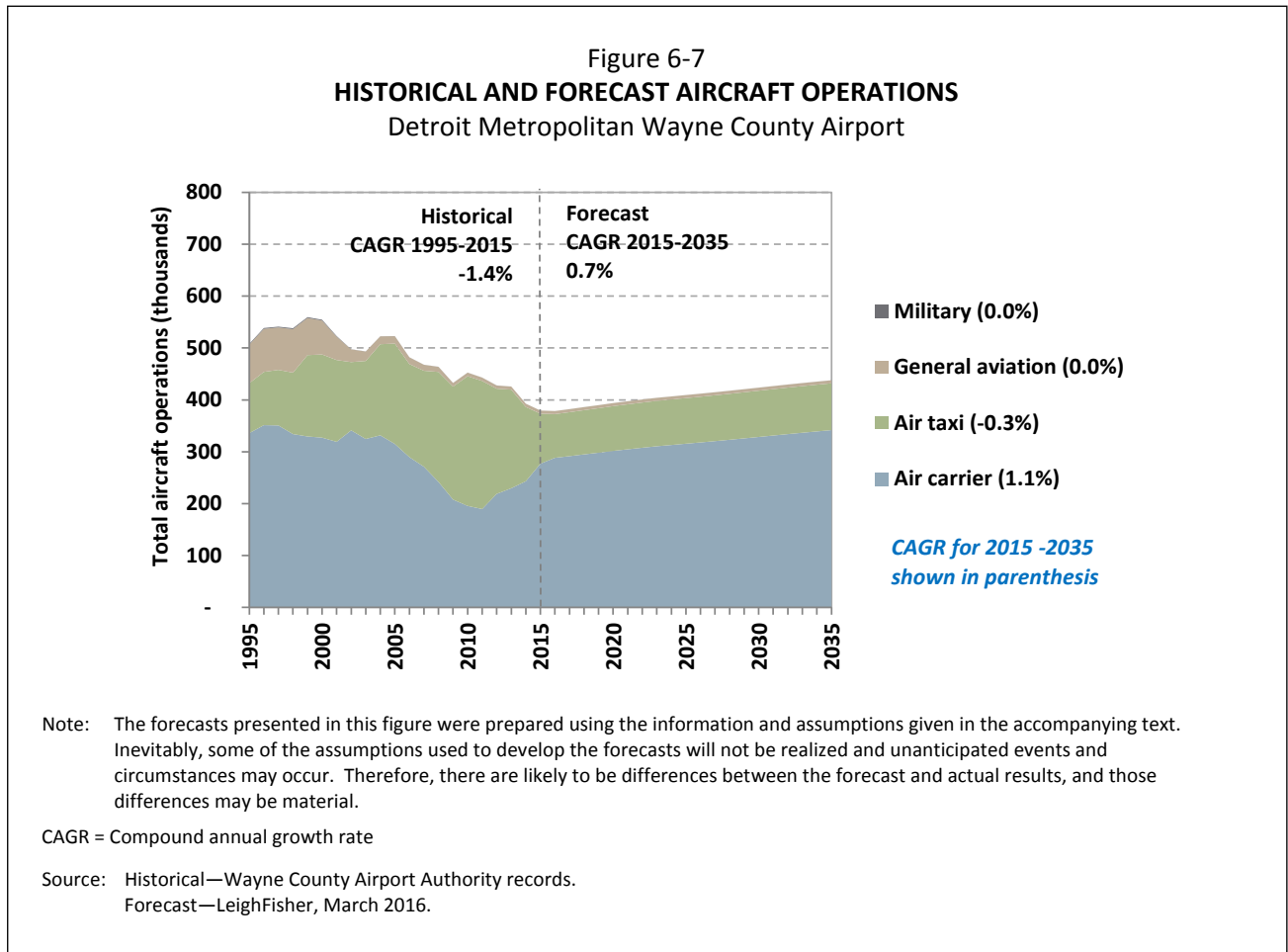
Totals may not add due to rounding.

(a) Includes air taxi, unscheduled, corporate, and ferry operations and empty flights.

Sources: Historical—Federal Aviation Administration, Air Traffic Activity System (ATADS), www.faa.gov.
 Forecast—LeighFisher, March 2016.

6.4.6 Total Aircraft Operations

Total aircraft operations at DTW are forecast to increase from 379,376 in 2015 to 435,180 operations in 2035 an average increase of 0.7% per year, as shown in Table 6-7 and on Figure 6-7.



7.0 COMPARISON WITH THE FAA TAF

Table 7-1 presents a comparison of the baseline aviation demand forecasts prepared for Detroit Metropolitan Wayne County Airport with the FAA 2015 TAF for the Airport. The baseline unconstrained forecasts are the “preferred” forecasts recommended for FAA approval. The forecasts are compared for the components of total enplaned passengers, commercial aircraft operations and total aircraft operations. The format of Table 7-1 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 2015 and forecast horizons years which are equal to the base year, plus 1, 5, 10 and 15 years (2016, 2020, 2025, and 2030). The Master Plan Update aviation demand forecasts have been compared graphically with the FAA 2015 TAF in the figures presented throughout this report, including Figures 1-1 and 1-3.

7.1 Comparison with the FAA 2015 TAF

The key findings of the comparison of the DTW Master Plan Update aviation demand forecasts with the FAA 2015 TAF are:

- The forecast of enplaned passengers for DTW approximates the TAF in 2020 and is lower in 2025. The variance between the DTW Master Plan Update enplaned passenger forecast and the FAA 2015 TAF is 0.1% in 2020 and 1.8% in 2025, as shown in Table 7-1.
- The forecast of commercial operations for DTW is less than the FAA 2015 TAF by 8.7% in 2020 and 15.2% in 2025.
- The forecast of total aircraft operations for DTW is less than the FAA 2015 TAF by 8.5% in 2020 and 14.9% in 2025.

Overall, the Master Plan Update aviation demand forecasts are consistent with the FAA 2015 TAF 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.

FAA guidance recognizes that a comparison of airport planning forecasts and the FAA TAF is limited by the use of:

- Calendar year data for an airport master plan vs. FFY data in the FAA TAF
- The absence of non-revenue and military charter passengers in the FAA TAF

Airport planning forecasts are based on airport data (as reported by airlines) to enable an airport operator to:

- Track actual and forecast activity
- Reconcile forecast activity with airport budgets which are based on airline reported data

*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 7-1
FAA TAF FORECAST COMPARISON
 Detroit Metropolitan Wayne County Airport

	Year (a)	Master Plan Update forecasts	FAA 2015 TAF	Master Plan Update forecasts vs. 2015 TAF (percent variance)
Passenger enplanements				
Base yr.	2015	16,681,255	15,984,984	4.4%
Base yr. + 5yrs.	2020	18,019,000	18,008,678	0.1%
Base yr. + 10yrs.	2025	19,230,200	19,584,828	-1.8%
Base yr. + 15yrs.	2030	20,421,800	21,081,030	-3.1%
Commercial operations (b)				
Base yr.	2015	373,431	374,525	-0.3%
Base yr. + 5yrs.	2020	387,420	424,531	-8.7%
Base yr. + 10yrs.	2025	400,870	472,551	-15.2%
Base yr. + 15yrs.	2030	415,070	507,697	-18.2%
Total operations (c)				
Base yr.	2015	379,376	380,160	-0.2%
Base yr. + 5yrs.	2020	393,320	429,754	-8.5%
Base yr. + 10yrs.	2025	406,770	477,774	-14.9%
Base yr. + 15yrs.	2030	420,970	512,920	-17.9%

(a) The Master Plan Update forecasts were prepared on a calendar year basis and the FAA 2015 TAF was prepared on a U.S. federal 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 2015 (actual)—Wayne County Airport Authority records and Federal Aviation Administration, Air Traffic Activity System (ATADS), www.faa.gov.

Master Plan Update Forecasts—LeighFisher, March 2016.

FAA 2015 TAF—U.S. Department of Transportation, Federal Aviation Administration.

Table 7-2 presents a summary of the Master Plan Update aviation demand forecasts using a second template provided by the FAA.

Table 7-2
SUMMARY OF MASTER PLAN UPDATE FORECASTS USING FAA TEMPLATE
 Detroit Metropolitan Wayne County Airport

	Forecast					Average annual compound growth rates			
	Base year 2015	Base year + 1 year 2016	Base year + 5 years 2020	Base year + 10 years 2025	Base year + 15 years 2030	Base year to +1 year 2015 - 2016	Base year to +5 years 2015 - 2020	Base year to +10 years 2015 - 2025	Base year to +15 years 2015 - 2030
Passenger enplanements									
Air carrier (a)	11,884,412	12,252,900	12,828,400	13,683,900	14,525,100	3.1%	1.5%	1.4%	1.3%
Commuter (b)	<u>4,796,843</u>	<u>4,874,400</u>	<u>5,190,600</u>	<u>5,546,300</u>	<u>5,896,700</u>	1.6%	1.6%	1.5%	1.4%
Total	16,681,255	17,127,300	18,019,000	19,230,200	20,421,800	2.7%	1.6%	1.4%	1.4%
Aircraft operations									
Itinerant									
Air carrier	276,898	287,920	301,190	315,020	328,010	4.0%	1.7%	1.3%	1.1%
Commuter/air taxi	<u>96,533</u>	<u>84,150</u>	<u>86,230</u>	<u>87,850</u>	<u>89,060</u>	-12.8%	-2.2%	-0.9%	-0.5%
Total commercial operations	373,431	372,070	387,420	402,870	417,070	-0.4%	0.7%	0.8%	0.7%
General aviation	5,843	5,800	5,800	5,800	5,800	-0.7%	-0.1%	-0.1%	0.0%
Military	102	100	100	100	100	-2.0%	-0.4%	-0.2%	-0.1%
Local									
General aviation	--	--	--	--	--	--	--	--	--
Military	--	--	--	--	--	--	--	--	--
Total operations	379,376	377,970	393,320	408,770	422,970	-0.4%	0.7%	0.7%	0.7%
Cargo/mail (enplaned + deplaned tons)	193,451	197,910	215,200	233,600	253,000	2.3%	2.2%	1.9%	1.8%
Based Aircraft									
Single-engine (nonjet)	--	--	--	--	--	--	--	--	--
Multiengine (nonjet)	--	--	--	--	--	--	--	--	--
Jet engine	7	7	7	7	7	0.0%	0.0%	0.0%	0.0%
Helicopter	--	--	--	--	--	--	--	--	--
Other	--	--	--	--	--	--	--	--	--
Total	7	7	7	7	7	0.0%	0.0%	0.0%	0.0%
Operational factors									
Average aircraft size (seats)									
Air Carrier (a)	158.9	159.0	159.5	160.2	160.9				
Commuter (b)	62.6	63.2	65.7	68.9	72.2				
Average enplaning load factor									
Air Carrier (a)	84.3%	84.3%	84.4%	84.4%	84.5%				
Commuter (b)	83.1%	83.1%	83.1%	83.1%	83.1%				
GA operations per based aircraft	835	829	829	829	829				

(a) The DTW Master Plan Update forecasts were prepared on a calendar year basis and the FAA 2015 TAF was prepared on a U.S. federal 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 2015 (actual)—Wayne County Airport Authority records and Federal Aviation Administration, Air Traffic Activity System (ATADS), www.faa.gov.
 Master Plan Update Forecasts—LeighFisher, March 2016.

APPENDIX A REGRESSION ANALYSIS

Regression analysis compares the historical relationship between a dependent variable, in this case, domestic O&D passengers, and an independent or “predictor” variable. The predictor variable is eventually used to project future levels of the dependent variable. In aviation demand forecasts, the predictor variable is typically represented by an economic or demographic metric such as population, employment, or personal income. Regression analyses produce a mathematical equation that identifies the strength or reliability of the historical correlation between the dependent variable (enplaned passengers) and predictor variables. The statistical reliability of this equation is typically measured by a regression statistic known as “R-squared.” An R-squared of 1.0 would represent a perfect historical correlation between the dependent and predictor variable and suggest that the measurement of this historical relationship will be a reliable predictor of future results.

Three regression models were defined during the forecast process to evaluate historical trends in DTW domestic O&D passengers and exports and imports in the Detroit Region shipped by air and are presented in Table A-1.

Table A-1
REGRESSION MODELS

	Coefficient	t-statistic	P-value
DTW Domestic O&D passengers			
Equation: $\text{Ln}(\text{DTW domestic O\&D passengers}) = 5.38 + \text{Ln}(\text{Detroit Primary Area per capita personal income, 2014 dollars}) + \text{Ln}(\text{Detroit Primary Area unemployment rate}) + \text{Ln}(\text{DTW domestic yield, 2014 dollars})$			
Dependent variable = $\text{Ln}(\text{DTW domestic O\&D passengers})$			
Independent variables			
Ln (Detroit Primary Area per capita personal income, 2014 dollars)	1.10	4.73	0.0001
Ln (Detroit Primary Area unemployment rate)	-0.13	-3.71	0.0015
Ln (DTW domestic yield, 2014 dollars)	-0.37	-5.20	0.0001
Dummy variable for prolonged recovery from 2001 economic recession and terrorist attacks (2001-2005= 1)	-0.12	-7.89	0.0000
Dummy variable (2012-2013= 1)	-0.07	-3.75	0.0014
Constant	5.38	1.96	0.0648
Observations	25		
Adjusted R-squared	0.97		
Detroit Region Air Freight Exports			
Equation: $\text{Ln}(\text{Detroit Region exports shipped by air}) = \text{Ln}(\text{U.S. GDP, chained 2009 dollars}) + \text{Ln}(\text{Trade Weighted U.S. Dollar Index})$			
Dependent variable = $\text{Ln}(\text{Detroit Region exports shipped by air})$			
Independent variables			
Ln (U.S. GDP, chained 2009 dollars)	3.03	5.40	0.0010
Ln (Trade Weighted U.S. Dollar Index)	-1.33	-2.75	0.0283
Dummy variable (2005-2007=1)	0.22	5.93	0.0006
Dummy variable (2012=1)	0.22	3.60	0.0087
Constant	-6.21	-0.85	0.4239
Observations	12		
Adjusted R-squared	0.95		
Detroit Region Air Freight Imports			
Equation: $\text{Ln}(\text{Detroit Region imports shipped by air}) = \text{Ln}(\text{U.S. GDP, chained 2009 dollars})$			
Dependent variable = $\text{Ln}(\text{Detroit Region imports shipped by air})$			
Independent variables			
Ln (U.S. GDP, chained 2009 dollars)	2.34	6.16	0.0005
Dummy variable (2007=1)	0.10	1.72	0.1298
Dummy variable (2009=1)	-0.33	-5.59	0.0008
Dummy variable (2011-2013=1)	0.10	2.31	0.0545
Constant	5.11	1.40	0.2030
Observations	12		
Adjusted R-squared	0.92		

Note: Detroit Primary Area = 10-county Detroit-Warren-Ann Arbor Combined Statistical Area, including the counties of Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

Detroit Region for air cargo = 7 air cargo airports, including Detroit Metropolitan Wayne County Airport, Willow Run Airport, Bishop International Airport/Flint, Capital Region International Airport/Lansing, Oakland County International Airport, Toledo Express Airport, and Windsor Airport, Canada.

(a) A dummy variable has a value of 0 or 1 to indicate the absence or presence of an event that may shift the outcome but is not explained by the independent variables. For example, the terrorist events of 2001 changed the structure of the aviation industry and are oftentimes represented by a dummy variable in econometric analyses. Note the dummy variables relate to the historical data only and are represented by "0" in the future years.

Source: LeighFisher, March 2016.

Table A-2
HISTORICAL DATA FOR REPRESENTATIVE MODEL OF DOMESTIC O&D PASSENGERS

Year	DTW Domestic Outbound O&D Passengers	Detroit Primary Area Per Capita Personal Income (2014 dollars)	Detroit Primary Area Unemployment Rates	DTW Domestic Airline Yield (cents per passenger mile, in 2014 dollars)
1990	5,292,630	37,744	7.9	26.73
1991	4,821,880	36,275	9.6	27.72
1992	4,821,540	36,958	9.2	27.50
1993	4,981,950	37,609	7.1	29.70
1994	5,676,580	39,352	5.6	28.16
1995	6,049,130	40,247	4.9	27.23
1996	6,322,720	40,808	4.7	25.41
1997	6,564,510	41,772	4.2	25.00
1998	6,761,290	43,639	3.9	23.60
1999	7,223,650	44,565	3.7	22.65
2000	7,609,680	46,029	3.4	22.62
2001	6,719,830	44,783	5.0	21.04
2002	6,290,850	44,199	6.2	19.44
2003	6,224,450	44,263	7.1	19.60
2004	6,813,970	44,165	7.1	18.08
2005	7,041,850	43,883	6.8	17.78
2006	7,218,940	43,534	7.0	17.70
2007	7,612,110	43,548	7.1	16.54
2008	7,115,100	42,569	8.2	16.81
2009	6,390,120	40,431	14.6	15.55
2010	6,289,240	40,761	13.4	16.97
2011	6,480,350	41,962	11.0	17.55
2012	6,297,300	42,782	9.7	18.16
2013	6,225,940	42,639	9.5	18.94
2014	6,908,020	43,662	8.0	21.14

Note: Detroit Primary Area = 10-county Detroit-Warren-Ann Arbor Combined Statistical Area, including the counties of Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

Sources: DTW Domestic Outbound O&D Passengers and Domestic Airline Yield -- U.S. Department of Transportation, Origin-Destination Survey or Airline Passenger Traffic, Domestic, online database, accessed January 2016.
 Detroit Primary Area Per Capita Personal Income—U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.gov, accessed January 2016.
 Detroit Primary Area Unemployment Rates— U.S. Department of Labor, Bureau of Labor Statistics, www.bls.gov, accessed January 2016.

Table A-3
**HISTORICAL DATA FOR REPRESENTATIVE MODEL OF
 DETROIT REGION AIR FREIGHT IMPORTS AND EXPORTS**

Year	Detroit Region Imports Shipped by Air(kilograms)	Detroit Region Exports Shipped by Air (kilograms)	US GDP in billions of chained 2009 dollars	Trade Weighted U.S. Dollar Index: Broad
2003	24,965,680	10,149,079	13,271.1	119.27
2004	32,486,970	13,737,581	13,773.5	113.76
2005	33,556,856	19,312,915	14,234.2	110.84
2006	32,905,654	20,351,655	14,613.8	108.70
2007	39,246,497	22,655,240	14,873.7	103.57
2008	33,688,467	20,299,912	14,830.4	99.88
2009	23,551,059	17,397,494	14,418.7	105.66
2010	35,440,778	17,563,479	14,783.8	101.82
2011	39,524,427	20,151,036	15,020.6	97.15
2012	43,074,154	26,615,316	15,354.6	99.82
2013	43,365,284	21,927,644	15,583.3	100.98
2014	41,409,958	22,835,879	15,961.7	104.16

Note: Detroit Primary Area = 10-county Detroit-Warren-Ann Arbor Combined Statistical Area, including the counties of Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

Detroit Region for air cargo = 7 air cargo airports, including Detroit Metropolitan Wayne County Airport, Willow Run Airport, Bishop International Airport/Flint, Capital Region International Airport/Lansing, Oakland County International Airport, Toledo Express Airport, and Windsor Airport, Canada.

Sources: Detroit Region imports and exports -- U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, usatrade.census.gov, accessed January 2016.

US GDP—U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.gov, accessed January 2016.

Trade Weighted U.S. Dollar Index— U.S. Federal Reserve Bank, www.federalreserve.gov, accessed January 2016.

APPENDIX B DETROIT REGION AIR CARGO FORECASTS

This appendix summarizes unconstrained forecasts of air cargo at the seven airports in the Detroit Region, 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. Using calendar year 2015 as the base year, annual forecasts were prepared for four future demand years—2020, 2025, 2030, and 2035.

B.1 Detroit Region Air Cargo Airports

As shown on Figure B-1, seven airports provide air cargo service in the Detroit Region, including:

1. Detroit Metropolitan Wayne County Airport (DTW)
2. Willow Run Airport (YIP)
3. Bishop International Airport/Flint (FNT)
4. Capital Region International Airport/Lansing (LAN)
5. Oakland County International Airport (PTK)
6. Toledo Express Airport (TOL)
7. Windsor Airport, Canada (YQG)

In 2015, these seven airports together handled an estimated 300,000 metric tons of air cargo, representing total air cargo demand for the Detroit Region. As shown on Figure B-2, DTW accounted for an estimated 64% of total cargo in the Detroit Region in 2015, with all-cargo airlines handling more than half (53%), nearly all of which was domestic air freight (99%). The passenger airlines serving DTW accounted for the remaining share of total air cargo (47%), of which 33% was international air freight. Willow Run accounted for an estimated 3% of total cargo in the Detroit Region in 2015, all of which was transported on all-cargo airlines.

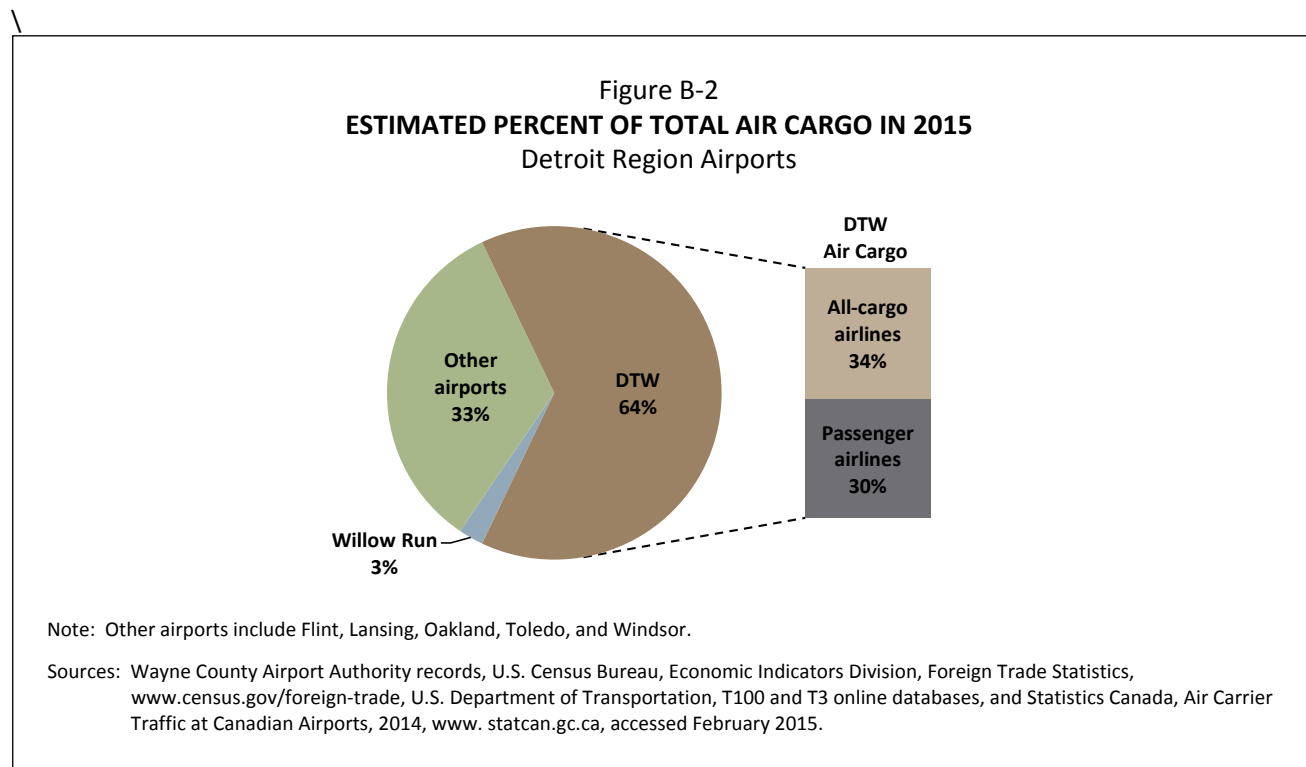
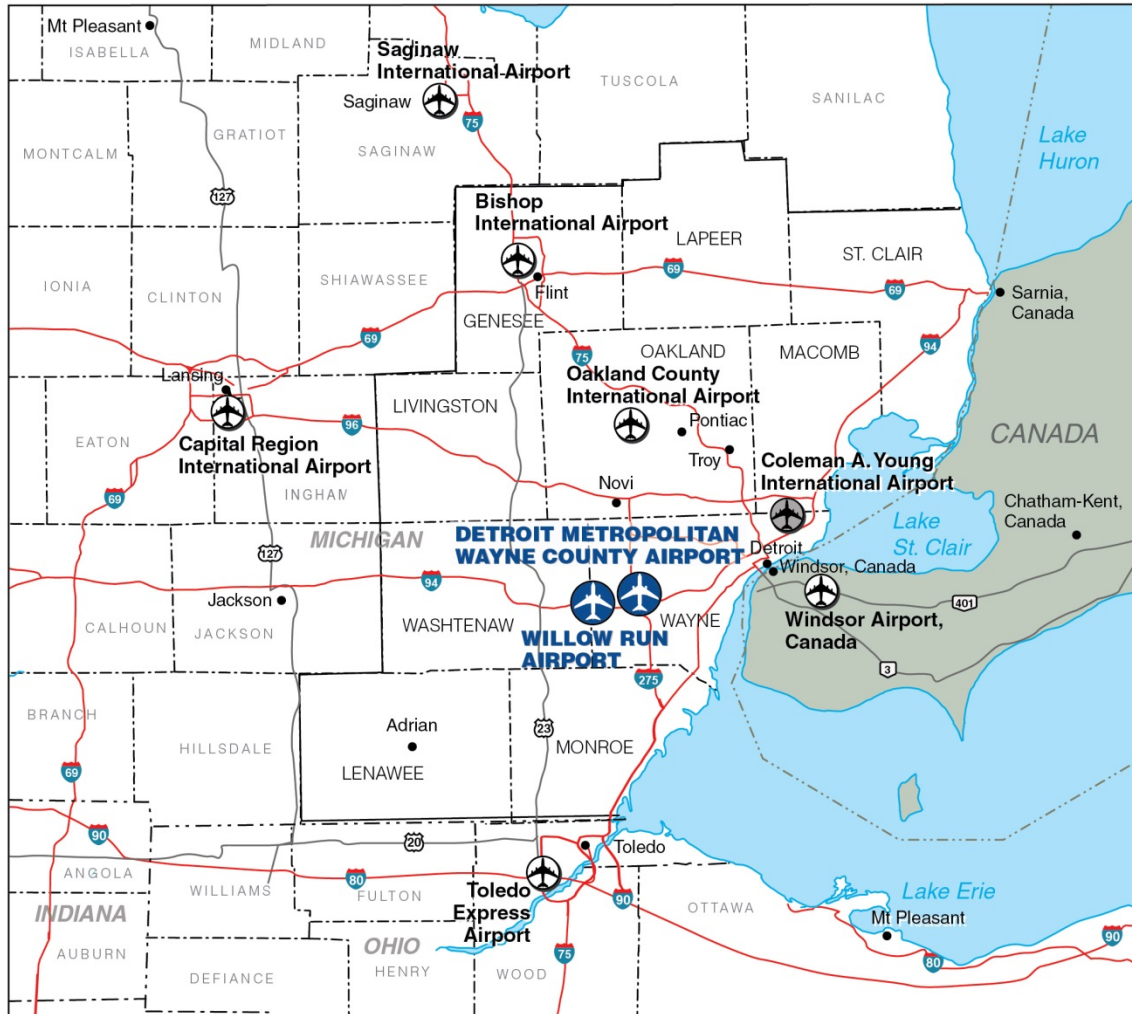


Figure B-1
AIRPORT SERVICE REGION
 Detroit Metropolitan Wayne County Airport



- Primary Area
- Wayne County Airport System Airports
- Other commercial service airport
- Non commercial service airport
- International boundary
- State boundary
- County boundary



Road miles from Detroit Metropolitan Wayne County Airport to:	
Fort Wayne	157
Grand Rapids	147
Cleveland	146
Saginaw	136
Kalamazoo	124
Lansing	98
Flint	79
Toledo	65
Pontiac	39
Windsor	29

Note: Road miles shown are from DTW to the airports located in each city listed.
 Source: Google Maps, www.google.com.

B.2 Forecast Approach

As illustrated in Figure B-3, the demand for air cargo depends on economic activity in the importing region or country, transportation costs, exchange rates, and relative prices. In addition to economic activity, other factors may affect air cargo demand such as fuel prices, competition with other modes of transportation, inventory management techniques, environmental regulations, globalization, market liberalization, national development programs, and the introduction of new air-eligible commodities.

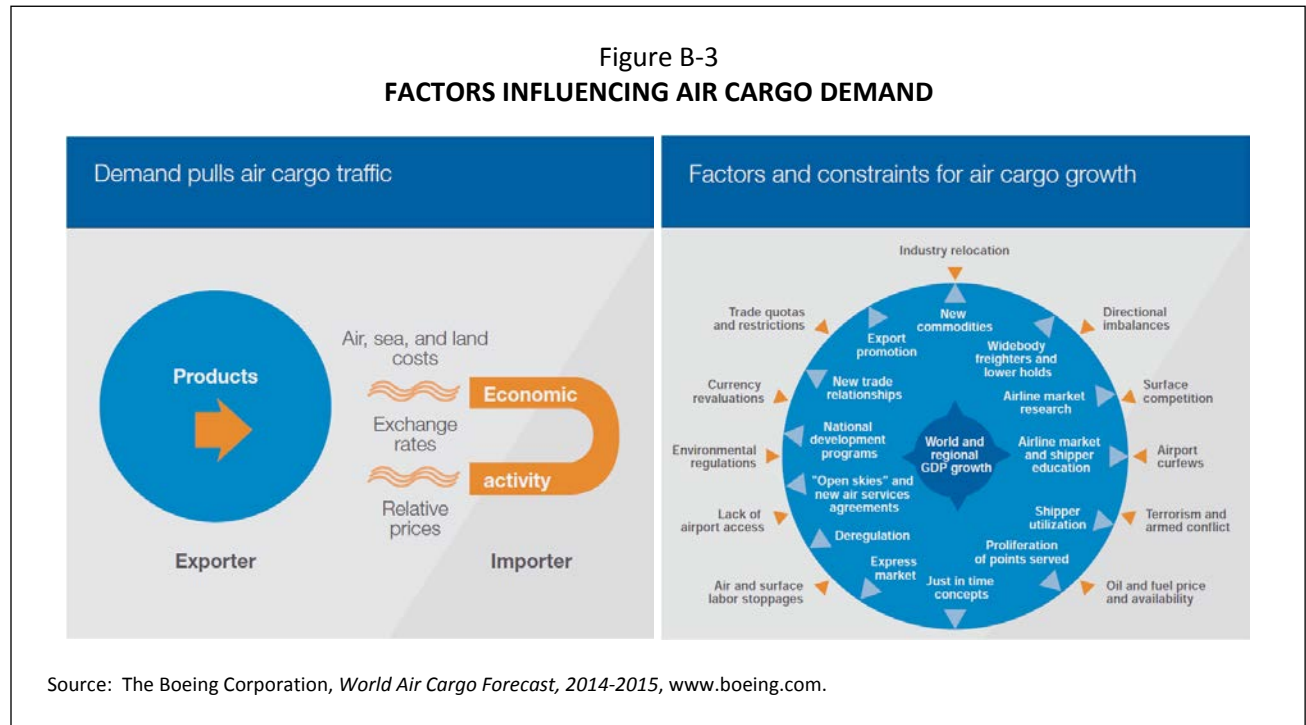


Figure B-4 summarizes the key components of air cargo demand in the Detroit Region. The forecast approach included an analysis of these key components and the drivers of past and future growth such as regional, national, and global economic conditions, the demand for just-in-time cargo services, particularly in the automotive industry, fuel prices, competing service by alternative transportation modes, and passenger airline belly capacity, particularly on international routes. The forecast approach and results for these four key components of passenger demand at the Airport are described in the following sections.

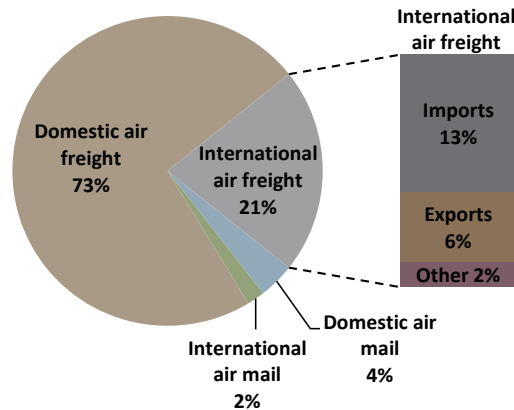
B.3 Data Limitations

A combination of data sources were used to estimate total air cargo tonnage at the seven Detroit Region airports in 2015, including:

- Wayne County Airport Authority records
- U.S. Department of Transportation, T100 and T3 online databases
- Statistics Canada
- U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics

Historical data series were available for DTW (for all components of air cargo) and for imports and exports for four of the seven Detroit Region airports (DTW, Willow Run, Lansing, and Oakland County). Partial data were available for Windsor Airport. Estimates of air cargo for the other airports were based on available data for cargo landings and estimates of cargo tonnage per operation.

Figure B-4
TOTAL AIR CARGO BY KEY COMPONENT IN 2015
 Detroit Region Airports



Sources: Wayne County Airport Authority records, U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, www.census.gov/foreign-trade, U.S. Department of Transportation, T100 and T3 online databases, and Statistics Canada, Air Carrier Traffic at Canadian Airports, 2014, www.statcan.gc.ca, accessed February 2015.

B.4 Air Cargo Forecasts

Domestic air freight accounted for 73% of total air cargo in the Detroit Region in 2015, followed by international air freight with 21%, domestic air mail (4%), and international air mail (2%), as shown on Figure B-4.

B.4.1 Domestic Air Freight

The seven Detroit Region airports handled an estimated 220,000 metric tons of domestic air freight in 2015. As shown on Figure B-5, DTW accounted for an estimated 51% of domestic air freight in the Detroit Region in 2015, with all-cargo airlines handling the largest share (90%); passenger airlines accounted for the remaining share (10%). Willow Run accounted for an estimated 3% of domestic air freight in the Detroit Region in 2015, with the other five airports accounting for the remaining 46%.

Since DTW accounts for more than half of domestic air freight in the Detroit Region, historical trends in DTW domestic air freight are assumed to be representative for the Region as a whole. A comparison of historical trends in DTW domestic air freight and U.S. domestic air cargo (measured in revenue tons miles) indicate that DTW domestic air freight trends generally follow U.S. trends and that domestic trends have stabilized in recent years, as shown in Figure B-6.

The preparation of domestic air freight forecasts is limited by the continuing decreasing trend in domestic air freight in the Detroit Region which does not correlate with economic variables such as employment and income which generally have an increasing trend. In addition, a complete dataset for the volume and value of domestic cargo carried by other modes, particularly by truck, is not available to evaluate the role of the regional airports in handling domestic air freight. Therefore, it is assumed that domestic air freight growth in the Detroit Region will approximate the growth rate forecast by the FAA for the nation as a whole—an average increase of 1.0% per year.*

*Federal Aviation Administration, *FAA Aerospace Forecast, Fiscal Years 2015-2035*, March 2015, www.faa.gov.

Domestic air freight in the Detroit Region is forecast to increase from an estimated 219,635 metric tons in 2015 to 268,010 metric tons in 2035—an average of 1.0% per year, as shown in Table B-1.

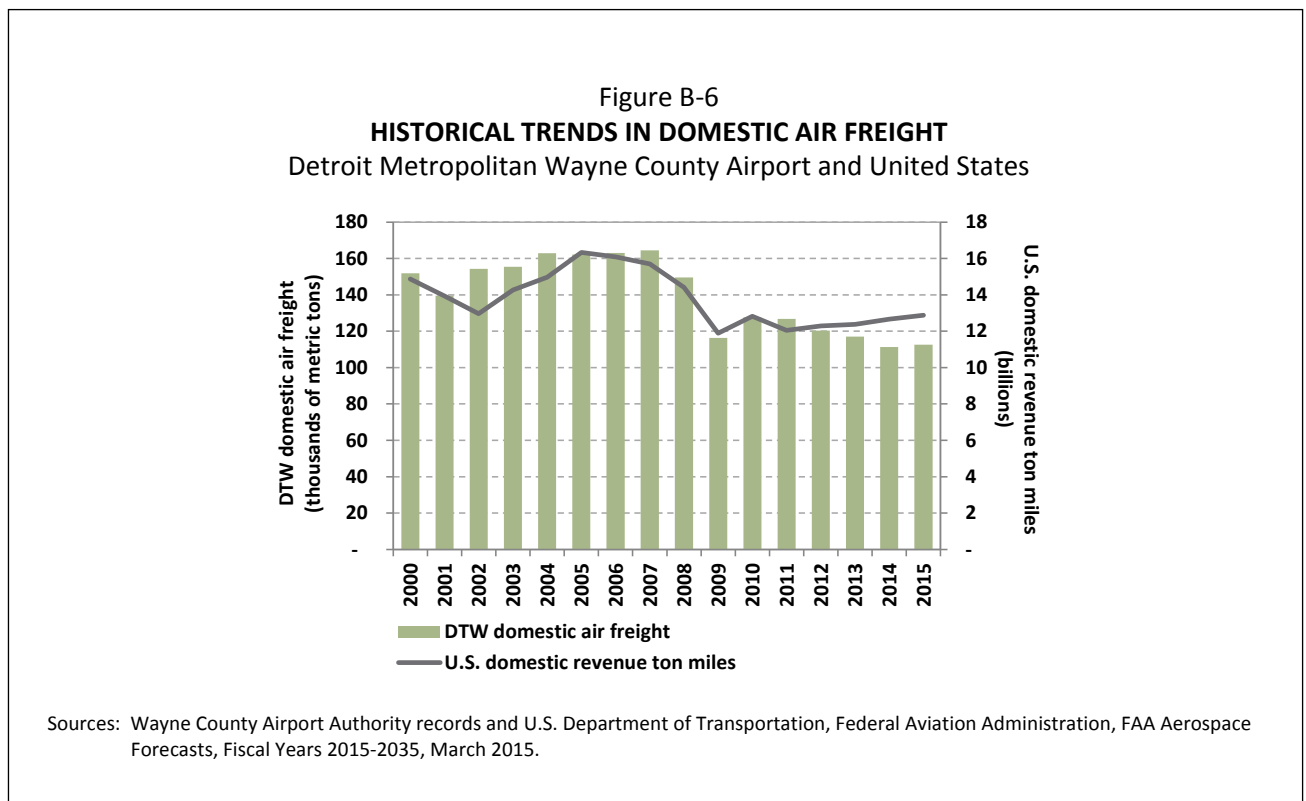
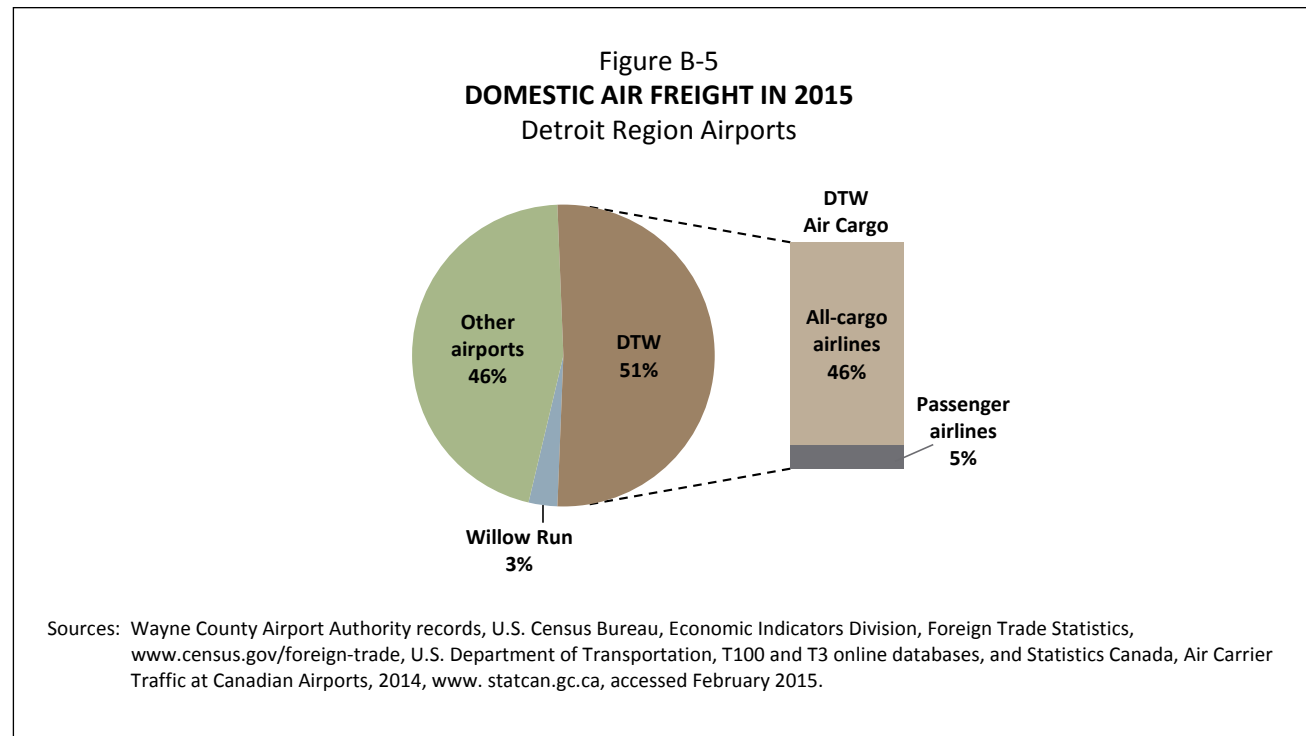


Table B-1
HISTORICAL AND FORECAST TOTAL AIR CARGO
 Detroit Region Airports

	Estimated 2015	Forecast				Compound annual growth rate				
		2020	2025	2030	2035	2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Air freight										
Domestic										
DTW	112,585	118,330	124,360	130,710	137,380	1.0%	1.0%	1.0%	1.0%	1.0%
Willow Run	6,730	7,080	7,440	7,820	8,220	1.0	1.0	1.0	1.0	1.0
Other airports	<u>100,320</u>	<u>105,440</u>	<u>110,820</u>	<u>116,470</u>	<u>122,410</u>	1.0	1.0	1.0	1.0	1.0
Total Domestic	219,635	230,850	242,620	255,000	268,010	1.0	1.0	1.0	1.0	1.0
International										
Imports										
DTW	37,850	46,600	52,820	60,250	68,110	4.2	2.5	2.7	2.5	3.0
Willow Run	230	290	320	370	420	4.7	2.0	2.9	2.6	3.1
Other airports	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>	3.7	3.1	2.7	2.4	3.0
Subtotal Imports	38,130	46,950	53,210	60,700	68,620	4.2	2.5	2.7	2.5	3.0
Exports										
DTW	19,246	25,260	30,180	34,450	38,870	5.6	3.6	2.7	2.4	3.6
Willow Run	250	330	400	460	510	5.7	3.9	2.8	2.1	3.6
Other airports	<u>100</u>	<u>130</u>	<u>150</u>	<u>170</u>	<u>200</u>	5.4	2.9	2.5	3.3	3.5
Subtotal Exports	19,596	25,720	30,730	35,080	39,580	5.6	3.6	2.7	2.4	3.6
Other										
DTW	6,785	7,130	7,500	7,880	8,280	1.0	1.0	1.0	1.0	1.0
Willow Run	80	80	80	90	90	0.0	0.0	2.4	0.0	0.6
Other airports	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	<u>30</u>	0.0	0.0	0.0	0.0	0.0
Subtotal Other	6,895	7,240	7,610	8,000	8,400	1.0	1.0	1.0	1.0	1.0
Total international										
DTW	63,881	78,990	90,500	102,580	115,260	4.3	2.8	2.5	2.4	3.0
Willow Run	560	700	800	920	1,020	4.6	2.7	2.8	2.1	3.0
Other airports	<u>180</u>	<u>220</u>	<u>250</u>	<u>280</u>	<u>320</u>	4.1	2.6	2.3	2.7	2.9
Total international	64,621	79,910	91,550	103,780	116,600	4.3	2.8	2.5	2.4	3.0
Air freight total										
DTW	176,466	197,320	214,860	233,290	252,640	2.3	1.7	1.7	1.6	1.8
Willow Run	7,290	7,780	8,240	8,740	9,240	1.3	1.2	1.2	1.1	1.2
Other airports	<u>100,500</u>	<u>105,660</u>	<u>111,070</u>	<u>116,750</u>	<u>122,730</u>	1.0	1.0	1.0	1.0	1.0
Total air freight	284,256	310,760	334,170	358,780	384,610	1.8	1.5	1.4	1.4	1.5

Table B-1 (page 2 of 2)
HISTORICAL AND FORECAST TOTAL AIR CARGO
 Detroit Region Airports

	Estimated	Forecast				Compound annual growth rate				
	2015	2020	2025	2030	2035	2015-2020	2020-2025	2025-2030	2030-2035	2015-2035
Air mail (a)										
Domestic										
DTW	11,723	12,320	12,950	13,610	14,300	1.0%	1.0%	1.0%	1.0%	1.0%
Willow Run	1	1	1	1	1	0.0	0.0	0.0	0.0	0.0
Other airports	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	0.0	0.0	0.0	0.0	0.0
Total Domestic	11,729	12,326	12,956	13,616	14,306	1.0	1.0	1.0	1.0	1.0
International										
DTW	5,262	5,530	5,810	6,110	6,420	1.0	1.0	1.0	1.0	1.0
Willow Run	--	--	--	--	--	--	--	--	--	--
Other airports	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	--	--	--	--	--
Total International	5,262	5,530	5,810	6,110	6,420	1.0	1.0	1.0	1.0	1.0
Total										
DTW	16,985	17,850	18,760	19,720	20,720	1.0	1.0	1.0	1.0	1.0
Willow Run	1	1	1	1	1	0.0	0.0	0.0	0.0	0.0
Other airports	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	0.0	0.0	0.0	0.0	0.0
Total air mail	16,991	17,856	18,766	19,726	20,726	1.0	1.0	1.0	1.0	1.0
Total air cargo										
DTW	193,451	215,170	233,620	253,010	273,360	2.2	1.7	1.6	1.6	1.7
Willow Run	7,291	7,781	8,241	8,741	9,241	1.3	1.2	1.2	1.1	1.2
Other airports	<u>100,505</u>	<u>105,665</u>	<u>111,075</u>	<u>116,755</u>	<u>122,735</u>	1.0	1.0	1.0	1.0	1.0
Total	301,247	328,616	352,936	378,506	405,336	1.8	1.4	1.4	1.4	1.5

Note: The forecasts presented in this table were prepared using the information and assumptions described 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.

Other airports include Flint, Lansing, Oakland, Toledo, and Windsor.

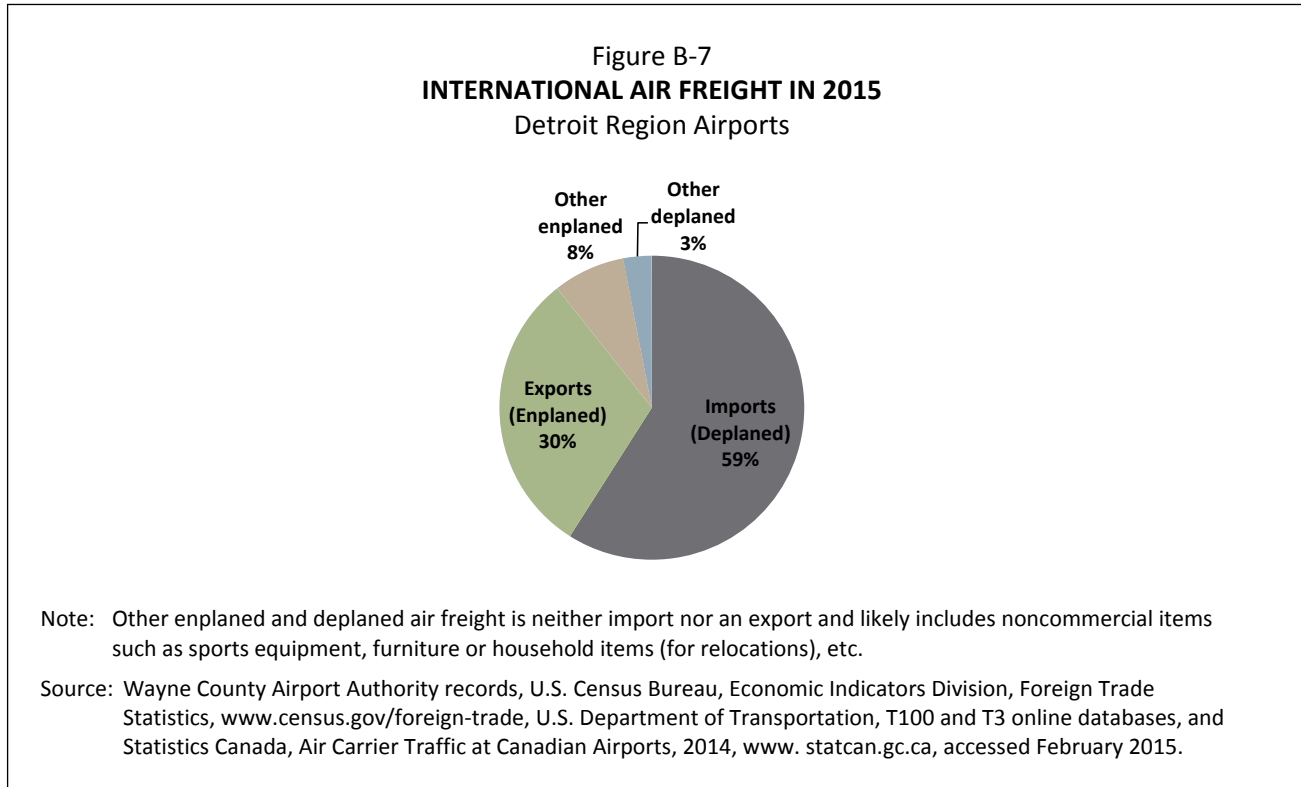
(a) Includes small packages.

Sources: Estimated 2015— Wayne County Airport Authority records, U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, www.census.gov/foreign-trade, U.S. Department of Transportation, T100 and T3 online databases, and Statistics Canada, Air Carrier Traffic at Canadian Airports, 2014, www.statcan.gc.ca, accessed February 2015.

Forecast—LeighFisher, March 2016.

B.4.2 International Air Freight

The seven Detroit Region airports handled an estimated 65,000 metric tons of international air freight in 2015. As shown on Figure B-7, imports accounted for an estimated 59% of international air freight in the Detroit Region in 2015, followed by exports with 30%, other enplaned (8%), and deplaned (3%). The forecasts of international air freight in the Detroit Region are based on econometric models relating trends in imports and exports to economic and cost variables.



B.4.2.1 Air Freight Imports

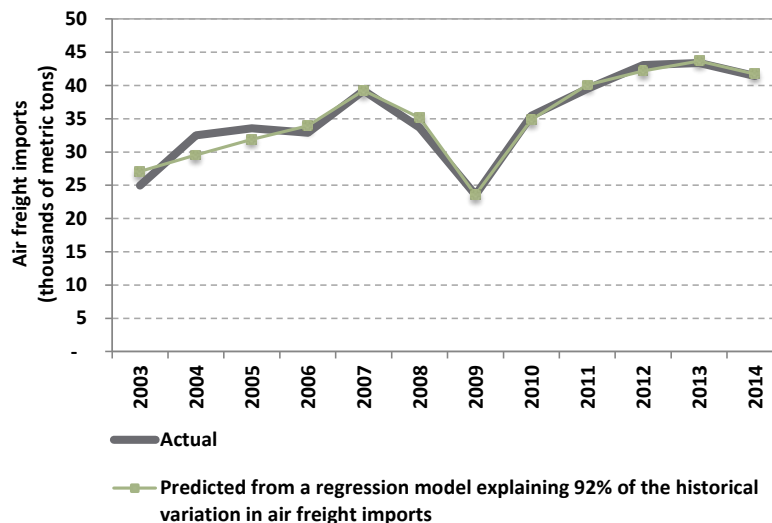
As shown in Figure B-8, the historical trend in Detroit Region air freight imports relates strongly to the predicted values from a regression model which includes U.S. GDP (in 2009 dollars). The forecasts of air freight imports were based on projections of U.S. GDP based on the FAA’s national forecasts.

B.4.2.2 Air Freight Exports

As shown in Figure B-9, the historical trend in Detroit Region air freight exports relates strongly to the predicted values from a regression model which includes U.S. GDP (in 2009 dollars) and U.S. currency values. The forecasts of air freight exports were based on projections of U.S. GDP based on the FAA’s national forecasts and U.S. currency values based on the U.S. Department of Agriculture Economic Research Service forecasts.

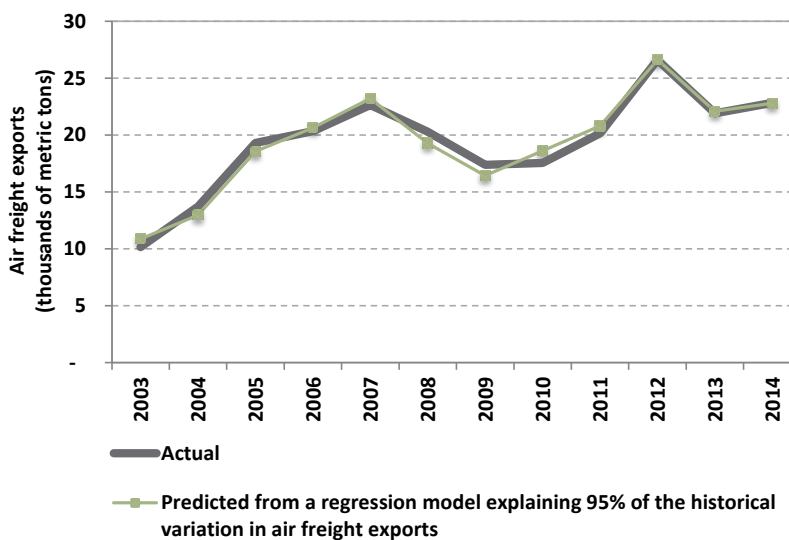
International air freight in the Detroit Region is forecast to increase from an estimated 64,621 metric tons in 2015 to 116,600 metric tons in 2035—an average of 3.0% per year, as shown in Table B-1.

Figure B-8
REPRESENTATIVE MODEL
ACTUAL AND PREDICTED AIR FREIGHT IMPORTS
 Detroit Region Airports



Sources: Actual—U.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, www.census.gov/foreign-trade, accessed February 2016.
 Predicted regression model results —LeighFisher, March 2016.

Figure B-9
REPRESENTATIVE MODEL
ACTUAL AND PREDICTED AIR FREIGHT EXPORTS
 Detroit Region Airports



Sources: Actual—.S. Census Bureau, Economic Indicators Division, Foreign Trade Statistics, www.census.gov/foreign-trade, accessed February 2016.
 Predicted regression model results —LeighFisher, March 2016.

B.4.3 Domestic and International Air Mail

The seven Detroit Region airports handled an estimated 17,000 metric tons of domestic and international air mail in 2015, with DTW accounting for more than 99% of total. Advances in technology and the increased use of email have reduced air mail demand in recent years and are expected to limit future demand. Air mail is assumed to increase an average of 1% per year (similar to national population growth) through 2035. Domestic and international air mail in the Detroit Region is forecast to increase from an estimated 16,991 metric tons in 2015 to 20,726 metric tons in 2035—an average of 1.0% per year, as shown in Table B-1.

B.2.4 Total Air Cargo

Total air cargo in the Detroit Region is forecast to increase from an estimated 301,247 metric tons in 2015 to 405,336 metric tons in 2035—an average of 1.5% per year, as shown in Table B-1.