

FLORIDA DEPARTMENT OF TRANSPORTATION / AVIATION AND SPACEPORTS OFFICE
2016 FLORIDA AIR CARGO STUDY



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INTRODUCTION

Goals and Objectives of the 2016 Florida Air Cargo Study

The 2016 Florida Air Cargo Study provides a comprehensive review of global air cargo trends and their implications to the Florida air cargo market. The goals and objectives of the study are to identify major trends within the air cargo industry and analyze the implications to Florida's airports, both commercial service and general aviation, with scheduled air cargo activity. The study is divided into subtopics which include:

- Global, national and local air cargo industry trends,
- Air cargo capacity at Florida airports,
- Forecast of air cargo demand, and
- The economic impact of air cargo commodities.

Overview of Major Events with Impacts on Industry Trends over the Last 20 Years

Air cargo plays a critical role in the growth and development of the global economy. This occurs through express shipments of air cargo commodities by well-known operators such as FedEx and UPS; the transport of cargo under the main decks of passenger aircraft as passenger airlines connect cities across the globe via the vast network of daily scheduled flights; deliveries of cargo by dedicated freighters; chartered flights delivering cargo on either a scheduled or ad hoc basis; and shipments of bulky or oversized freight requiring the use of heavy lift freighters or smaller general aviation aircraft. Air cargo supports trade and investment, promotes connectivity, enhances shipment security, and improves efficiency and competitiveness.

The air cargo industry is typified by time sensitive, high value, and low volume shipments. Examples of products regularly shipped by air include electronics, telecommunications equipment, apparel, and perishable products such as flowers, food, and human tissues and organs. Data available from the International Air Transport Association (IATA) shows that while the 51.3 million metric tons of cargo transported by the world's airlines in 2014 represented less than 1 percent of world trade by volume, it amounted to more than 35 percent of global trade by value.

An examination of historical air cargo data available from sources including IATA, the *Boeing World Air Cargo Forecast 2014-2015*, and Airports Council International-North America (ACI-NA) reveals several trends that have occurred within the industry. In this study, these trends are discussed from global, regional, and statewide perspectives.

From the early 1980s through the early 2000s, global air cargo traffic experienced rapid growth exceeding 6 percent annually as the air cargo industry benefited from low fuel prices.¹ A significant change in the industry was observed beginning in 2005, however, as fuel prices began to rise. Air cargo traffic began to slow as many shippers shifted their cargo to cheaper modes of transport, such as trucks

¹ Boeing World Air Cargo Forecast 2014-2015

and ships. From 2003 to 2013, air cargo traffic grew at an annual growth rate of less than 3 percent as shown in the Boeing World Air Cargo Forecast. The modal shift is evident in data available from IATA, which indicates that in the early 2000s, when combining all cargo tonnage transported by sea and air, 3.1 percent of the cargo tonnage is attributable to aircraft. This percentage dropped to 1.7 percent by 2013.²

As of 2013, Asia held the largest market share of the global air cargo industry, with 36 percent of the nearly 208 billion revenue ton-kilometers transported.³ North America, Europe, and the Middle East followed with 25 percent, 21 percent, and 11 percent, respectively. Asia's position atop the global air cargo industry results from the explosion of growth in that region's export markets.

In terms of air cargo revenues to the global airline industry, the last 15 years were primarily marked by the Great Recession of 2008 and 2009. IATA data indicated growth in revenues occurred consistently from 2002 to 2008, reaching more than \$60 billion. In 2009, revenues tumbled to less than \$48 billion before rebounding to \$65 billion in 2010. Revenues since 2011, however, have generally plateaued, never achieving the consistent growth trajectory observed before the recession.

On a regional scale, air cargo tonnage at airports within the Southeast Region of the U.S. (which includes Florida, Georgia, South Carolina, Alabama, and Mississippi) has decreased since the late 1990s. Total air cargo tonnage was just below 4.0 million short tons in 1997, falling precipitously to slightly more than 3.0 million short tons during the Great Recession.⁴ Growth resumed in 2010, with total air cargo tonnage reaching nearly 3.6 million tons in 2014, but still below the levels observed in the late 1990s. A similar pattern was observed at airports within Florida, with enplaned and deplaned air cargo tonnage totaling between 2.6 and 2.8 million short tons in the late 1990s, before falling to approximately 2.2 million tons in 2009, and then climbing to over 2.7 million tons in 2014.

Of the Florida airports, Miami International Airport (MIA) is clearly dominant in terms of enplaned and deplaned air cargo tonnage. MIA is the leader in the Americas in international air freight and the world's largest gateway to Latin America and the Caribbean, serving as a hub for the distribution of perishable products, hi-tech commodities, telecommunications equipment, textiles, pharmaceuticals, and industrial machinery. With more than 100 passenger and cargo airlines linking the U.S. to not only Latin America and the Caribbean, but also to Europe, Asia, and the Middle East, MIA has increased its market share in Florida in terms of air cargo tonnage throughput from 73 percent in 1997 to 81 percent in 2014.⁵ During the same period, airports such as Orlando International, Fort Lauderdale-Hollywood International, and Tampa International all saw their market share decrease from 9 percent, 6 percent, and 5 percent, to 6 percent, 3 percent, and 3 percent, respectively.⁶

[Importance of Air Cargo and the Airports that Support Air Cargo Activity](#)

As the world economy has become more global, markets and manufacturing have developed, shifted, and in many instances, relocated to markets with low labor rates. New logistics and supply-chain

² <http://www.iata.org/publications/economic-briefings/modal-shift-cargo-mar14.pdf>

³ A revenue ton-kilometer is generated when a metric ton of revenue load is carried one kilometer.

⁴ Airports Council International-North America

⁵ Ibid.

⁶ Ibid.

concepts based on low fuel and labor costs developed along with trends in just-in-time production and final manufacturing assembly at destination. As new product shelf life has decreased (such as for consumer electronics) and as the value of goods shipped has increased, the demand for expeditious transport and control has correspondingly increased. Transport by aircraft fills this need in today's economy.

Because shipping cargo via aircraft involves a higher cost per unit than other modes of transport including truck, rail, and water, businesses must determine when such cost is justified. Several factors in addition to cost play a role in this decision making, including the level of service commitment to the customer, the value of the material, and the time-sensitivity or perishability of the material.

Key Findings

There are many variables affecting air cargo demand at both the international and the domestic level. These range from the value of the U.S. dollar and its role in demand for imports and exports, to the value of oil and its impact on transportation choices amongst shippers. The study focused on factors impacting demand and competition amongst carriers to meet current demand. Factors shaping and influencing cargo demand in Florida include:

- *Value of the U.S. Dollar* – The strong U.S. dollar is putting pressure on U.S. exports to foreign nations. In simple terms this means that fewer people in countries outside the U.S. are buying goods manufactured here because consumers can find those goods cheaper locally.
- *The new role of e-commerce in consumer choices and impacts to logistics* – The e-commerce industry is continuing to cluster in central Florida near the I-4 corridor. This trend is related not only to Florida's population growth and the area's central location, but also to the fact that retail companies are realizing a stronger need for more distribution channels in order to satisfy online consumers seeking same- or next-day delivery.
- *Demographics of an aging U.S. and Florida population* – Florida's aging population is one of the key social challenges facing the logistics industry within the state. Today, nearly one quarter of the population in Florida is above 60 years old. The current population of Florida residents in this age bracket is approximately 5 million and is anticipated to rise to 9.5 million by 2030. This growing demographic segment will increase demand for new logistics channels to access medication, food, and care services.
- *Alternatives to air freight transport: roadways and maritime* – As a result of increased air cargo security measures and improvements in cargo tracking information technologies, trucking companies have increased their market share. Both passenger and cargo airlines use trucking services, known as road feeder service (RFS), as a substitute for air shipment. Additionally, some commodities are increasingly switching to maritime transport.
- Air mail, as a percentage of total air cargo, is relatively insignificant and is not a major driver of Florida's air cargo system. It is important to note that air mail volume has declined consistently over the last decade.

EXECUTIVE SUMMARY

Introduction

The 2016 Florida Air Cargo Study provides a comprehensive review of global air cargo trends and their implications to the Florida air cargo market. The goals and objectives of the study are to identify major trends within the air cargo industry and analyze the implications to Florida with regard to air cargo activity at both commercial service and general aviation airports. The study includes discussions of global, national, and local air cargo industry trends, air cargo capacity at Florida airports, forecast of air cargo demand, and the economic impact of the air cargo industry.

Economic Impact

Air freight in Florida has a significant impact on the overall economy. The air freight industry facilitates economic activity via the services rendered to people and industries by enabling the movement of goods necessary to conduct economic pursuits. Transport, trade services, employment and tax revenue all contribute to Florida's economy.

- Employment – Economic impacts of air freight extend beyond the 7,920 employees directly employed in the provision of air freight transport services. When trade-related users are included, air freight-related employment in Florida totals 625,410 jobs, which represent 5.8% of the 10.8 million jobs statewide.
- Income – The \$31.2 billion earned by 625,410 total employees represent 6.2% of Florida's total labor income.
- Value-Added – The combined value-added impact of \$48.2 billion associated with the air freight services and users represents 5.8% of the state's Gross State Product (GSP).
- Output – Total sales associated with all air freight-related activity equates to roughly \$98.8 billion, representing 6.7% of Florida's total economic output.
- Tax Revenues – The federal, state, and local tax revenues associated with air freight-related economic activity totals \$4.1 billion (5.9% of State).

Airports with Scheduled Air Cargo Activity

While many airports are capable of accommodating air cargo activity, 14 of the 20 commercial service airports in Florida had scheduled air cargo activity on dedicated freighter (all-cargo carriers and integrated express carriers) or widebody passenger aircraft in 2016:

- Miami International Airport (MIA)
- Orlando International Airport (MCO)
- Tampa International Airport (TPA)
- Ft. Lauderdale/Hollywood International Airport (FLL)
- Jacksonville International Airport (JAX)
- Palm Beach International Airport (PBI)

- St. Pete-Clearwater International Airport (PIE)
- Southwest Florida International (RSW)
- Tallahassee International Airport (TLH)
- Pensacola International Airport (PNS)
- Orlando Sanford International Airport (SFB)
- Gainesville Regional Airport (GNV)
- Key West International Airport (EYW)
- Northwest Florida Beaches International Airport (ECP)

Air Cargo Tonnage

Actual air cargo processed at an airport is quantified as total enplaned and deplaned tons of freight and mail and is an indicator of the demand for air cargo services within a particular market area. All types of aircraft operations can contribute to an airport's annual air cargo tonnage total, not just scheduled air cargo service. Statewide air cargo tonnage grew at an average annual rate of 2.1 percent from nearly 2.5 million tons in 2010 to over 2.7 million tons in 2014. Over the past decade, statewide air cargo tonnage grew at an average annual rate of 0.3 percent from 2005 to 2014. This growth is largely due to Miami International, which accounted for over 81 percent of total statewide tonnage in 2014. The airport with the second largest amount of statewide air cargo tonnage, Orlando International, accounted for approximately 6.4 percent of total statewide tonnage in 2014. Since 2010, 10 airports experienced growth in total tonnage.

Florida's system of commercial service airports is anticipated to see moderate growth during the 20-year planning period. Air cargo tonnage is forecast to grow from 2.7 million tons in 2014 to more than 4 million tons by 2034. This represents an annual growth rate of 2.1 percent. Miami International will remain the primary driver of this growth, increasing from 2.2 million tons in 2014 to 3.3 million tons by 2034.

Air Cargo Lift Capacity

Air cargo lift capacity is the available space on an outbound aircraft for carrying freight and mail. Of Florida's 20 commercial service airports, 14 were found to have scheduled air cargo lift capacity on dedicated freighters or widebody passenger aircraft. During the one-week sample timeframe in June 2016, statewide air cargo lift capacity was estimated at over 6,835 tons. This represents an increase of 44 tons, or 0.6 percent, over the nearly 6,795 tons identified in 2012.

In terms of total capacity, Miami International remains the state's capacity leader by a wide margin. MIA's more than 4,800 tons of daily lift capacity accounts for 70 percent of the statewide total which is in line with MIA's 2012 share of the statewide total. Orlando International has the second largest share of average daily lift capacity in Florida with 12 percent; up from its 11 percent share in 2012. Tampa International and Ft. Lauderdale/Hollywood International rank third and fourth, with six and five percent, respectively.

Miami International's growth of approximately 122 tons of lift leads all Florida airports and represents an increase of 3 percent over the nearly 4,700 tons seen in 2012. In terms of average daily tons of lift capacity, Tampa International (98 tons) and Orlando International (89 tons) were the only airports to see

gains nearing that of MIA. When comparing the percentage of growth in lift capacity, five airports saw a higher percentage of growth than MIA between 2012 and 2016: Gainesville Regional (230 percent), Tampa International (30 percent), St. Pete-Clearwater International (22 percent), Northwest Florida Beaches International (14 percent), and Orlando International (12 percent).

Air Cargo Operations

Dedicated air cargo aircraft operations (arrivals and departures) at commercial service airports grew at a rate of 1.1 percent annually during the 2010 to 2014 period. Total dedicated cargo aircraft operations are forecast to increase from 56,317 operations in 2014 to nearly 59,400 operations by 2019 and nearly 69,600 operations by 2034. From 2014 to 2034, Miami International and Orlando International will see the largest gain and their operations will increase from 37,430 to nearly 46,300 and 4,804 to over 5,900, respectively.

Florida Air Cargo Market Share

Statewide air cargo tonnage enplaned and deplaned at Florida's commercial service airports increased at an average annual growth rate of 2.1 percent from 2010 to 2014. Of the airports with measurable tonnage, nine saw increases in enplaned and deplaned air cargo tonnage for a net gain of nearly 215,000 tons. Miami International continues to be the major driver of air cargo tonnage growth, with a market share that has steadily increased from 73 percent in 1997 to over 81 percent in 2014. Orlando International, Tampa International, Fort Lauderdale-Hollywood International, and Jacksonville International round out the top five airports in terms of statewide air cargo tonnage market share.

International Trade Lanes

As the leader in the Americas in international freight and the world's largest gateway to Latin America and the Caribbean, Miami International controls the north-south cargo flows in the Western Hemisphere. Florida's airports directly serve 97 international destinations with either dedicated all-cargo or wide-body passenger aircraft. Seven of the top 10 trade lanes are from MIA to markets located in Latin America and the Caribbean. Air cargo lift capacity to Bogotá, Colombia remains as the largest trade lane. In 2014, MIA handled 84 percent of all air imports and 81 percent of all air exports from the Latin American and Caribbean region.

Miami International is the point of origin for each of the top ten international trade lanes. This is consistent with what was observed in 2012 and not surprising given MIA's role as an international air cargo gateway. MIA provides more lift to more international destinations than any other Florida airport.

Miami International is the leading airport in the U.S. for international freight, and ranks 10th globally. Its total air trade for 2014 was valued at \$61.6 billion, or 96 percent of the dollar value of Florida's total air imports and exports (or 40 percent of the state's total air and sea trade with the world).

Domestic Trade Lanes

The top ten domestic trade lanes in 2016 combined for an average daily lift capacity of over 1,650 tons, which is a decrease from the more than 1,750 tons identified in 2012. Ft. Lauderdale to Memphis dropped from the second largest domestic trade lane in 2012 to the seventh largest in 2016. The three major integrated express hubs are included as destinations on 8 of the top 10 domestic trade lanes from

Florida: Memphis (FedEx), Louisville (UPS), and Cincinnati (DHL). The remaining destination markets included in the top ten domestic trade lanes are New York (JFK) and Los Angeles – two major international gateways for both passengers and air cargo.

Air Cargo at General Aviation Airports

General Aviation (GA) airports play a significant role in facilitating the transport of air freight within the state and region. GA airports provide several unique advantages over commercial service airports that enable air cargo carriers to optimize the markets they serve. These advantages include less congestion (in the air and on the ground), shorter taxi times, ease of ground access, proximity to market area, and less demanding ground support needs. In 2016, 32 known air cargo carriers combined for a total of more than 5,000 operations at 40 general aviation airports in Florida. These carriers combined for an available capacity of nearly 8,000 tons, of which 3,800 tons of actual cargo was estimated to have been flown.

Opa-Locka Executive accommodates the most GA air cargo operations with over 1,600 annual operations. Tampa Executive experiences the second most with 930 annual operations, followed by Ft. Lauderdale Executive, Cecil Airport, The Florida Keys Marathon International Airport, and Executive Airport with 546, 485, 470, and 468 annual operations, respectively. Cecil Airport and The Florida Keys Marathon International Airport saw the most significant gains in annual operations from 2012 to 2016, growing by 321 and 164 operations, respectively.

Over the course of the 20-year planning period, air cargo activity at Florida's general aviation airports is forecast to grow at a rate of 0.52 percent annually. GA air cargo operations are forecast to grow from 5,013 operations in 2016 to 5,819 operations by 2034, and estimated air cargo carried is projected to increase from over 3,800 tons in 2016 to over 4,400 tons by 2034.

Commodity Flows

Significant air freight volumes traverse Florida's airports annually. Air freight includes various commodities such as finished goods, materials, and supplies, which originate and terminate in Florida, other states, and abroad. Air freight comprises tangible merchandise that is produced, used, or sold, which can be quantified by commodity type, tonnage, and value. The airfreight sector has been a big beneficiary of the globalization of the cut-flower sector. The two largest shipments to Florida comprise Agriculture Products Imports (340,900 tons) and Meat/Seafood Imports (132,099 tons).

Air Cargo Issues Related to Other FDOT Plans

There are a variety of issues and trends with the potential to impact the ability of Florida's airports to maintain and/or increase air cargo service in the state. As air cargo operations do not occur in isolation, it is important to understand the transportation and community issues surrounding airports. These issues have been identified and examined in several state and local planning efforts, including the Florida Freight Mobility and Trade Plan, Florida Transportation and Strategic Intermodal System Policy Plans, FDOT District freight planning efforts, and various MPO plans and studies.

Chapter 1. AIR CARGO TRENDS

This section provides an overview of the global, national, regional, and state trends affecting the air cargo industry, as well as trends internal to the air cargo industry. The following elements are discussed in this section:

- Global Air Cargo Trends
- National Air Cargo Trends
- Regional Air Cargo Trends
- Florida Air Cargo Trends
- Air Cargo Industry Trends

Every day, air cargo commodities are loaded onto aircraft around the world to expedite manufacturing processes, transport time sensitive perishables (food, medicines and flowers) and to connect businesses with customers. In short, air cargo supports trade, promotes connectivity, improves shipment security, and enhances industry competitiveness. According to the International Air Transport Association (IATA), in 2014 the world's airlines transported 51.3 million metric tons of goods, representing more than 35 percent of global trade by value but less than 1 percent of world trade by volume. That is equivalent to \$6.8 trillion worth of goods annually, or \$18.6 billion every day. It is noteworthy that the industry experienced a precipitous drop in cargo traffic during 2008 and 2009, when traffic fell 3.2 percent and 9.6 percent, respectively. This was the first time that air cargo traffic declined in two consecutive years.

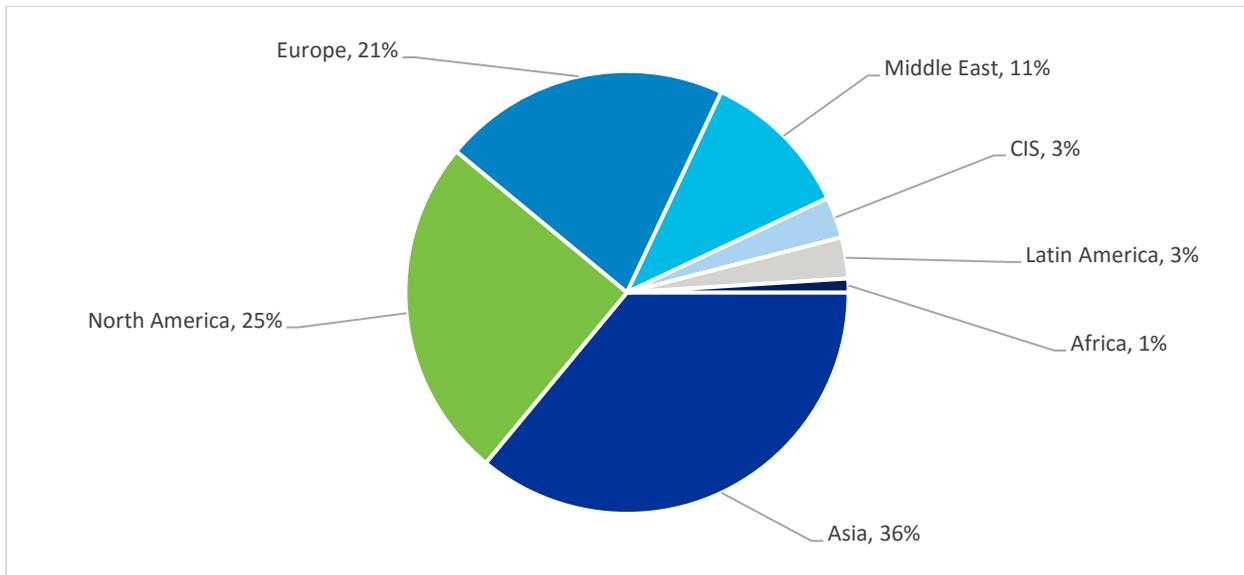
Many of Florida's airports are key participants in this well-orchestrated transport mode, functioning as sophisticated gateways for international air cargo imports and exports. Domestic air cargo also makes its way from arriving aircraft to consumers throughout Florida's cities, suburbs and rural areas. Businesses and hospitals throughout the state rely on air cargo to transport time-sensitive parts and equipment, as well as medical supplies and samples, out of state to distant facilities in the U.S. Air cargo is a necessary part of Florida's industrial fabric, and provides many benefits to local economies in the form of jobs, payroll, and airline sales.

1.1 Global Air Cargo Trends

Of the 207.8 billion revenue-ton-kilometers (RTKs)⁷ carried by the global air cargo industry in 2013, Asia made up the largest market share with 36 percent of the total. This reflects the rapid expansion of Asian export markets. North America, Europe, and the Middle East followed with 25 percent, 21 percent, and 11 percent, respectively. Since 2000, carriers based in the Middle East have capitalized on their geographic position at the crossroads between Africa, Asia, and Europe by rapidly expanding their widebody passenger and freighter fleets, allowing them to increase their market share from 4 percent in 2004 to 11 percent in 2013. **Exhibit 1-1** illustrates the global air cargo market share by region in 2013.

⁷ A revenue ton-kilometer is generated when a metric ton of revenue load is carried one kilometer.

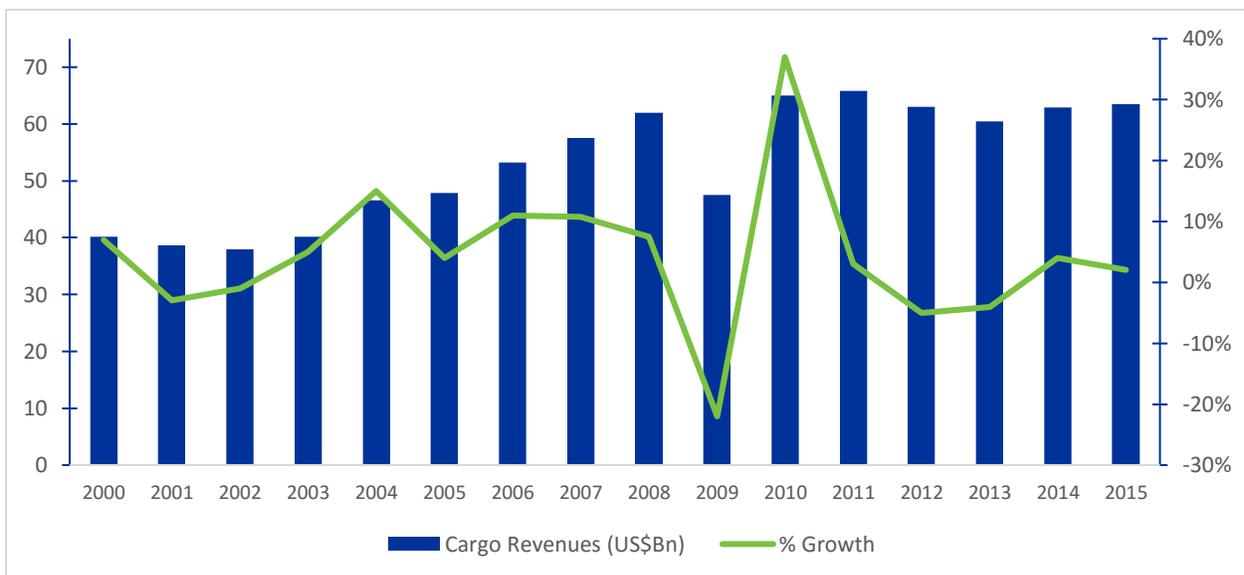
Exhibit 1-1: 2013 World Air Cargo Market Share by World Region



Source: Boeing World Air Cargo Forecast 2014-2015

On average, worldwide air cargo transport generates 9 percent of passenger airline revenues, representing more than twice the revenues from the first-class cabin segment. **Exhibit 1-2** identifies air cargo revenues related to the global airline industry. Worldwide air cargo revenues consistently increased from 2002 to 2008, representing a rebound from the “factory recession” of 2000-2001 and the terrorist attacks on 9/11, before experiencing a rapid decline due to the Great Recession of 2008 and 2009. Revenues rebounded in 2010, reaching a pinnacle of over \$60 billion in 2010 and 2011. Since 2011 air cargo revenue to the airlines has plateaued. Air cargo growth increased from 2012 until 2015, when a slight decrease in growth was experienced.

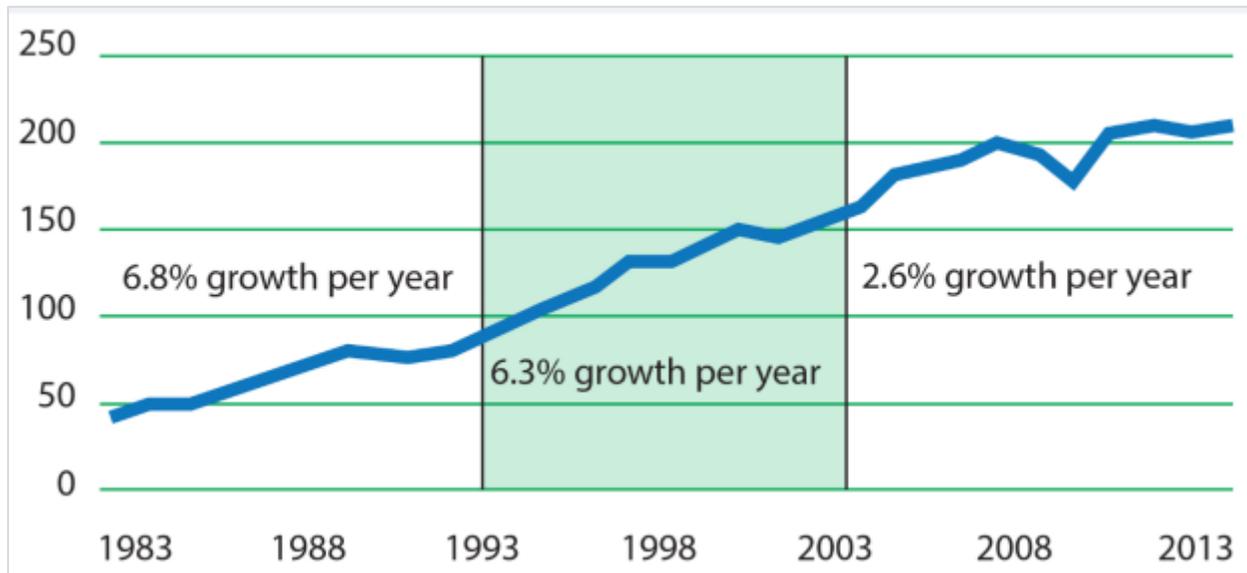
Exhibit 1-2: Worldwide Airline Cargo Revenue



Source: IATA

Historical air cargo traffic data from the early 1980s indicates global air cargo grew rapidly, exceeding 6 percent annual growth up until 2003. Growth slowed as fuel prices began to rise in 2005, and some shippers began to divert freight to less expensive modes of transport, such as maritime transport. As presented in **Exhibit 1-3**, air cargo, as measured in RTKs, decreased precipitously in 2009 as a result of the Great Recession. IATA data indicates that in 2000, when combining all cargo tonnage transported on ships and aircraft, 3.1 percent of the cargo tonnage was attributable to aircraft. By 2013, air cargo accounted for 1.7 percent of the total tonnage.⁸ This modal shift is likely a key contributor to the plateauing of air cargo RTKs and revenues.

Exhibit 1-3: Worldwide Historic Air Cargo Trends in RTKs in Billions



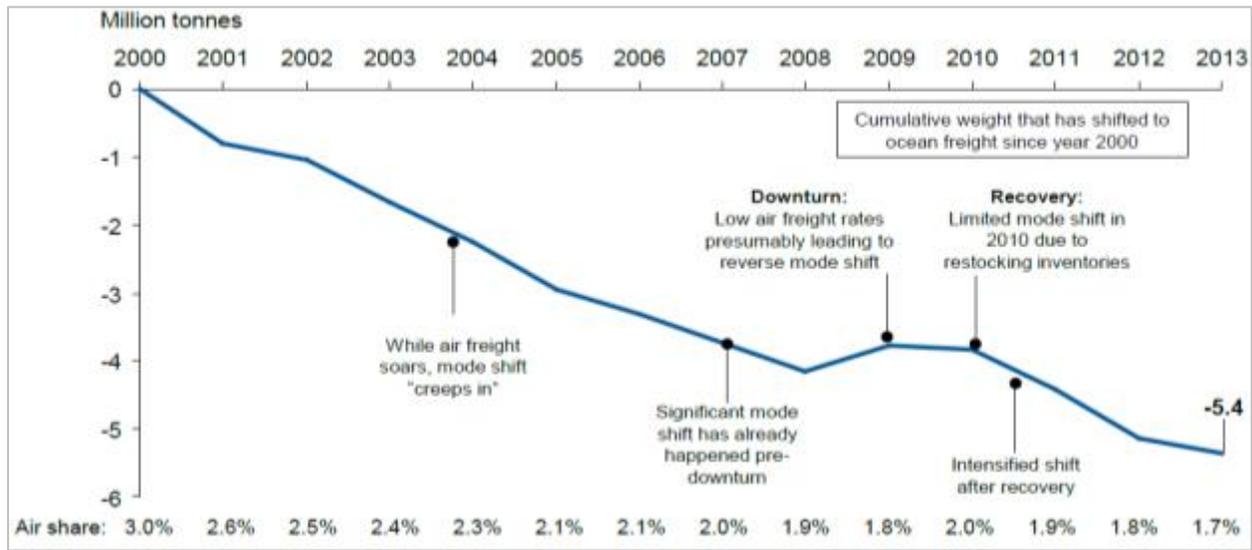
Source: Boeing World Air Cargo Forecast 2014-2015

While the modal shift to sea transport has not decimated the air cargo industry, it has taken market share. **Exhibit 1-4** identifies the primary reasons for the modal shift, which include:

- Supply chain organizers doing their utmost to reduce transport spending
- Companies evolving their supply chains and reducing dependence on expedited freight
- Product miniaturization has reduced overall volume demand for commodities (e.g., laptops to tablets)
- Container shipping lines improving performance, thereby making services more attractive to shippers
- Using maritime for just-in-time shipments for hi-tech components

⁸ <http://www.iata.org/publications/economic-briefings/modal-shift-cargo-mar14.pdf>

Exhibit 1-4: Cumulative Mode Shift Weight by Year



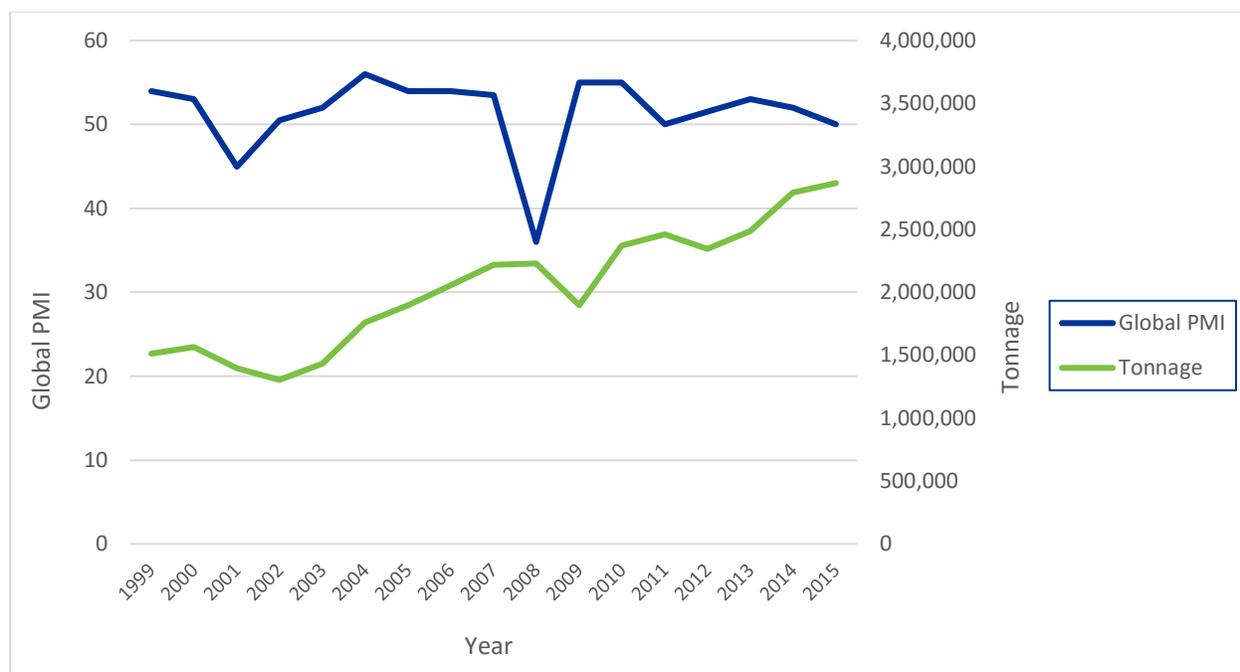
Source: IATA

1.2 National Air Cargo Trends

CASS USA, a division of IATA, has 78 member airlines which provide data on annual tonnages of air cargo exports out of the U.S. While this data does not capture the entire universe of air cargo activity, it does provide a sample of trends within the industry. This data indicates air cargo exports for the historic 16-year period of 1999 to 2015 experienced an up-tick in tonnage flown between 1999 and 2000, followed by a decrease in tonnage in 2001 and 2002. From 2003 to 2008, air cargo exports climbed and then dropped significantly as a result of the Great Recession (see **Exhibit 1-5**).

J.P. Morgan measures global manufacturing output, which acts as a barometer of overall operating conditions in the global manufacturing sector. Their “no-change 50” mark separates growth from contraction, whereby any value above 50 indicates growth while below 50 represents contraction. When comparing global air cargo tonnage data to global manufacturing production, a trend emerges and the 2008-2009 corresponding drops in activity are apparent. Both global manufacturing and air cargo declined from 2000 to 2001 as a result of global recession as well as the 9/11 terrorist attacks. Air cargo continued to decline in 2002 as the aviation industry assessed security protocols, and a modal shift from air to surface transport occurred. Global manufacturing rebounded slightly during this time period. In 2003 and 2004, both global manufacturing and air cargo exports activity experienced growth, with the latter increasing significantly. In 2005, air cargo exports activity continued to increase while manufacturing slipped slightly. Interestingly, air cargo export tonnages continue to climb, post the Great Recession, while global manufacturing remains somewhat flat. This is likely indicative of air cargo’s growth in food perishables and decreasing reliance on manufacturing as a prime commodity.

Exhibit 1-5: CASS USA Airline Tonnage and Global Manufacturing PMI, ⁹ 1999 – 2015



Source: CASS USA (IATA), JPMorgan PMI Global Manufacturing Index

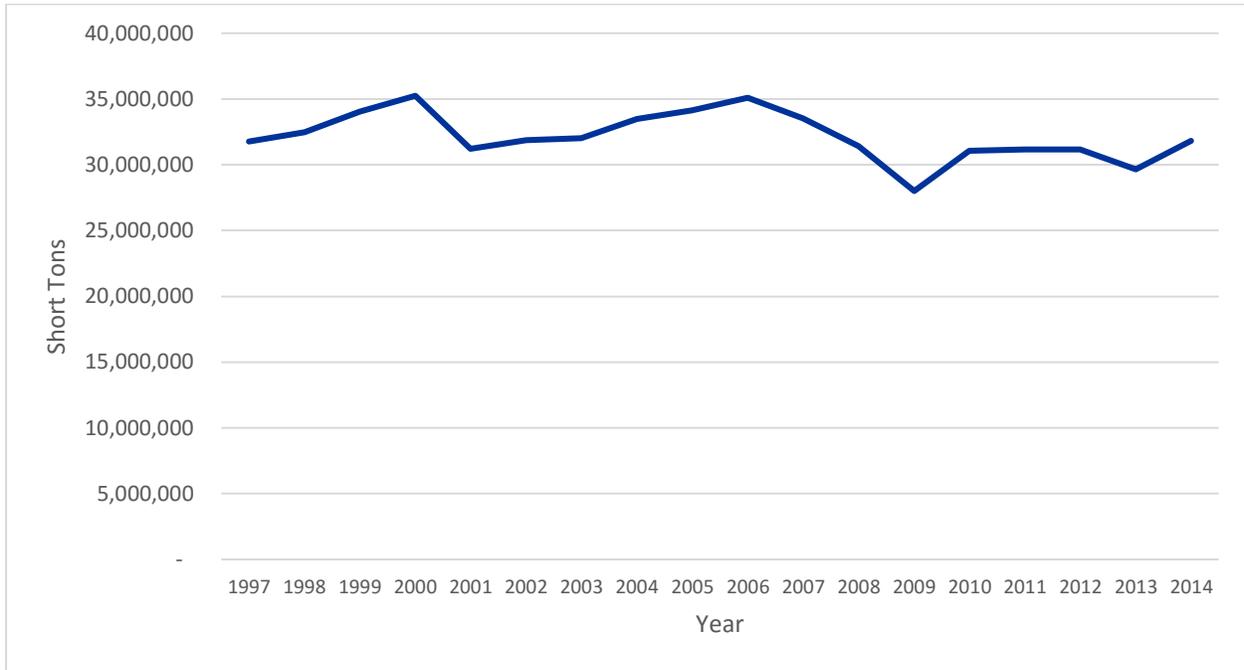
The North American domestic air cargo market has remained relatively flat in recent years, except during the Great Recession, which resulted in a drop in 2009. The air cargo industry in North America is dominated by the integrated express industry, and is considered to be a mature market. Trucking has diverted some of the express products off of aircraft. Air cargo traffic continued a slow recovery in 2012 and 2013, growing 1.9 percent and 1.0 percent, respectively. Overall, air cargo tonnage for airports throughout North America from 1997 to 2014 ranged from 30 million annual tons to 35 million tons, with the exception of 2009, when cargo dipped below the 30-million-ton threshold (see **Exhibit 1-6**).

According to the FAA Aerospace Forecast, U.S. air carriers flew 35.9 billion revenue ton miles (RTMs) in 2015, up 2.2 percent from 2014, with domestic cargo RTMs¹⁰ increasing 3.3 percent to 13.1 billion and international RTMs increasing by 1.6 percent to 22.9 billion. Air cargo RTMs flown by all-cargo carriers comprised 78.1 percent of total RTMs in 2015, with passenger carriers flying the remainder. Total RTMs flown by the all-cargo carriers increased 1.8 percent in 2015, while total RTMs flown by passenger carriers grew by 3.6 percent (see **Exhibit 1-7**).

⁹ These indicators are based on the highly-regarded world-wide national Purchasing Managers' Index surveys (conducted by ISM in the United States), which have developed an unmatched track record of correctly anticipating economic growth and other key economic variables.

¹⁰ Revenue Ton Mile is a single ton of goods that is transported for one mile by aircraft.

Exhibit 1-6: Historical Air Cargo Tonnage – North America Airports, 1997 - 2014



Source: Airports Council International – North America

Exhibit 1-7: Historical U.S. Air Cargo Revenue Ton Miles, 2008 - 2015

	ALL-CARGO CARRIER RTMS			PASSENGER CARRIER RTMS			TOTAL RTMS		
	DOMESTIC	INT'L.	TOTAL	DOMESTIC	INT'L.	TOTAL	DOMESTIC	INT'L.	TOTAL
2008	12,261	17,516	29,777	2,147	6,905	9,052	14,408	24,421	38,829
2009	10,275	13,834	24,109	1,623	5,266	6,889	11,898	19,100	30,998
2010	11,243	16,733	27,976	1,580	6,332	7,912	12,823	23,065	35,888
2011	10,601	18,980	29,581	1,446	6,250	7,696	12,047	25,230	37,277
2012	10,886	18,310	29,196	1,360	5,952	7,312	12,246	24,262	36,508
2013	10,996	16,741	27,737	1,354	5,700	7,054	12,350	22,441	34,791
2014	11,226	16,356	27,582	1,451	6,148	7,599	12,677	22,504	35,181
2015	11,672	16,403	28,075	1,417	6,456	7,873	13,089	22,859	35,948

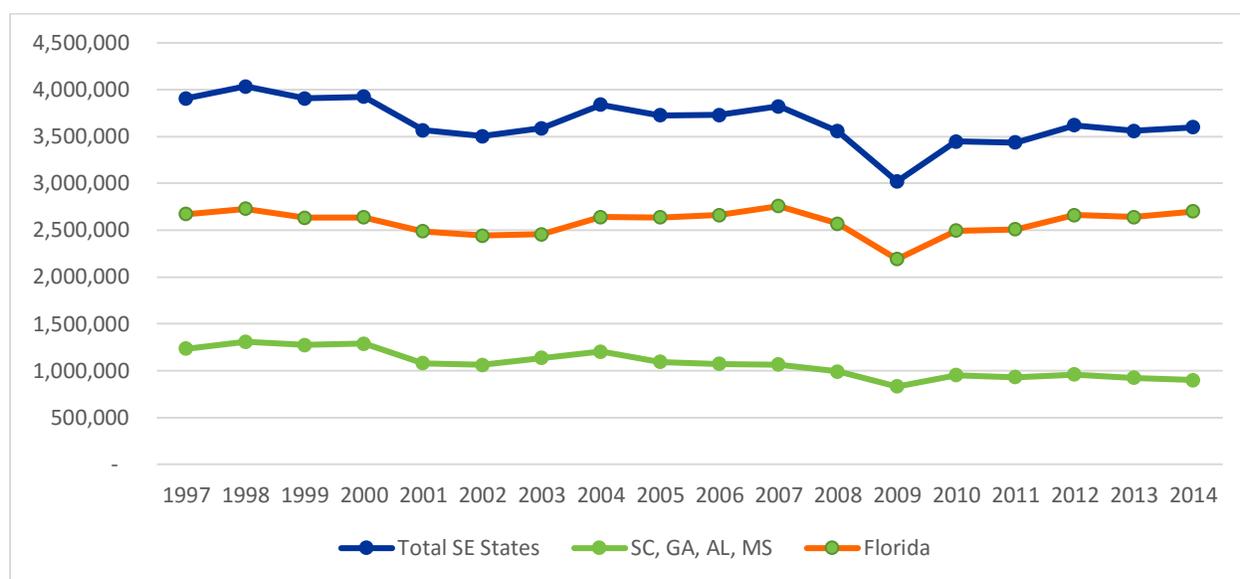
Source: FAA Aerospace Forecast, March 2016

1.3 Regional Air Cargo Trends

The Southeast Region in the U.S. has experienced an overall decline in total annual air cargo enplaned and deplaned from aircraft. In 1999, the Southeast Region experienced a peak annual volume of just over 4.0 million annual tons, and hit a low of 3.0 million tons in 2009. Air cargo volumes rebounded in 2014 to 3.6 million tons for the region, but remain below the peak traffic period of the late 1990s.

Exhibit 1-8 identifies total air cargo tonnage traffic for the Southeast Region, which includes Florida's airports as well as those in Georgia, South Carolina, Alabama and Mississippi. The graph also provides a breakout of Florida airports air cargo tonnage trends and separates the remaining Southeast Region states in aggregate. The other states in aggregate have experienced a decline in annual air cargo tonnage from a high of 1.3 million tons in 1999 to a low of approximately 900,000 tons in 2014.

Exhibit 1-8: Historical Southeast U.S. Air Cargo Tonnage (U.S. Short Tons), 1997 - 2014

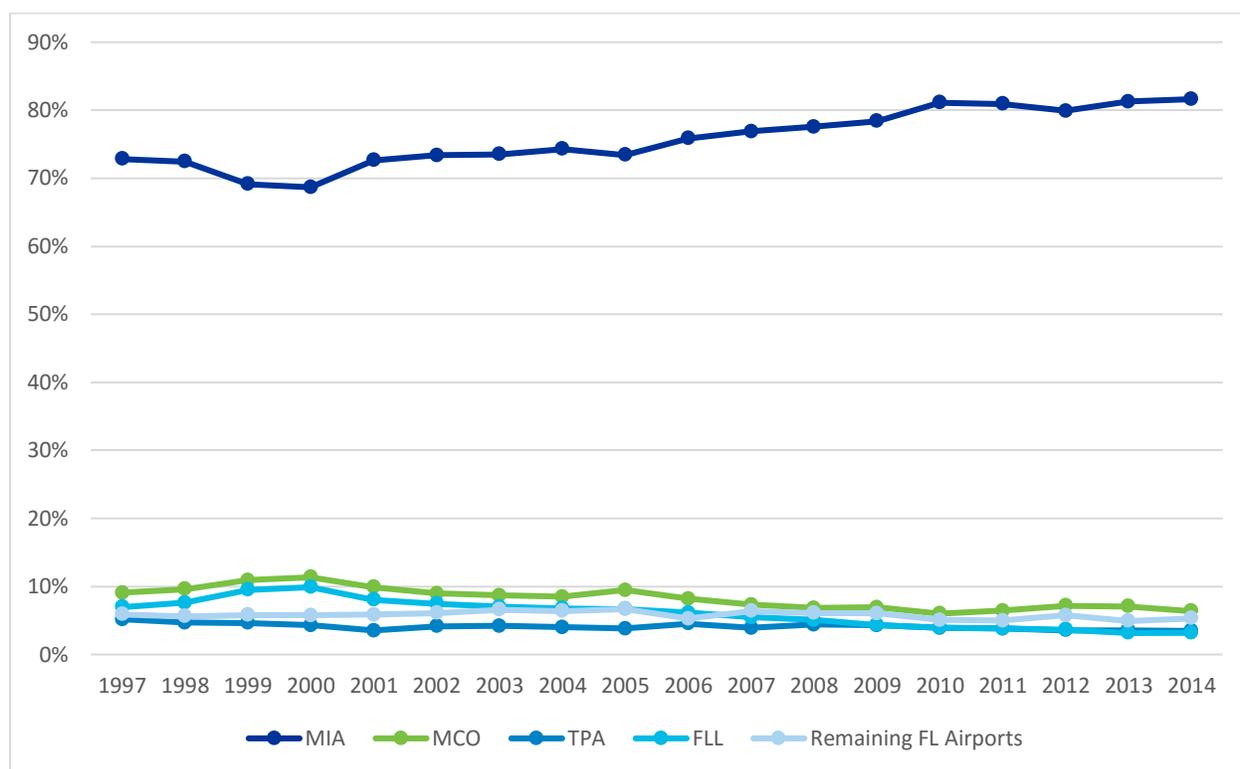


Source: Airport Council International-North America, CDM Smith analysis

1.4 Florida Air Cargo Trends

Florida air cargo trends, which are also based on tonnage throughput by airport, are presented by market share. In the context of this analysis, market share represents the percentage of Florida's total air cargo tonnage attributable to each airport. When considering the market share of air cargo tonnage throughput for Florida's airports, Miami International Airport (MIA) has had the largest share. **Exhibit 1-9** identifies air cargo market shares in Florida from 1997 to 2014. Miami International's market share has steadily increased from 73 percent in 1997 to 81 percent in 2014. Orlando International, Fort Lauderdale-Hollywood International and Tampa International have experienced slight declines in market share over the same time period. Since they are based on a percent of the total statewide tonnage, which is largely driven by the growth of Miami International, the market share trend lines seen in Table 9 do not display the same patterns as seen in previous tonnage trend tables.

Exhibit 1-9: Historical Florida Airports Air Cargo Market Share in Percent, 1997 - 2014



Source: Airport Council International-North America, CDM Smith analysis

MIA is the leader in the Americas in international freight and the world’s largest gateway to Latin America and the Caribbean. The airport controls the north/south cargo flows in the Western Hemisphere, handling 84 percent of all air imports and 81 percent of all exports from the Latin American/Caribbean region. It also serves as the hub for distribution of perishable products, hi-tech commodities, telecommunications equipment, textiles, pharmaceuticals and industrial machinery. Over 100 passenger and cargo airlines at Miami International contribute to the year-round, two-way cargo traffic, linking North America and Latin America with the high growth markets in Asia, Europe, the Middle East and the Caribbean.

1.5 Air Cargo Industry Trends

1.5.1 IATA’s Cargo iQ

Many airlines utilize performance measuring programs known as ‘Notified for Delivery’ (NFD) as a tool to keep track of service commitments to shippers and consignees. Simply put, NFD means cargo and related documents are ready for pick-up at the airline’s cargo building and the customer (or forwarder) is notified. IATA sponsors Cargo iQ (formerly Cargo 2000 or C2K), a self-funded global consortium composed of approximately 80 major airlines, freight forwarders, ground-handling agents, trucking companies, and IT solution providers. Cargo iQ members show key performance indicators (KPI) data, which are presented monthly to the group as a way to monitor the air cargo industry’s commitment to quality. The goal is to cut down on cargo “dwell time” in the destination cargo building as much as possible.

1.5.2 Pharmaceutical Shipments

Air freight is critical to the pharmaceutical industry, especially as supply chains become increasingly complex. New trends such as home healthcare where medicines are delivered to the patient, clinical trials in different areas of the world, companion diagnostics, and advanced therapies are changing the industry. For example, a patient in Germany has their biopsy results sent to a U.S. lab where a “made to order” medicine would be developed. This medicine is then exported to the United Kingdom (U.K.) for Qualified Person (QP) certification, and then sent to the patient in Germany. These types of lean and just-in-time logistics favor air freight.

To respond to this type of specialized air cargo demand, Miami International Airport became the first airport in the United States, and the second in the world, to be named a pharmaceuticals hub under the Center of Excellence for Independent Validators for Pharmaceutical Handling (CEIV-Pharma) program. The only other airport to achieve this designation thus far is Belgium’s Brussels Airport. Airports in Asia are making progress in achieving this status. The program is comprised of cargo airlines, ground handling companies, and freight forwarders that participated in IATA’s training for the CEIV-Pharma certification. The six companies that committed to training for CEIV certification in Miami are Amerijet International, Brink’s Global Services, Centurion Cargo, Consolidated Aviation Services, LAN Cargo, and Liaison Can/U.S. Pharmaceutical goods transported through the hub are handled in accordance with the very best practices. The total value of pharma products transported through MIA has increased by 79 percent since 2010. In 2015 alone, MIA handled pharmaceutical shipments worth \$3.28 billion.

Nuclear medicine, since it is subject to rapid but predictable radioactive decay, is a special category of perishable goods that is commonly transported on aircraft. Recently, Coqui Radio Pharmaceuticals announced that it selected the city of Alachua, Florida to build its \$250 million, 100,000-square-foot medical radioisotope production facility. The facility will make nuclear radioisotopes used in medical diagnoses and treatments for diseases such as cancer, Alzheimer’s, renal disease, and bone traumas. With this new facility, it is likely that the Gainesville Regional Airport will see an uptick in air cargo tonnage and regional air cargo aircraft operations.

1.5.3 Shippers Enter the Air Cargo Airline Business

In September 2015, air cargo flight activity at Wilmington Airpark (ILN) in Ohio resumed after an eight-year hiatus. U.S.-based aircraft lessor Air Transport Services Group (ATSG), which is based at ILN, launched a “trial Aircraft, Crew, Maintenance and Insurance (ACMI) express network,” leasing four 767 freighters to an unnamed client. ILN is the former hub of DHL (and formerly Airborne Express). Inbound flights included routes to Allentown, Pennsylvania; Dallas/Fort Worth, Texas; Oakland and Ontario, California; and Tampa International Airport in Florida. Each of the airports into which the 767s flew were remarkably close to distribution centers run by e-commerce giant Amazon.com.

Around the same time, routes were being identified in western states. Alaska-based carrier Northern Air Cargo began operations in Seattle with a Boeing Field-Boise-San Bernardino-Boeing Field route – not exactly a common trade corridor, but one that is small enough to go unnoticed and also close enough to several Amazon distribution centers to be beneficial. Additionally, an Amazon air express trial route was formed in Europe, with aircraft flying five times a week from Wroclaw, Poland, to Luton or Doncaster in the U.K., and Kassel, Germany.

In January 2016, it became apparent that the new air cargo activity was attributable to Amazon when the company announced that it would lease 20 B767s from ATSG and operate out of ILN. Analysis indicates the advantage for Amazon is that the company can now manage its own air traffic volumes on a daily basis since it monitors the amount of cargo that needs to be transported from distribution centers in Tampa to the West and East Coasts. Rather than give cargo to a third-party provider, such as FedEx or UPS where it would pay a premium and compete for limited space with other cargo shippers, Amazon saves money by chartering a plane and benefits by providing its own capacity.

In China, the Asian e-commerce giant Alibaba has been dominating the logistics industry on a global scale, much as it has already done to Chinese domestic e-commerce. Formed in 2013, Alibaba's logistics arm, called Cainiao, is a complete logistics network that aims to offer next-day delivery service in 50 cities by the end of 2016. Since its launch, Cainiao has partnered with thousands of large and small established logistics service providers, and is establishing warehouse and distribution centers in 12 key cities. It opened service centers in 1,200 villages and rural provinces which function as digital ordering sites, since many Chinese do not own a computer or similar device. The company recently launched a mobile app so consumers can use smartphones to track their orders and locate nearby established package pick-up points as many packages are not delivered to a consumer's home.

Chapter 2. OVERVIEW OF THE AIR CARGO INDUSTRY

This section provides an overview of the air cargo industry and its component parts. Each type of cargo carrier satisfies a specific air cargo demand sector and serves a specific function within air transport. The following elements are discussed in this section:

- Air Cargo Historical Overview
- Key Sectors in the Industry
- Types of Air Cargo
- Types of Air Cargo Aircraft
- Worldwide Air Cargo Aircraft Market
- All-Cargo Aircraft Commonly Used in Florida
- Widebody Passenger Aircraft Commonly Used to Transport Cargo Capabilities in Florida

2.1 Air Cargo Historical Overview

The air cargo industry began as airline air mail services expanded in the years prior to World War II. Following the war, air freight grew at an exponential rate while air mail growth remained relatively flat. During the 1950s, air cargo, which is comprised of both mail and freight, was transported primarily in the belly holds of passenger propeller driven aircraft in bulk (crates, boxes and mail bags). In 1958, Pan Am initiated the first jet service from New York to Paris offering passenger and cargo service on the same route. In the 1960s the advent of jet aircraft and containerization of air cargo, using Unit Loading Devices (ULD), revolutionized air freight. The industry evolved from air cargo on military-type freighter aircraft and passenger aircraft to specific air cargo niches and cargo aircraft.

United Parcel Service (UPS) began as a trucking company in 1914 and, in 1929, and was the first package delivery company to provide air service via privately operated airlines. Air service was discontinued in 1931 due to pressures of the Great Depression. After World War II, UPS began to revisit the idea of providing air shipment. They resumed air operations in 1953, offering two-day service to major cities on the east and west coasts. In the 1980s, UPS entered the overnight air delivery business, and by 1985 UPS Next Day Air service was available in all 50 states and Puerto Rico. That same year, UPS introduced international air package and document service between the U.S. and six European nations. In 1988, UPS won approval from the Federal Aviation Administration (FAA) to operate its own aircraft, thus launching UPS Airlines.

In 1969, DHL began transporting and delivering documents between San Francisco and Honolulu utilizing space available on passenger airlines. The company expanded its service throughout the world in the late 1970s by continuing to use passenger belly space but also began purchasing its own fleet of aircraft. The company was primarily interested in offshore and inter-continental deliveries, but the success of Federal Express (FedEx) prompted their own intra-U.S. expansion. Beginning in 1983 national hubs were developed at Cincinnati/Northern Kentucky International Airport and Salt Lake City International Airport.

Federal Express (FedEx) began as a small overnight shipping company and has evolved into a major worldwide logistics giant. FedEx began operating aircraft in 1973 out of its base in Memphis, Tennessee.

On its first night of continuous operation, 389 FedEx team members and 14 Dassault Falcon jets delivered 186 packages overnight to 25 U.S. cities. Air cargo deregulation in 1977, and the subsequent deregulation of the airline industry in 1978 propelled FedEx and other airlines forward. In 1984, FedEx Express began operations in China and Japan. In 1989, they continued their expansion into Asia with the purchase of Flying Tiger Airlines. Included in the acquisition were routes to 21 countries, a fleet of Boeing 747 and 727 aircraft, facilities throughout the world, and Tiger’s expertise in international airfreight. Today, FedEx Express has the world’s largest all-cargo air fleet, including Boeing 777s, 767s, 757s, McDonnell Douglas MD-11s, and Airbus A-300s and A-310s.

2.2 Key Sectors in the Air Cargo Industry

Several niche air cargo sectors continued to evolve and develop in order to meet the ever-changing demand of shippers. **Exhibit 2-1** identifies the wide variety of air cargo participants currently impacting the industry on a daily basis. These include passenger airlines, integrated express carriers, and air carriers transporting only cargo. This summary provides a general overview of industry sectors, while a subsequent section of this study will spell out the function of each air cargo sector and the competitive nature of the industry.

Exhibit 2-1: Key Sectors in the Air Cargo Industry

<p>Integrated Express Carriers - Integrated express operators move the customer’s goods door-to-door, providing shipment collection, transport via aircraft/truck, and delivery. Integrated express operators utilize a hub-and-spoke transport model, similar to passenger airlines. The air cargo hub used for package sortation and aircraft transfer is the backbone of integrated express operators. Integrated express carriers are known for their capability of delivering packages overnight and include UPS, DHL, and FedEx.</p>	
<p>Passenger Airlines - Many passenger airlines provide cargo services to shippers by offering available capacity of the belly compartment. Passenger baggage has a higher priority than freight but many narrowbody and widebody passenger aircraft have additional capacity to accommodate cargo in addition to baggage. Passenger carriers include American, Delta, United, Southwest, JetBlue, and Alaska Airlines to name a few.</p>	
<p>Combination Aircraft Carriers - Carriers that have both passenger and freighter aircraft in their fleet are considered combination aircraft carriers. These carriers include Cathay Pacific, Emirates, Alaska Airlines, Asiana, KLM, and Lufthansa.</p>	
<p>Aircraft, Crew, Maintenance, and Insurance (ACMI) Charters - The air cargo industry also uses charters operation under an arrangement referred to as an "Aircraft, Crew, Maintenance, and Insurance (ACMI) contract - or wet lease - agreements to provide cargo services on a scheduled basis or ad hoc operation. Carriers include Atlas, Southern Air, and Kallita.</p>	

Exhibit 2-1: Key Sectors in the Air Cargo Industry (Continued)

<p>Heavy Lift Cargo Carriers - Heavy lift cargo freighters are typically operated by charter cargo airlines utilizing aircraft designed originally for military purposes. These carriers provide heavy lift operations for special industry projects which include military and civil industrial needs. Aircraft in this category typically have nose and tail cargo doors, and are capable of quickly loading vehicles. Carriers include Volga-Dneper, Polet Airlines, and Maximus Air.</p>	
<p>Specialized Operators - Specialized air cargo providers have unique capabilities to carry freight that is oversized/bulky or freight related to a specific industry. Many general aviation caliber aircraft are used to transport medical supplies. Carriers include Lab Corp, Quest Diagnostics, and Ameriflight.</p>	
<p>All-Cargo Carriers - All-cargo carriers operate airport-to-airport and offer air cargo and freight services for their customers, but do not offer passenger service. Customers typically include air forwarders, passenger airlines, and integrated express carriers requiring additional lift. All cargo carriers often sell "block space" which guarantees a specified amount of capacity to shippers and other carriers. Carriers include Polar, Centurion, Panapina, and LAN Cargo.</p>	
<p>Air Forwarders - A freight forwarder is an intermediary that arranges the best means of transport for goods, typically by accepting shipments and consolidating them into container loads. These loads are then transferred to the non-integrated carrier or passenger airline to deliver to an agent or subsidiary at the destination airport.</p>	

Source: CDM Smith Analysis

2.3 Types of Air Cargo

Air cargo demand is generated when there is a need for expeditious transportation of material and goods between two points. In the business world, logistics managers must justify the use of air cargo as their preferred mode of transport, as shipping by air has a greater cost than shipping via truck, rail, and water. Factors involved in deciding to transport via air include:

- Cost of transporting the material
- Level of service commitment to the customer or end user
- Value of the material
- Time-sensitivity or perishability of the material

Products best suited for air cargo shipping are those that benefit from increased speed of distribution or better stock availability. Those products tend to be high value, relatively light weight, and/or time critical.

2.3.1 Unit Load Device

As previously discussed in the historical overview section, one of the most beneficial advances in the handling of shipments for the air cargo industry is the ability to rapidly load and unload commodities onto widebody and narrowbody freighter aircraft using Unit Load Devices (ULD), including pallets and igloos.¹¹ Cargo aircraft have large doors and rollers fastened to the deck of the aircraft. These aircraft allow containers and pallets laden with freight and mail to be rolled on and off aircraft either manually or through a mechanized system. ULDs come in several dimensions and are designed to fit the belly hold of a jet plane, particularly widebodied aircraft. The number of containers that can be accommodated is determined by aircraft design. Loading ULDs is simple as it involves rolling the container off a loader and onto the aircraft deck, which has rollers and ball mats. Up to 32 ULDs can be loaded in a 747-400. ULDs offer several advantages:

- Standardized sizes and equipment that fit in most commercial aircraft
- Faster handling (loading and unloading)
- Improved tracking of the cargo
- Can be designed to transport temperature sensitive commodities such as pharmaceuticals (see **Exhibit 2-2**)
- Properly outfitted trucks and trailers can transport ULDs, easing cargo transfers and loading and unloading off airports

Exhibit 2-2: Example Unit Load Device*



**AcuTemp RKN, an example of a specialized ULD, is the only FAA approved battery powered, compressor driven refrigeration unit permitted in the cargo section of an aircraft.*

¹¹ An igloo is a structural or non-structural container contoured to the dimensions of a standard-body freighter main deck.

2.4 Types of Air Cargo Aircraft

Air cargo is transported on passenger aircraft as well as dedicated air cargo freighter aircraft. Many of the freighter aircraft operating in the industry today were originally designed to transport passengers. These aircraft are either converted from retired passenger aircraft airframes or were manufactured with the intent of serving as freighters only. Some turbo prop passenger aircraft are converted to freighters as well.

Passenger aircraft in the airline fleet primarily transport cargo in the belly hold of the aircraft and can be categorized as widebody aircraft, narrowbody aircraft, or regional jets/turboprops. Additionally, combination aircraft, airframes modified so that the aircraft can be used to carry either passengers as an airliner, or cargo as a freighter, are serving in the commercial fleet.

2.4.1 Widebody Aircraft

Widebody aircraft are defined as having two passenger aisles with seven or more seats abreast.¹² These aircraft offer the largest belly cargo capacity of aircraft within the passenger airlines' fleets. Examples of widebody passenger aircraft include the Boeing 747, 767, 777, and 787; the Airbus A330, A350, and A380; and the McDonnell Douglas DC-10, MD-11, and MD-12. Of these, the Boeing 747 has been the most recognizable and represents one of the more significant advances in commercial aviation history.

Introduced in 1969, the 747 reigned supreme on trans-Pacific and trans-Atlantic flights because, unlike the competing McDonnell Douglas DC10 and Lockheed L1011 Tristar, the 747 had four engines instead of three, a significant safety advantage if one of the engines were to fail.¹³ The 747's engines also provided greater propulsion power and better fuel economy than was previously available.¹⁴ **Exhibit 2-3** shows a Delta Air Lines Boeing 747-400.

Today, however, the 747's prominence in the commercial fleet is coming to an end. Airlines no longer view the aircraft's four engines as a safety advantage as new twin-engine aircraft with improved engine reliability are being manufactured. Fuel efficiency is another factor. According to data reported by U.S. operators, the 747 burns more fuel per hour and per seat-mile than any other widebody commercial airliner.¹⁵ Although oil prices have plummeted over the last two years, prices soared for years prior to

Exhibit 2-3: Cargo Being Loaded onto a Boeing 747-400



Source: Delta Airlines

¹² https://en.m.wikipedia.org/wiki/Wide-body_aircraft

¹³ <http://www.cnn.com/2016/02/01/aviation/sun-setting-boeing-747-conversation/>

¹⁴ Ibid.

¹⁵ <http://qz.com/217727/boeing-747-airplane-is-going-extinct>

2014. This, along with surging global air travel, drove airlines to buy more fuel-efficient aircraft from Boeing and Airbus, with the backlog of orders stretching through the end of the decade.¹⁶ As a result, 747s are seen less frequently at the world's major airports. For example, Los Angeles International Airport (a major trans-Pacific gateway that has long accommodated 747 aircraft operations by the world's major airlines) saw nearly 2 dozen different operators of the passenger version of the 747 flying more than 30 flights per day from the airport in 2004 fall to 5 operators with fewer than 10 departures per day by the end of 2014.¹⁷ In January 2016, Boeing announced that due to decreasing demand for four-engine aircraft and a slumping cargo market, the company will reduce output of the 747 to six aircraft per year starting in September 2016.¹⁸

Widebody aircraft that are replacing the 747 include the smaller and significantly more efficient Boeing 777 and 787 as well as the Airbus A350. Each of these aircraft have cavernous belly holds that have boosted the passenger airlines' cargo capabilities. For example, the Boeing 777-300ER passenger airline (see **Exhibit 2-4**) can hold 163,000 pounds of freight, which is 25 percent more than a four-engine 747-8 can hold in its belly compartment.¹⁹ The A350-900, which began service in 2015, can carry 36 ULDs or 11 pallets in its belly hold, which is the equivalent of 126,000 pounds.²⁰ The effect of the passenger airlines adding these aircraft to their fleets in response to rising fuel costs and soaring worldwide travel demand has been a glut of belly cargo capacity that has reduced revenues for air cargo shippers²¹ and stalled sales of cargo aircraft as less-urgent shipments are shifted to the cargo holds of jetliners.²²

Exhibit 2-4: The Boeing 777-300ER Passenger Aircraft Offers Substantial Cargo Capacity



Source: Wikimedia Commons

¹⁶ <http://www.wsj.com/articles/airbus-racks-up-more-2014-jet-orders-than-boeing-1421142005>

¹⁷ <http://crankyflier.com/2014/05/19/the-747-is-quickly-disappearing-from-passenger-service/>

¹⁸ <http://www.bloomberg.com/news/articles/2016-01-21/boeing-to-take-569-million-charge-on-lower-747-jumbo-jet-output>

¹⁹ <http://www.bloomberg.com/news/articles/2014-06-26/big-belly-boeing-777-blunts-demand-for-cargo-only-jets>

²⁰ <http://www.asiacargonews.com/en/news/detail?id=83>

²¹ http://www.dcvclivity.com/articles/20160414-airfreights-belly-ache/?utm_source=rss&utm_medium=rss&utm_campaign=RSS-articles

²² <http://www.bloomberg.com/news/articles/2014-06-26/big-belly-boeing-777-blunts-demand-for-cargo-only-jets>

2.4.2 Narrowbody Aircraft

Narrowbody aircraft are defined as having one passenger aisle permitting up to six seats abreast.²³ Examples of narrowbody aircraft include the Boeing 737 and 757, the McDonnell Douglas MD-80, and the Airbus A320. Since they are smaller than widebody aircraft, narrowbody aircraft have less belly cargo capacity.

Southwest Airlines has been the most successful airline to use narrowbody aircraft for transporting belly cargo. Southwest flies the Boeing 737 (see **Exhibit 2-5**) exclusively, which was never considered an optimum aircraft for belly cargo. Flying the B737 limits the type and size of cargo the airline can transport. For example, it does not carry mail, live animals, oversize cargo, or hazardous materials.

It should be noted that not all airlines flying narrowbody aircraft transport air cargo. Airlines such as Allegiant Air, which caters to vacation travelers, seldom carry cargo.

Exhibit 2-5: Loading Cargo onto a Southwest Airlines Boeing 737-7



Source: Bizjournals.com

2.4.3 Regional Jets/Turboprops

The smallest of the three categories of aircraft are the regional jets and turboprops. Regional jets and turboprops used as passenger aircraft have a single aisle.²⁴ Examples include the Embraer ERJ 145, Bombardier CRJ700, and De Havilland Dash 8. Cargo space on these aircraft is limited, as they are smaller aircraft and passenger luggage is given priority in the baggage compartments.

2.4.4 Converted Cargo Aircraft

A significant number of freighters in service today are converted passenger aircraft that have reached the end of their service life as passenger carriers. Other freighters, particularly widebody freighters, are manufactured as such by Boeing and Airbus. The converted freighters tend to be significantly older, less fuel efficient, and, given their age, are more susceptible to maintenance problems than their passenger carrier counterparts and recently manufactured freighters. The conversion process includes strengthening the main deck floor of aircraft to accommodate ULDs and installing a cargo door behind the flight deck. It may also include increasing the size of center fuel tanks.

2.4.5 Combination Aircraft

Combination (combi) aircraft in commercial aviation are aircraft that can be used to carry either passengers (as an airliner) or cargo (as a freighter) and may have bulkhead partitions in the aircraft cabins to allow both uses at once. Alaska Airlines is an example of a carrier that operates a combi aircraft (the Boeing 737-400 pictured in **Exhibit 2-6**). These aircraft typically feature an oversized cargo

²³ https://en.m.wikipedia.org/wiki/Narrow-body_aircraft

²⁴ https://en.wikipedia.org/wiki/Regional_airliner

door, as well as tracks on the cabin floor to allow seats to be added or removed quickly. Combi aircraft were marketed early on by Boeing as “convertible” or “QC” (quick change), since they facilitated a rapid conversion between roles. Asiana Airlines continues to operate B747-400 combi aircraft, which allow ULD containers and pallets to be loaded onto the rear portion of the main deck through a large cargo door while passengers travel in the forward portion of the main deck.

Exhibit 2-6: Alaska Airlines Boeing 737-400 Combi



Source: Alaska Air, Inc.

2.4.6 General Aviation Aircraft

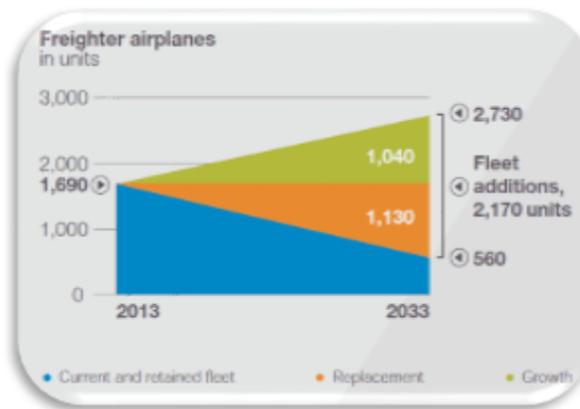
General aviation (GA) aircraft may also operate as freighters but have less capacity than aircraft used by major air cargo carriers. These are typically single or twin engine piston or turboprop aircraft capable of operating on the shorter runways of GA airports and are more economic when operating on shorter routes. While large cargo aircraft payloads can range from 18,000 to 95,000 pounds for narrowbody jets and 80,000 to 240,000 for widebody jets, the capacities of cargo aircraft operating at GA airports have payloads that range from 800 up to around 7,000 pounds. Commonly used GA cargo aircraft include Cessna 210, Cessna 208 Caravan, Beechcraft Baron 58, Learjet 35, Embraer EMB-500 Phenom, Piper Navajo Chieftain, Shorts 360, Swearingen/Fairchild Metroliner, and others. One of the smallest of these aircraft is a Beechcraft Baron 58, which is a twin-engine piston aircraft with a payload of around 800 pounds.

2.5 Worldwide Air Cargo Aircraft Market

According to Boeing, the number of airplanes in the worldwide freighter fleet will increase by more than 50 percent during the next 20 years, as demand for air cargo services more than doubles. Using aircraft freighter counts as a barometer of cargo growth proves useful when studying the industry. As air carriers face pressure to increase yields, the industry is shifting towards larger more efficient freighter aircraft. In fact, Boeing forecasts that the large production freighter (new aircraft and not conversions) market share will grow from 21 percent to 30 percent during the 2013 to 2033 forecast period.

Challenging market conditions have forced operators to adjust freighter utilization such as tonnage carried per trip and the number of flights to markets per week. Some carriers have temporarily grounded less fuel-efficient aircraft in their fleets, and retired older freighters whose maintenance costs have become uneconomical or whose fuel consumption is less efficient than new aircraft on the market. Boeing forecasts that the number of freighter aircraft will increase from 1,690 aircraft in 2013 to 2,730 aircraft by 2033, an overall net growth of 1,040 freighter aircraft during this 20-year period as indicated in **Exhibit 2-7**.

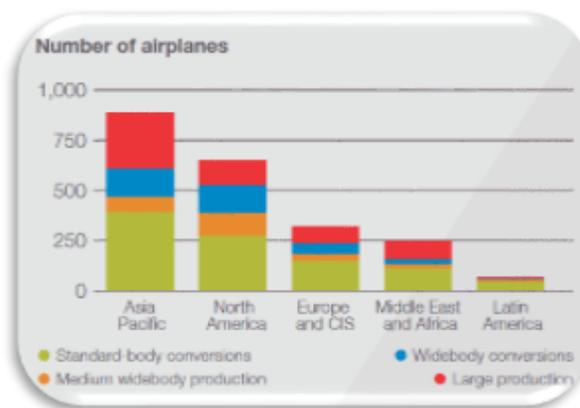
Exhibit 2-7: Freightier Fleet Additions for Growth and Replacement



Source: Boeing World Air Cargo Forecast 2014—2015

According to the Boeing Forecast, more than 40 percent of all freighter deliveries during the 20-year forecast period will be to Asian carriers, which also continue to receive the highest proportion of large freighters. See **Exhibit 2-8**. These freighters serve long-haul, intercontinental routes. Historically, up to three-quarters of medium widebody aircraft, both production and conversion (such as Boeing 767, or Airbus A300), have supported express operations. Relatively low airplane utilization makes converted freighters more

Exhibit 2-8: Freightier Fleet Additions by World Region



Source: Boeing World Air Cargo Forecast 2014—2015

converted freighters more economically attractive. North America receives the largest number of medium widebody deliveries because of the high concentration of express carriers in that region.

2.6 All-Cargo Aircraft Commonly Used in Florida

There are approximately 20 types of air cargo aircraft operating within Florida on a regular basis. These range from widebody aircraft originally designed for passenger transport (but have either been converted to an air cargo aircraft or have been built by the manufacturer as a freighter) to small single-engine turbo prop aircraft. The Boeing 767 (B767), which has a number of variations, is the most common air cargo aircraft to operate in Florida. Over 90 percent of B767 operations occur at Miami

International Airport and 29 percent of all cargo aircraft operations in Florida during a typical week are B767 aircraft.

According to Boeing, cargo operators around the world keep the global 767 freighter fleet busy, using each airplane an average of 10 hours per day. The second most common cargo aircraft to operate in Florida is the Pilatus PC12, with 100 flights a week. The PC12 is an excellent cargo feeder aircraft and is also used considerably for the transport of time sensitive medical commodities. Pensacola International Airport has nearly 40 percent of PC12 operations in the state. Other cargo aircraft include the B757, B747 and the Airbus 300-6.

Exhibit 2-9 identifies air cargo aircraft operations at Florida’s airports during a typical week based on analysis of Official Airline Guide (OAG) Cargo Aircraft Schedule data. OAG data presents weekly schedules for airlines and is updated on a monthly basis; however, not all air carriers submit their schedules. Other data sources are used to fill in data gaps and include Flightwise.com and Flightaware.com websites. Air cargo transported in small feeder aircraft frequenting general aviation airports are not reported to OAG. That information is gleaned from FAA IFR databases provided by Flightwise.com. Miami International Airport garners over 50 percent of all air cargo aircraft flights in Florida, followed by Orlando International (MCO) with just 7 percent.

**Exhibit 2-9: Dedicated Freighters Operating in Florida on a Scheduled Basis
(All Cargo Carriers and Integrated Express)**

Aircraft Type	ECP	EYW	FLL	GNV	JAX	MCO	MIA	PBI	PIE	PNS	RSW	SFB	TLH	TPA	Weekly Ops
B767	0	0	0	0	11	10	245	0	0	0	0	0	0	0	266
PC12	15	0	0	0	0	5	0	0	0	39	0	0	25	16	100
B757	0	0	13	0	0	3	41	6	4	0	10	9	7	1	94
B747	0	0	0	0	0	0	87	0	0	0	0	0	0	0	87
A306	0	0	10	0	11	9	12	5	8	5	0	0	0	6	66
C208	4	10	15	0	0	8	10	0	0	0	0	0	8	0	55
MD11	0	0	2	0	0	12	27	0	0	0	0	0	0	14	55
DC10	0	0	8	0	0	11	18	0	0	0	0	0	0	0	37
SF34	0	0	1	0	0	0	36	0	0	0	0	0	0	0	37
SW4	5	0	0	0	4	3	9	0	0	5	0	0	0	0	26
B727	0	0	0	0	0	0	22	1	0	0	0	0	0	0	23
B777	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16
CVLT	0	0	0	0	0	0	16	0	0	0	0	0	0	0	16
AC50	0	0	0	0	0	0	0	5	0	0	0	0	0	9	14
TBM7	0	0	0	5	0	5	0	0	0	1	0	0	0	0	11
LJ35	1	0	0	0	0	0	0	1	0	0	0	0	2	2	6
B190	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
E120	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
SH36	0	0	0	0	0	0	5	0	0	0	0	0	0	0	5
B73F	0	0	0	2	0	0	1	0	0	0	0	0	0	0	3
Total	25	10	49	7	26	66	550	18	12	55	10	9	42	48	927

Source: OAG, CDM Smith Analysis

2.7 Widebody Passenger Aircraft Commonly Used to Transport Cargo in Florida

As discussed above, widebody passenger aircraft transport air cargo in the aircraft’s belly hold compartment primarily designed to accommodate ULDs. On international flights, it is not unusual for 40 to 50 percent of the belly capacity to be utilized by air freight and mail. This capacity is usually constrained during the Christmas holiday season as passengers tend to bring more luggage. In Florida, the B767 passenger aircraft is the most common passenger widebody aircraft to serve the state with nearly 325 weekly operations. B767 activity at MIA comprises 70 percent of B767 passenger operations within the state. The next most common widebody passenger aircraft to operate in Florida is the B777 which operates primarily at MIA and offers cavernous cargo space in the belly hold of the aircraft.

Exhibit 2-10 identifies widebody passenger aircraft operating in Florida in rank order. The Airbus 330 is the third most active passenger widebody aircraft in the state and is followed by the B787 Dreamliner. The B747, which once dominated the international passenger market, ranks fifth in the number of weekly flights in the state. It is noteworthy to point out that the Miami International Airport has over 70 percent of all widebody passenger jet operations within Florida and, as a result, provides a substantial amount of air cargo capacity to the Florida market area.

Exhibit 2-10: Widebody Passenger Aircraft Types Operating in Florida

Aircraft Type	FLL	MCO	MIA	RSW	SFB	TPA	Weekly Ops
B767	35	40	226	0	1	22	324
B777	0	20	128	0	0	6	154
A330	7	17	68	4	0	2	98
B787	5	4	46	0	5	0	60
B747	0	33	14	0	0	0	47
A343	0	0	9	0	0	4	13
A388	0	0	7	0	0	0	7
A350	0	0	2	0	0	0	2
Total	47	114	500	4	6	34	705
	7%	16%	71%	.5%	.5%	5%	100%

Source: OAG, CDM Smith Analysis

Passenger airlines such as Delta Air Lines and Southwest Airlines sell space in the belly compartments of their aircraft for cargo. The cargo space sold to shippers is the space remaining after passenger-related items such as luggage, food and beverage, and company materials are loaded onto the aircraft. There are limitations in the size of cargo the passenger airlines can transport due to the combined services they offer, the size of cargo doors and payload capacity, and airframe limitations. A significant advantage, however, is that passenger airlines’ frequent flights to destinations provide transport flexibility to the air cargo industry.

Chapter 3. FACTORS SHAPING AIR CARGO DEMAND AND COMPETING SUPPLIERS

There are many variables affecting air cargo demand at both the international and the domestic level. These variables range from the value of the U.S. Dollar and its role in demand for imports and exports, to the value of oil and its impact on transportation choices amongst shippers. This section of the study focuses on factors shaping demand and competition amongst carriers to meet that demand. Factors shaping and influencing air cargo demand in Florida include:

- Value of the U.S. Dollar
- The new role of ecommerce in consumer choices and impacts to logistics
- Demographics of an aging U.S. and Florida population
- Alternatives to air freight transport (roadways and maritime)

3.1 Strong U.S. Dollar Impacts on Exports and Imports

The strong U.S. dollar is putting pressure on U.S. exports to foreign nations. In simple terms, this means that fewer people in countries outside the U.S. are buying goods manufactured here because consumers can find those goods cheaper locally. This translates to fewer outbound shipments for the U.S. The U.S. Dollar Index, which measures the value of the dollar against other currencies, is at a peak for the decade. The dollar averaged about 96 for 2015, which is 7 percent higher than the previous decade high reached in 2009, and 28 percent higher than the decade low reached in 2008. The dollar ended 2015 at nearly 98 (see **Exhibit 3-1**). Thus, some manufacturers who export lower their prices to compete with foreign suppliers.

Exhibit 3-1: U.S. Dollar Index, 2006 to 2015



Source: Barchart.com

Conversely, a stronger dollar means U.S. consumers and businesses have tremendous purchasing power, and are buying more goods and materials from overseas. The economic upside is that U.S. households gain more purchasing power when the dollar strengthens. With prices of imported goods falling, e-commerce retailers (e.g., Amazon), that sell a significant number of products manufactured in China, Vietnam, and other markets with significant exports, benefit from a strong dollar. Multi-national chains, such as Walmart, earn sales domestically and see increases in sales in the U.S. stores for foreign made goods. These same multi-national chains, however, have retail outlets all over the globe, yet they account for those sales in the United States. When the dollar is strong, these retailers will suffer a large negative foreign exchange impact when the monies come back into the U.S.

On the logistics side of the equation, integrated express carriers and other air cargo carriers are seeing significant increases in inbound delivery volumes due to the imports trend related to the strong dollar. With the price per barrel of oil at its lowest since 2008, transportation is currently relatively inexpensive. The strong dollar combined with weak oil prices increases imports. For example, driven by a surge in online shopping, DHL Express in the United States has experienced a 20 percent growth in international inbound shipment volume for each of the last several years. Delivery companies in the past were heavily focused on business-to-business services where multiple packages went to one location. Today, DHL indicates more packages are going to individual households and small businesses. This uptick in last-mile deliveries has increased staffing levels at the logistics giant.

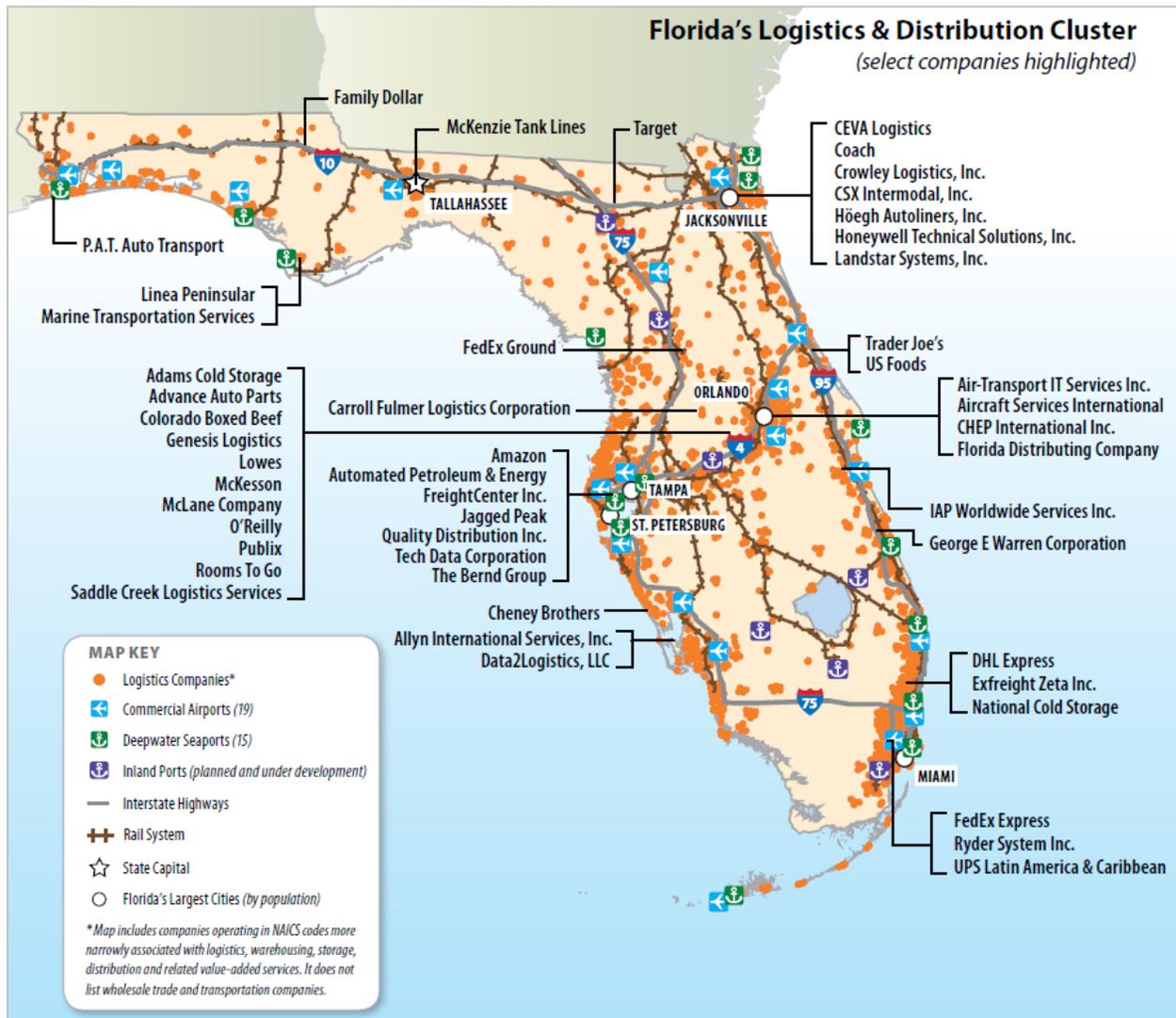
3.2 Florida Based Logistics and e-Commerce Fulfillment Centers

The broader wholesale trade, transportation, and logistics industry is home to more than 70,000 companies, employing 630,000 Floridians. As a major commercial gateway, Florida's logistics and distribution industry is poised to grow further with the Panama Canal expansion. Florida will benefit from continued domestic and international trade and logistics services.

According to the 2014 Florida Trade and Logistics Study 2.0, all modes of transport in Florida, both intermodal cargo and containerized cargo (which typically include high-technology products and consumer goods) are anticipated to experience high growth due to the ongoing containerization and globalization of trade. Break bulk or general cargo is anticipated to experience moderate to high growth for all modes except rail. Bulk cargo, which includes coal, grain, petroleum, chemicals, and similar products, is anticipated to experience low growth. Today, we continue to see evidence of growth in high-technology products and consumer goods as consumer fulfillment centers are developed in areas around the state. **Exhibit 3-2** identifies Florida's logistics and distribution clusters.

The e-commerce industry is continuing to cluster around the Lakeland and Davenport areas in central Florida near the I-4 corridor. This trend is related to Florida's population growth and the area's central location. These attributes support retail companies as they are realizing their need for more distribution channels in order to satisfy online consumers seeking same- or next-day delivery. Four significant e-commerce fulfillment center trends in Central Florida include:

Exhibit 3-2: Florida’s Logistics and Distribution Clusters



Source: Enterprise Florida

- The U.S. Postal Service (USPS) Center renewed its lease for 350,000 square feet near the Orlando International Airport, and closed their Lake Mary regional sorting facility.
- Amazon's new million-square-foot fulfillment centers in Ruskin and Lakeland.
- FedEx is building a center with more than 300,000 square feet in Davenport so it can work in concert with the Amazon fulfillment centers
- Walmart Stores, Inc. (the world’s largest retailer) has chosen Davenport in Polk County as the site to build its newest e-commerce fulfillment centers.

3.2.1 USPS

The USPS plans to close its Lake Mary distribution center in July 2016 as part of a nationwide consolidation plan for 82 mail-processing centers. This is the result of changes within commodities carried by the USPS. There are now fewer letters and considerably more packages in mail trucks and on aircraft, and changes to the network are reflecting that. For the postal service, deliveries were up 18 percent during the holiday season with much of this increase attributable to e-commerce sales. The soon-to-close Lake Mary postal center is geared toward letter-sorting functions while the center that will remain open near the airport is more geared to packages. It is noteworthy to point out that Amazon and the postal service are blending two services, with the Amazon logistics arm transporting bulk movements closer to the delivery points, and then the USPS postal vehicles fleet making the last-mile-delivery. In fact, USPS vehicles now deliver on Sundays strictly for Amazon.

3.2.2 Amazon Fulfillment Centers

The Amazon Fulfillment Center in Lakeland opened in August 2014 with 500 employees and an additional 300 were added since that time. Amazon's Fulfillment Center in Ruskin opened in September 2014 and has more than doubled its workforce, from 1,000 full-time employees to more than 2,500. Amazon's two Fulfillment Centers in Florida are the most technologically advanced in the Amazon fleet of 11, and each is about the size in square footage of 28 football fields. In Lakeland, Amazon ships larger orders like televisions and kayaks, while in Ruskin, Amazon ships smaller items like toys and books. Given the size of these two facilities, in September 2015 Amazon based one of its widebody jets at Tampa International Airport to connect these fulfillment centers with others around the country. Besides its two Florida Fulfillment Centers, Amazon operates two "sortation" centers; one in Davenport and one in Miami.

3.2.3 FedEx Corporation

FedEx Ground Shipping Services built a distribution center of more than 300,000 square feet in Davenport, Florida. The facility created 160 new jobs as of May 2016, and is designed to work in concert with the fulfillment center Amazon completed in 2014 in Lakeland.

FedEx Ground is also expanding services up the I-75 corridor. In 2015 FedEx Ground Package System Inc. constructed a hub facility in the Ocala/Marion County Commerce Park. The project is expected to bring 165 full-time equivalent jobs to Ocala. The distribution center was initially planned to be 383,161 square feet. The fully built-out distribution center, however, will measure 630,000 square feet. It is east of I-75 and north of U.S. 27 off Northwest 35th Avenue. Ultimately, the facility will include six buildings: the distribution center, a vehicle maintenance building, a gateway building, a truck wash and two gate houses.

3.2.4 Walmart

Slated to open in 2016, Walmart is building two fulfillment centers dedicated to shipping online orders. Walmart selected the Majestic I-4 Distribution Center Park, located near the intersection of I-4 and Highway 27 in Polk County, as the site to build the two centers. The first facility will be just under 1 million sq. ft., will employ more than 500 associates, and house smaller products such as iPads, PS4 gaming systems, apparel, toys and more. Walmart's second facility will be a 1.2 million sq. ft. building

that will employ more than 125 associates and will house oversized items such as large electronics, select home products and exercise equipment.

3.3 Logistics for a Greying Florida

Florida's aging population is one of the key social challenges facing the logistics industry within the state. Today, nearly one quarter of the population in Florida is above 60 years old. The current population of Florida residents in this age bracket is approximately 5 million, and it will rise to 9.5 million by 2030. This growing demographic segment will increase demand for new logistics channels within metropolitan and rural areas. Specialized logistics services that cater to the needs of aging Floridians could include scheduled, temperature-controlled delivery of medicines to homes, and preventative care. Florida's future seniors will be in-tune digitally and will be ordering healthcare services and goods online and less reliant on conventional trips to a pharmacy and retail outlets.

3.4 Air Cargo Surface Transport Competition – Roadways

Air cargo demand is generated off airport by manufacturers, agricultural centers, businesses, and healthcare providers. The trucking industry is vital in providing connectivity to and from the airport for these industries. As a result of increased air cargo security measures and improvements in cargo tracking information technologies, trucking companies have gained a larger share of shipments once transported by air. Both passenger and dedicated cargo airlines use trucking, known as road feeder service (RFS), as a supplement for aircraft cargo services. RFS is commonly used by both domestic and international airlines. Some domestic heavy-weight integrated carriers such as Menlo, a division of UPS, also rely on this alternative. Among the largest national suppliers of RFS are Forward Air (which recently acquired Towne Air Freight), Alliance Air, Expeditors International, and CH Robinson.

Less-than-truckload (LTL) companies have also become major competitors to air freight and enjoy a significant cost advantage because of lower capital costs for equipment and lower wage scales. Some of the larger LTL companies competing for time-definite shipments include YRC Freight, XPO Freight, Old Dominion Freight Line, Estes Express and FedEx Freight (which is separate from FedEx Express). LTL companies also operate using a hub-and-spoke system similar to the integrated express carriers in which several banks of trucks arrive and depart daily. The key to LTL expansion into traditional air cargo markets is not increased speed of delivery, but time-definite delivery; a service once exclusively in the domain of the integrated express carriers.

3.5 Air Cargo Modal Shift to Surface Transport Competition – Maritime

The airfreight sector has been a big beneficiary of the globalization of the cut-flower sector, as fertile soils, warm climates and low labor costs turned countries such as Colombia and Ecuador in South America, and Kenya and Ethiopia in Africa, into major flower producers. As a result, Miami International Airport (MIA) processes and clears more cut flowers than any other airport in the United States. Flowers represent one of MIA's top import commodities and it is there that 85 percent of imported flowers arrive in the United States, in freighter aircraft as well as the bellies of passenger planes. **Exhibit 3-3**

depicts the highly-orchestrated process of transporting flowers through the airport to their final destination.

Exhibit 3-3: Flower Logistics at MIA



Source: MIA, CDM Smith analysis

The business of transporting fresh-cut flowers from field to consumer is shifting slightly, with more blooms taking maritime transport by sea from South America instead of being transported by air. Global cut-flower sales approached \$14 billion last year and most move by cargo plane, but high jet-fuel costs and improvements in chilling technology are prompting a shift to more ocean shipping, particularly for imports to Europe. About 15 percent of total cut flower exports from Colombia are shipped by sea.²⁵ Costs of ocean transport, on a per unit basis, can be half those of airfreight. This is an important consideration for price-conscious supermarkets and florists. Proponents say certain roses, carnations and other hearty varieties show no ill effects from the sea voyages spent in refrigerated containers a degree or two above freezing.

²⁵ https://www.rabobank.com/en/images/World_Floriculture_Map_2015_vanRijswick_Jan2015.pdf

3.6 Competing Air Cargo Suppliers

As presented in a previous discussion there are a number of competing air cargo sectors that make up the entire industry. This section of the report provides detail on the business models for each air cargo sector from a competitive perspective and discusses the symbiotic relations between these sectors since they often rely on each other for transport of their customer’s shipments.

3.6.1 Integrated Express (FedEx Express, UPS, TNT Express, and DHL)

Integrated express operators move the customer’s goods door-to-door, providing shipment collection, transport via air/truck, and delivery. Dominant worldwide integrated express operators include FedEx Express, UPS, TNT Express, and DHL,²⁶ with FedEx announcing plans in April 2015 to acquire TNT Express. The acquisition, approved by the European Commission in January 2016, is expected to close in mid-2016 and will significantly expand FedEx’s market share in Europe and South America.²⁷ Express companies provide next-day and deferred, time-definite delivery of documents and small packages (two to 70 pounds), but with bankruptcies of heavy cargo carriers such as Kitty Hawk and the merger of Menlo and UPS, the integrators are increasingly transporting heavy freight (over 70 pounds).

Integrated express operators utilize a hub-and-spoke transport model, similar to passenger airlines. The air cargo hub used for package sortation and aircraft transfer is the backbone of integrated express operators. This allows for total product connection to each market in the operator’s system. Each day of operation, flights from around the world arrive at the hub, where packages are unloaded, sorted by destination market, and then loaded onto outbound aircraft. Integrators often make heavy use of automated sorting at their hub terminals in order to achieve desired turnaround times and delivery commitments. The automated sorting complex at UPS’ Worldport Hub in Louisville, Kentucky, sorts 7,000 packages per minute.²⁸

3.6.2 Regional Air Cargo Carriers (Ameriflight, Air Cargo Carriers, Wiggins Airways, and Mountain Air Cargo)

Regional air cargo carriers operate smaller turboprop aircraft between origin-and-destination (O&D)/ local market stations and smaller, or more remote, cargo markets. Typically, this is in support of a larger integrated express cargo operator such as FedEx, UPS, or DHL. Wiggins Airways, Mountain Air Cargo, and Air Cargo Carriers are examples of contracted “feeder” airlines. Feeder flights often transport cargo from a smaller market and feed cargo to an awaiting

Exhibit 3-4: Ameriflight Beechcraft 1900



Source: Wikimedia Commons

²⁶ DHL’s U.S. domestic pickup and delivery service was discontinued in January 2009

²⁷ http://www.logisticsmgmt.com/article/fedex_acquisition_of_tnt_receives_unconditional_approval_from_european_comm and http://www.ioc.com/air-cargo/express-cargo/fedex/fedex-tnt-deal-set-boost-duo%E2%80%99s-latin-american-footprint_20150407.html

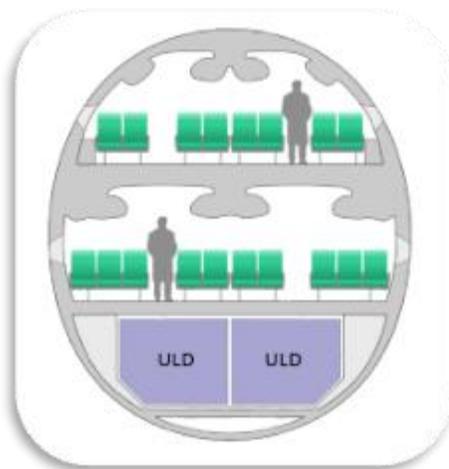
²⁸ <http://gizmodo.com/inside-the-automated-ups-complex-that-sorts-7-000-packa-1705368971>

cargo jet bound for the carrier’s hub. Feeder aircraft may also fly directly to a hub. Ameriflight is a regional cargo carrier not affiliated with any larger airline, providing custom and time-critical contracted charter flights moving air freight from point-to-point. **Exhibit 3-4** shows an Ameriflight Beechcraft 1900 at Los Angeles International Airport.

3.6.3 Passenger Airlines

Many passenger airlines provide cargo services to shippers by offering capacity in the belly compartment of available aircraft. Passenger baggage has a higher priority than freight but many narrowbody and widebody passenger aircraft have additional capacity to accommodate cargo in addition to baggage. Passenger airlines with widebody aircraft utilize cargo containers, or ULDs, as depicted in **Exhibit 3-5**, which shows a cross section of an A380 aircraft fuselage.

Exhibit 3-5: ULDs in the Lower Deck Belly Compartment of a Widebody A380 Passenger Aircraft



Source: Wikipedia

Delta Air Lines and Southwest Airlines are examples of passenger carriers that sell belly compartment space for cargo. Passenger airlines have limitations in the size of cargo they accept since they face capacity restrictions because of the combined services they offer, the size of cargo doors and belly compartment payload capacity, and airframe limitations. However, these airlines can provide the industry with air cargo transport flexibility in the form of frequent flights to a wide range of destinations. Moreover, in the case of Southwest, they use the same gauge of aircraft throughout their system, providing continuity in aircraft-to-aircraft transfers. Such service capability reduces the chances of the cargo being bumped from a flight.

Air cargo services provided by passenger airlines vary in scope and size from airline to airline, based on the type of aircraft operating within their fleet. A regional airline, with a fleet of turboprop and regional jets, cannot accommodate bulky cargo due to limited cargo capacity in baggage compartments. Airlines operating widebody passenger aircraft often have containerized lower decks and are capable of handling larger shipments. Passenger airlines generally provide airport-to-airport service, with freight and mail carried as “belly” cargo. Freight on passenger airlines is dropped off at a warehouse at the origination airport by the shipper (or freight forwarder); the freight is then picked up at the destination

airport by the customer (or freight forwarder) after arriving on the passenger airline. See **Appendix B** for a list of the leading freight forwarders worldwide, and the top 25 air cargo carriers.

3.6.4 Combination Aircraft Carriers

Aircraft that are designed to carry either passengers (as an airliner) or cargo (as a freighter) are referred to as “combi” aircraft. Airlines with this type of aircraft in their fleet are considered combination aircraft carriers. Carriers operating this type of aircraft include Cathay Pacific, Emirates, Alaska Airlines, Asiana, KLM, and Lufthansa. For example, Alaska Airlines operates a combi version of the Boeing 737-400 (see **Exhibit 3-6**), used primarily to service airports in Alaska and the Pacific northwest. At the international level, Asiana Airlines continues to operate B747-400 combi aircraft, which allow ULD containers and pallets to be loaded onto the rear portion of the main deck through a large cargo door while passengers travel in the forward portion of the main deck.

Exhibit 3-6: Alaska Airlines Boeing 737-400 Combi



3.6.5 Aircraft, Crew, Maintenance, and Insurance Charters

The air cargo industry also uses charters operating under an arrangement referred to as an “Aircraft, Crew, Maintenance, and Insurance (ACMI)” contract – or wet lease –to provide cargo services on a scheduled basis or ad hoc operation. Under an ACMI contract, one airline or aircraft operator (the lessor) provides an aircraft, crew, maintenance, and insurance (hull and third party liability) to another airline or aircraft operator (the lessee) to carry the latter’s cargo on its schedules and to its destinations. The advantage of ACMI charters are that lessees can expand their capacity and capitalize on the air freight market without taking on exposure to fluctuations in the value of owned aircraft or a long-term commitment related to crews and maintenance. Under such an arrangement, the lessee assumes marketing and direct operating expenses, including fuel, cargo, and landing fees. Examples of ACMI charter operators include Polar Air Cargo and Southern Air. **Exhibit 3-7** shows a Southern Air Boeing 777F contracted to DHL departing Los Angeles International Airport.

Exhibit 3-7: Southern Air Boeing 777F



Source: Wikimedia Commons

3.6.6 Heavy Lift Cargo Freighters

Heavy lift cargo freighters are operated by charter cargo airlines such as Volga-Dnepr Airlines and Antonov Airlines, providing specialized heavy lift operations with their fleets of Antonov AN-124 (see **Exhibit 3-8**) and AN-225 aircraft, respectively. Limited numbers of these aircraft exist since they are some of the largest aircraft in the world. Therefore, operations are typically highly specialized charters and are seldom done on a scheduled basis. These carriers transport goods and equipment for businesses and governments. Florida has seen operations of the AN-124 at the Tampa International Airport where it was recently used to transport a flight simulator to a military base in Denmark. It was also used in January 2016 to deliver a replacement engine for a British Airways A-380 at the Miami International Airport. This type of cargo operation is commonly referred to in the industry as “project cargo.”



3.6.7 Specialized Operators

Specialized air cargo providers have unique capabilities to carry freight that is oversized/bulky or freight related to a specific industry. Aircraft such as the Aero Spacelines Super Guppy, Boeing DreamLifter, and Airbus Beluga are able to haul oversized items that are not extremely heavy (typically aircraft parts). Limited numbers of these aircraft exist, as operations are highly specialized.

Quest Diagnostics, a medical diagnostic testing and information services firm with its own fleet of aircraft, provides transport service for medical laboratory test samples, medical materials, and equipment. These include aircraft customized to carry time- and temperature-sensitive items. **Exhibit 3-9** shows a Quest Diagnostics Embraer Phenom 300.

Exhibit 3-9: Quest Diagnostics Embraer Phenom 300



Source: Flickr.com

3.6.8 All-Cargo Carriers

All-cargo carriers operate airport-to-airport air cargo and freight services for their customers but do not offer passenger service. All-cargo carriers include Polar Air Cargo, Atlas Air, and Kalitta Air Cargo, to name a few.

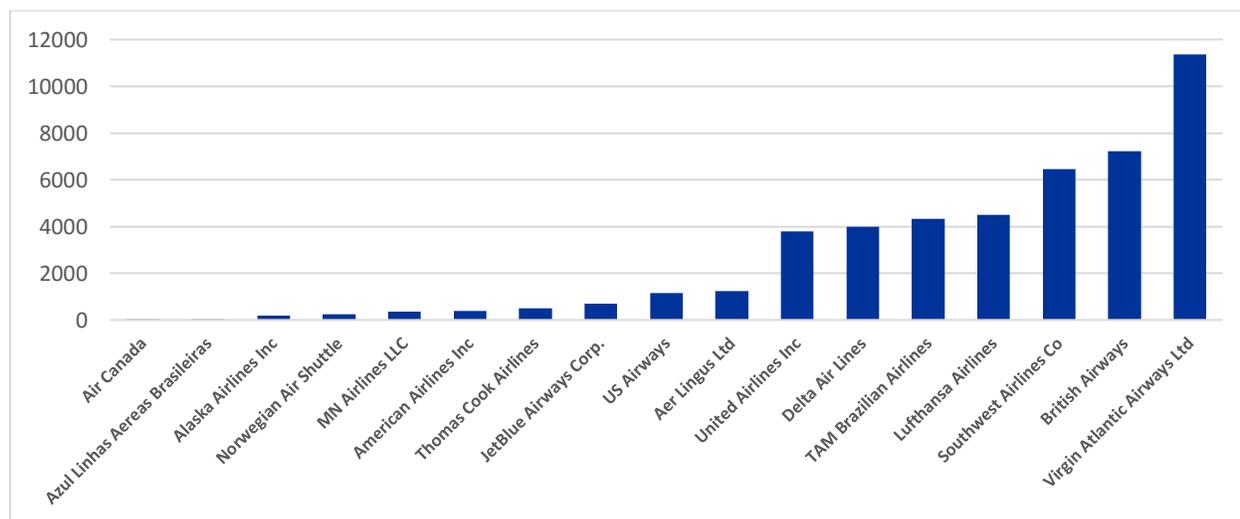
3.7 Air Cargo Competition – Market Share Analysis

Many airports in Florida, but not all, provide statistics related to monthly and annual air cargo traffic volumes. This data is typically provided in aggregate combining all carriers’ activity as well as specific traffic volume by air carrier. Trucking information is not provided nor is information related to cross docking, or truck-to-truck air cargo transfers. The following is an analysis of one Florida airport’s air cargo market share.

3.7.1 Case Study: Air Cargo Market Share Report for Orlando International Airport

The Greater Orlando Airport Authority presents air cargo volumes for Orlando International Airport on a monthly and annual basis. These statistics provide a break out of air cargo market share by carrier, both passenger and air cargo. Analysis of this data provides a snapshot of the cargo handled by carriers which provide air cargo services and the competitive aspect of the sector. **Exhibit 3-10** identifies air cargo for 2014 and presents them in rank order for passenger airlines reporting cargo tonnage. As presented in the graph, Virgin Atlantic carried the most cargo measuring nearly 11,400 annual tons, which translates into approximately 62,500 pounds per day. The second greatest amount of cargo carried is attributable to British Airways with just over 7,200 tons for the year. Southwest Airlines ranks third in passenger carrier tonnage and is notable since it does not operate widebody aircraft at Orlando International. United, Delta, TAM and Lufthansa all transported air cargo tonnage in the 4,000 annual tons range. The remaining carriers transported less than 1,500 annual tons at MCO. Foreign carriers comprise 63 percent, 27,400 tons, of all cargo transported by passenger airlines and is indicative of the airport’s international connectivity.

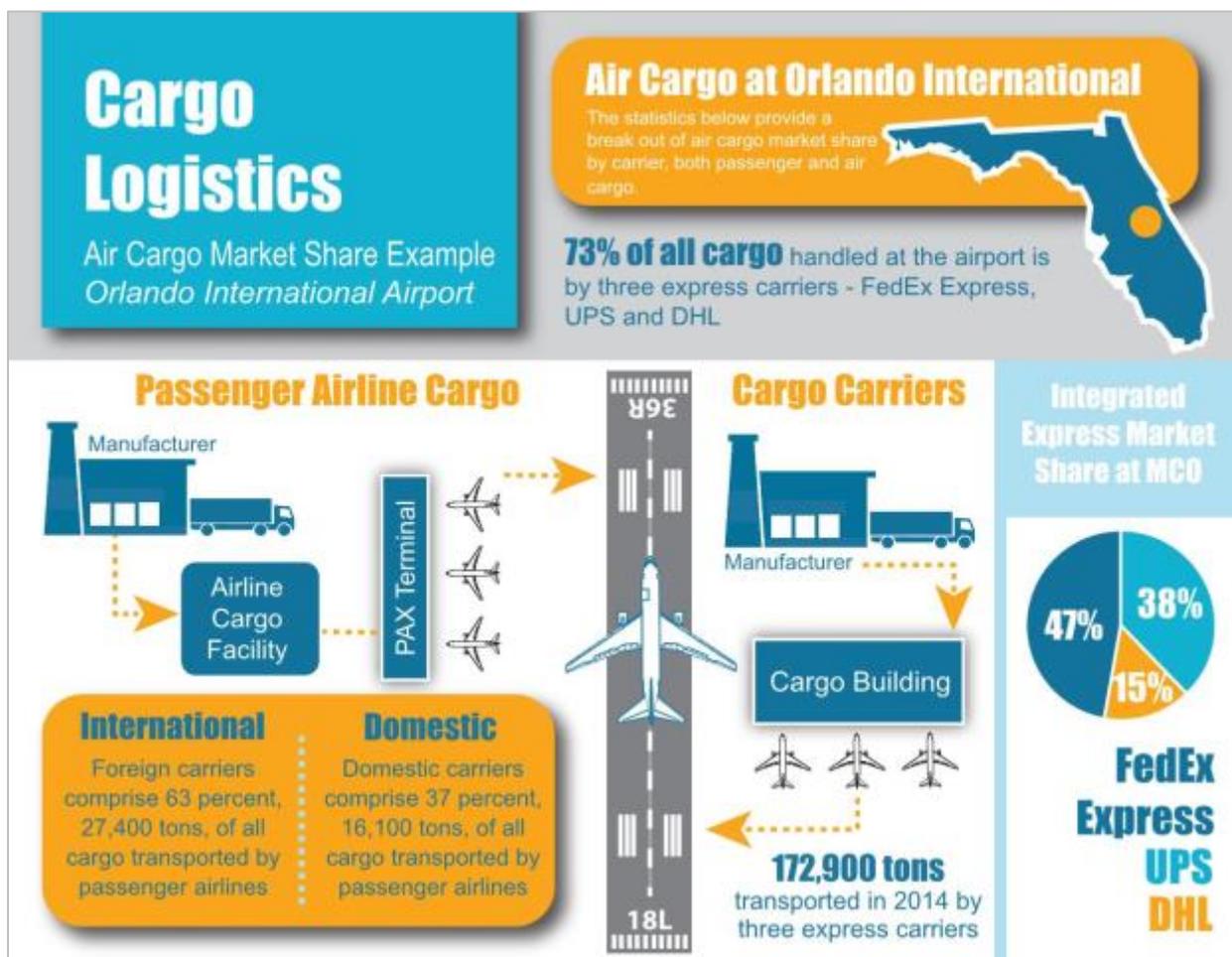
Exhibit 3-10: Passenger Carriers 2014 Air Cargo Tonnage for Orlando International Airport



Source: GOAA, CDM Smith analysis

Three integrated express carriers operate at MCO and account for 73 percent of all cargo handled at the airport. Of the three, FedEx Express has the largest market share with 47 percent, followed by UPS which has a 38 percent share. DHL’s 15 percent share is entirely international air cargo since the carrier does not transport U.S. domestic air cargo. **Exhibit 3-11** identifies the share of each integrator. Total tonnage for all integrated express carriers in 2014 was nearly 172,900.

Exhibit 3-11: Integrated Express Carriers
2014 Air Cargo Market Share for Orlando International Airport



Source: GOAA, CDM Smith analysis

3.8 Interdependent Relations Within the Air Cargo Industry

While the industry is very competitive there are many cooperative relationships within it as carriers buy cargo space on aircraft from a competitor when demand or network capacity shortages warrant. In the last 10 years, trucks and cargo aircraft have formed increasingly interdependent relationships. For example, as regional passenger jet service grew more popular with airlines that relied on smaller aircraft, trucks became a more cost-effective mode of transporting bulk express cargo between cities and airports. Additionally, forwarders preferred to use road services whenever possible for domestic cargo. **Exhibit 3-12** depicts the freight forwarding process as it is employed at Florida’s air cargo airports.

Exhibit 3-12: Florida Freight Forwarding Process



Source: CDM Smith analysis

Integrated express carriers also rely on competitors’ air cargo capacity. For example, DHL utilizes block space on a scheduled Lufthansa B747 out of New York’s JFK to Frankfurt every week night. A block space agreement is the purchase of an agreed capacity or space on another carrier. The arrangement could be “hard block” whereby the purchasing carrier has to pay for the space regardless of whether it is sold, or “soft block” where the purchasing carrier only pays for the space sold. Some integrated express carriers rely on specific routes of passenger carriers to transport domestic air cargo when aircraft in their fleet have mechanical issues. The United States Postal Service (USPS) also utilizes competitor’s aircraft.

In 2013, the USPS awarded FedEx Express a seven-year Air Cargo Network contract to provide domestic air transportation service for Priority and Express Mail. This is an extension of an existing contract with FedEx Express dating back to 2001. Based on estimated volumes the new agreement is valued at approximately \$10.5 billion over the seven-year term. While FedEx Express and the USPS compete for market share, the USPS realizes the value of FedEx network and fleet capabilities. The postal service also recognizes the value of having a consistent schedule and airport-to-airport transport capability. USPS’s greatest strength is in performing the last-mile of delivery to the customer while FedEx’s greatest strength is its hub-and-spoke airline network.

Chapter 4. ADDITIONAL FACTORS INFLUENCING THE AIR CARGO INDUSTRY

A wide variety of factors influence the air cargo industry ranging from public policy related to security screening to economic changes impacting all modes of transportation. As changes arise, the air cargo industry continuously monitors at the micro level (by individual market performance) as well as at the macro level (by monitoring global trends). Changes in aircraft size, airport selection, and trucking distance are often the result of on-going economic change. This section of the report focuses on specific factors influencing air cargo at the national, state, and local level.

4.1 Air Cargo Security Trends

Prior to the attacks of September 11, 2001, the focus of air cargo security revolved primarily around theft deterrence. Since then, the air cargo industry and air cargo related public policy has been focused on anti-terrorism security. The characteristics of air cargo shipments differ significantly from those of passengers checked baggage. For instance, air cargo does not follow the “typical” dimensions, commodities, weights, or volumes (i.e., number of pieces) encountered at baggage or passenger operations. Commodities transported by air range from automotive parts, electronics, pharmaceuticals, and fresh vegetables to various high value consumer commodities. Shipment weights range from less than a pound to several tons. Air cargo can be transported on dedicated freighter aircraft or in the cargo holds (“bellies”) of passenger aircraft, adding to the complexities of air cargo transportation.

4.1.1 Air Cargo Security Related to Passenger Aircraft

In the U.S., the Transportation Security Administration (TSA) is responsible for transport security, which includes air cargo. The legislation that mandates air cargo security regulations is the *Implementing the 9/11 Commission Recommendations Act* of 2007, also known as the 9/11 Act. The Act directed the Secretary of Homeland Security to establish a system to enable the industry to screen 100 percent of cargo transported on passenger aircraft at a level of security commensurate with that of passenger checked baggage. The legislation set interim milestones for the industry to screen 50 percent of all cargo shipped on a passenger aircraft by February 2009 and 100 percent screening by August 2010.

TSA implemented three programs to meet the air cargo screening goals. The first, narrowbody aircraft screening, became effective in 2008. This program required that all cargo on narrowbody aircraft must be 100 percent screened individually before it is netted, containerized, or shrink-wrapped. The second, the Certified Cargo Screening Program (CCSP), allows freight forwarders and shippers to pre-screen cargo. This effort can be cost-prohibitive for smaller operations since scanning equipment can cost between \$30,000 and \$100,000 (Morrell, 2011). The third program was international collaboration, which has been initiated with the European Union (EU), Canada, and Australia. By mid-2010 almost all domestic and outbound U.S. cargo on passenger services complied with the Act. TSA, along with Customs and Border Protection (CBP) and international partners, also developed risk-based targeting to increase screening of air cargo. Among the risk-based strategies that are being utilized is the Known Shipper Program. This program established an industry-wide Known Shipper Database (KSDB) for vetting all shipments placed on passenger aircraft. Shipments from parties that do not appear on the database

may not be placed aboard passenger aircraft, even if they are screened or inspected physically. This applies to inbound international, as well as domestic flights.

4.1.2 Air Cargo Security Related to Freighters

While there are currently no statutory or regulatory requirements mandating screening all cargo loaded onto cargo only aircraft, the industry has been proactive in developing internal processes and protocols for accepting and screening cargo prior to loading. The TSA extensively regulates aviation security through rules, regulations, and security directives designed to prevent unauthorized access to passenger and freighter aircraft, and the introduction of prohibited items, including firearms and explosives, onto an aircraft. Combi-carriers and all-cargo carriers operating freighter aircraft currently operate pursuant to a TSA-approved, risk-based security program which, carriers believe, adequately maintains the security of their personnel and aircraft in their fleets. These carriers work closely with the TSA to ensure that they have available security research and intelligence information to assist them.

Many carriers and trade organizations representing the industry indicate that any additional security requirements imposed by TSA or by the U.S. Congress will impose substantial costs on the carriers, thereby having a material adverse effect on freighter operations and customer commitments. To mitigate any such increase, carriers work closely with the Department of Homeland Security and other government agencies to ensure that a risk-based management approach is utilized to target specific “at-risk” cargo. This approach will limit any exposure to regulation that would require 100 percent screening of all cargo at an excessive cost to the industry.

4.1.3 Implications of Air Cargo Security Screening

Trucking air cargo from one airport’s market area to a competing airport may make economic sense for shippers if schedules can be met and airline freight tariffs are lower. In some instances, trucking to competing airports may be related to air cargo security screening. For example, anecdotal information indicates one carrier trucks cargo from Orlando to Atlanta where it is screened for security purposes then loaded onto aircraft. This international carrier in Orlando made a business decision to screen cargo for both the Orlando and Atlanta markets at ATL. This type of air cargo leakage is one of the most difficult variables to measure as a competing airport’s market area may entail a radius of 1,000 miles or greater. Another unknown variable is whether cargo is screened in Atlanta, trucked to Orlando in a secured trailer, then loaded onto an outbound international flight. The trucking industry also provides an alternative to air cargo shipments on domestic routes. Since air cargo must be screened prior to loading on passenger aircraft, trucking air cargo avoids costs and time delay, and enables them to theoretically capture a greater percentage of the market.

4.2 Logistical Outsourcing Trends

Retailers, manufacturers, and e-commerce distribution centers often rely on third party logistics providers in their overall supply chain strategies. The practice of outsourcing logistics suggests that companies whose core competencies do not include transportation are better served by vendors specializing in supply chain management. The advantages of outsourcing logistics are numerous but the primary benefits are reduction in staff related to transport, reductions or elimination of assets such as trucks and warehouse space, and reduced liabilities.

The scale of outsourcing will vary among e-commerce, brick-and-mortar retailers, and manufacturers. Some may choose to outsource their entire supply chain to a third party. For example, specialty foods retailer Omaha Steaks outsources their entire supply chain to UPS Supply Chain Solutions. Other businesses may use several supply chain providers such as DHL for international shipments and FedEx for domestic. Businesses may also choose to use only domestic trucking to serve a specific region of the country and avoid the higher cost of air cargo.

Logistics providers also have a wide scale of operations, fleet and modes of transport. DHL Global Forwarding is the largest air forwarder in the world with over \$32 billion in sales in 2014; moving over 4 million tons of cargo by air. Some forwarders fall into the specialized category with only a handful of employees and a few vehicles but providing air cargo services and customs brokerage on specific trade lanes such as Miami to Sao Paulo.

Outsourcing may also entail more than just transportation services. Some third-party vendors also provide warehousing, value added manufacturing, factory service repairs, fleet management, and customer support services. Much of the grocery, wholesale and clothing sectors have the most mature outsourcing practices, while pharmaceutical and healthcare operate with higher levels of in-house logistics provision.

One recent trend, however, is a shift toward partial outsourcing of supply chain logistics allowing the shipper to have greater control over the supply chain management. The Limited Brands, which includes retail outlets such as Victoria's Secret, and Bath and Body Works, charters its own aircraft lift from Asia to the U.S. Although the frequency of these operations is consistent, these flights are not scheduled routes but are charters. Most of the commodities carried inbound are apparel, primarily related to Limited Brands apparel distribution network which is based in Columbus, Ohio. Limited Brands charters the B747 aircraft to Rickenbacker International Airport (LCK), which is unusual since forwarders typically do this for shippers. Given the Limited's large scale of operations they break convention, as a shipper, and go directly to the airline with their transport needs.

Amazon.com is also entering the logistics industry with aircraft leasing Aircraft Crew Maintenance Insurance (ACMI) contracts with both Atlas Air Cargo and Air Transport Services Group. Amazon.com is also a major shareholder with these air carriers. This supply chain strategy will provide up to 40 widebody cargo aircraft to transport a large portion of products directly from its distribution center network and divert a significant portion of shipments away from third party providers such as UPS and FedEx Express.

4.3 Air Cargo Carrier Airport Selection

Air cargo carrier operations on airports are the result of a carrier identifying local demand for a cargo aircraft. Cargo operations initiation at an airport are the based on several demand scenarios:

- New market entry - trucks replaced by aircraft to expedite cargo traffic
- Carrier relocating an aircraft from one airport market to another for better service
- Demand for larger aircraft due to increases in cargo volumes

4.3.1 Air Cargo Carrier Operations - New Market Entry

When integrated express carriers' aircraft reach capacity on a regular basis they must make a decision as to the most economical means to increase the capacity. The choices range from trucking cargo to another airport where another fleet aircraft has additional capacity to increasing the size of aircraft currently scheduled in the market. Customer commitments may be impacted when trucking cargo to an airport outside the market since the truck operation moves up the cut-off times for afternoon package pickups. It may also increase package collection costs as additional couriers and vehicles may be needed to meet earlier customer package pickups. Another option is for integrated express carriers to add a new aircraft route to a nearby airport.

In 2012, FedEx Express initiated aircraft operations at Palm Beach International Airport (PBI). FedEx Express previously served the Palm Beach market area by trucking packages, parcels, and freight to FedEx aircraft at Ft Lauderdale/Hollywood International Airport. They replaced trucking cargo by adding an Airbus A310 routed to their global hub in Memphis. This route operates twice a day. As a result of adding a cargo jet at PBI the carrier discontinued the FedEx C208 operation at Vero Beach Municipal, since that market is trucked to-and-from PBI where cargo is loaded and unloaded onto the A310.

4.3.2 Air Cargo Carrier Aircraft Station Relocations

In October 2012, Louisville-based UPS Airlines relocated its regional sorting operation from Brookley Aeroplex at Mobile Downtown Airport (BFM) in Mobile, Alabama, to Pensacola International Airport (PNS). Based on discussions with UPS personnel, the purpose of the relocation was to better serve the region and provide operational cost savings. As part of the relocation, UPS transferred four of its own employees from Mobile to Pensacola, and GAT Airline Support, a contracted ground handler for UPS, transferred 28 part-time jobs from Mobile to Pensacola. The City of Pensacola provided UPS with a \$25,000 relocation incentive in return for infrastructure improvements made by UPS, according to published reports. UPS currently operates five weekly flights from Pensacola International using widebody Airbus A300-600 aircraft, which is shared with Southwest Georgia Regional Airport (ABY) in Albany, Georgia, both to-and-from UPS' Louisville hub. UPS previously had a month-to-month lease agreement for some 10 years at Mobile Brookley Aeroplex. FedEx Express continues to operate its regional sorting facility out of Mobile Downtown with over 21 flights per week.

In the late 1990s, DHL had one aircraft based at San Antonio International Airport (SAT) to serve both the San Antonio and Austin, Texas markets. The Austin market was served by trucking to and from SAT. Although San Antonio had a population 500,000 greater than Austin, DHL chose to relocate its aircraft to Austin Bergstrom International Airport since computer manufacturing giants - Dell, Samsung and Advanced Micro Devices - insisted on better morning delivery and evening collection cut-off times. Other airports have seen air cargo service enhancements as a result of customer need. In Lafayette, Louisiana FedEx obliged jewelry manufacturer Stuller Settings by placing a "spare" aircraft at Lafayette Regional Airport to support FedEx's primary aircraft in case of a mechanical issue. Many carriers such as FedEx and UPS place spare aircraft in certain regions of the country to quickly replace aircraft with mechanical issues within their region.

4.3.3 Air Cargo Carrier Operations – Demand for Larger Aircraft

When demand warrants, air cargo carriers will increase the size of aircraft operating in a market. For example, after Amazon.com built two distribution centers in 2011, one in Chattanooga and another in Charleston, Tennessee, and Volkswagen opened its assembly plant at an industrial park near the Chattanooga airport, air freight soared at that airport. Within 1 year air cargo rose 247 percent to over 11 million pounds. Prior to these two fortune 500 businesses expanding in Chattanooga, FedEx Express served the region with two small turbo prop air cargo aircraft, an ATR73 and a C208. Initially, FedEx Express replaced the two turboprops with a B727 which operated at the airport for less than a year. That aircraft was then replaced by a larger, and more fuel efficient, B757. The rapid cargo growth required airport officials to expand a cargo ramp on the south end of its main runway to accommodate FedEx, spending more than \$2.3 million.

4.4 Alternate International Air Cargo Gateways

For several decades some airport sponsors have made significant efforts to develop their airport into an alternate gateway for the “over capacity” Miami International Airport (MIA). While these efforts may have resulted in cargo related infrastructure improvements and increased market awareness of the airport’s cargo facilities, it often yields no additional freighter activity to the markets MIA or comparable airports serve.

There are several airports in the U.S. that have earned the reputation as operating as “alternate” gateways or “cargo” airports for the air cargo industry. These airports either marketed themselves heavily to the air cargo industry during the industry’s formative years (late 1980s and early 1990s), or they have locations in proximity to major distribution or production centers of time sensitive commodities. These airports and their “anchor” industries are shown in **Exhibit 4-1**.

Exhibit 4-1: Examples of Alternate Air Cargo Gateways

Airport	City	Anchor Industry
Rickenbacker International Airport	Columbus, OH	Apparel
Huntsville International Airport	Huntsville, AL	Automotive, Defense, Aerospace
Indianapolis International Airport	Indianapolis, IN	Pharmaceuticals

Source: CDM Smith

Airports pursuing development of freighter routes often argue that operations at their airport offer a less congested environment for cargo aircraft. While there are savings to operating in less busy airports, air carriers prefer dealing with congestion, as well as frequently higher airport costs and land rents, in order to locate where steady demand exists and profits can be maximized. Connectivity – sheer volume and diversity of frequencies, destinations, and carriers – is key to garnering consolidations that also attract competition in supporting vendors, such as ground-handlers and trucking. It is also important to point out that non-American air cargo carriers do not have comparable U.S. domestic networks, so they interline with U.S. passenger and cargo carriers and rely on allied service providers – extensively trucking – for interior transport. Therefore, the flow of international carriers from one gateway to another is unsurprising. Both cause and effect, this service superiority attracts shippers and forwarders whose demand supports even more service at the gateway.

Air forwarders rely on a mix of belly and freighter capacity. Consolidations gravitate to gateways where air options are greatest. Network offices merely feed those consolidations, mostly with trucks. Simply having a variety of forwarders in an area does not guarantee alternative gateways the critical mass required to support international operations. Local forwarder station managers have little autonomy in routings when the company must satisfy volume-dependent block-space guarantee agreements with passenger and freighter carriers at major gateways. As such, developing an airport as an alternative gateway is often an uphill battle since well-established gateway airports have considerable inertia – in the form of lift and supporting services - in their favor.

Keys to success for alternative gateway airports:

- *Sufficient Backhaul* – An airport’s market area must generate enough demand for an air carrier to arrive full and depart nearly full, or vice versa, to be economically sustainable.
- *Anchor Industry* – An anchor industry (or industries) which generates sufficient demand for air cargo services on a regular basis is required for an airport to gain regularly scheduled cargo aircraft. This may be a single customer, such as a pharmaceutical manufacturer, or a multitude of customers, such as aerospace and automotive manufacturers.
- *Air Forwarder Support* – Air forwarders act as “travel agents” for cargo shippers and arrange the transportation of air cargo to and from airports. As in the case at Huntsville, air forwarders recognized the need for consistent air cargo lift to Europe and coordinated scheduled freighters on a weekly basis which ultimately grew to daily departures and arrivals.

4.5 Panama Canal Expansion

After nearly a century in operation, the Panama Canal is undergoing a \$5.25 billion expansion to increase capacity and accommodate larger ships. The expanded canal with new locks will allow for deeper, longer and wider “New Panamax” vessels, doubling existing throughput capacity from 5,000 20-foot equivalent units (TEU) on current vessels to (potentially) 13,000 TEUs. The expansion, scheduled for completion in mid-2016, should reduce delays and shipper costs. The expansion of the Panama Canal will likely have some impact on future freight flows – the degree to which remains to be seen. Despite the potential gains for Florida ports, maritime freight has little to no connectivity with domestic air cargo as it is primarily transported on land via rail and truck. While the Panama Canal expansion will likely have little impact on air cargo flows in Florida, some international ports in other regions of the world do have limited maritime-to-air connectivity and are presented later in this document.

4.5.1 Port Preparation

Across the U.S., maritime ports have been working to expand their infrastructure in anticipation of accommodating greater cargo volumes as a direct result of the Panama Canal expansion. This means ensuring ports have a 50-foot channel depth and turning basin, larger cranes, larger docks, and corresponding vertical bridge clearances. The Ports of New York/New Jersey, Philadelphia, Charleston,

Savannah, Mobile, and New Orleans are all upgrading their facilities in hopes of attracting the large ships that were previously only seen at West Coast ports.²⁹

West Coast ports, such as Los Angeles, Long Beach, Oakland, and Seattle, currently receive the majority of cargo that originates in Asia. Much of the cargo destined for the Midwest, East Coast, and Gulf Coast is transported by a rail/truck land bridge. Approximately 40 percent of goods clearing the Port of Long Beach are destined for interior markets.³⁰ This traffic is called Interior Point Intermodal (IPI) and is typically distributed on double-stacked container rail cars into regional distribution facilities where they are unpacked and trucked to their final destination. These western ports and land bridge railroads have also been working on improving their capacities in hopes of mitigating loss of market share.

Presently, imports/exports between Asia and a majority of the U.S. are slightly faster via West Coast ports and an intermodal land bridge. It is estimated that the cost of transporting a 20-foot container from Hong Kong to the Eastern U.S. through a Los Angeles port, then by intermodal transport is approximately \$3,500. After the Panama Canal expansion, the cost of shipping the same container through the Canal on a New-Panamax vessel directly to the east coast is anywhere from \$250 to \$1000 less per container.³¹ Therefore, one passage through the expanded Canal could save upward of \$8 million.³² The major drawback is time, as the transit time of an all-water route from Asia to the Eastern U.S. would add at least one-week to the current land-bridge route. The bottom line is that third party logistics agents and operators will look for the lowest cost options, and shippers ultimately control the supply-chain decisions that influence the use of the Panama Canal and U.S. transportation infrastructure.

In Florida, Ports of Miami, Jacksonville, Tampa, and Port Everglades, among others, have invested \$2.6 billion in infrastructure improvements in anticipation of the Panama Canal expansion. These investments include channel deepening, dockside rail, larger cranes, intermodal transfer facilities, and a truck tunnel bypassing downtown Miami. As the nearest U.S. deep-water port to the Panama Canal, Port Miami is particularly optimistic that its geographic advantage and strategic investments will translate to increased cargo volumes.

Opinions differ as to the scale to which cargo will increase for East Coast ports. Some industry experts expect a couple million TEUs to shift to East Coast ports; however, it will be divided among numerous ports along the East and Gulf Coasts, minimally impacting each individual port.³³ This shift will also likely occur gradually, as carriers have already been shifting routes eastward for several years as a result of labor and congestion issues at West Coast Ports. Shipping to most U.S. regions is both quicker and more cost effective through West Coast Ports than through the Panama Canal. Canal expansion will narrow the cost gap between coasts, but the decision to shift cargo from one side of the country to the other involves a complex calculation of everything from proximity to population centers, fuel costs, and time.

²⁹ <http://businessfacilities.com/feature-story-racing-to-be-ready-u-s-ports-prepare-for-post-panamax-era/>

³⁰ <http://midamericafreight.org/2011/03>

³¹ <http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/5201/MP-Brandon%20Morrison-FINAL.pdf?sequence=1>

³² Calculation assumes a post-panamax vessel carrying 8,000 TEU, with savings of \$1,000 per TEU. Comparatively, assuming the lower estimate of savings per TEU (i.e. \$250), a post-panamax vessel would still save \$2 million.

³³ <http://www.miamiherald.com/news/business/biz-monday/article2197067.html>

The timing and scale of the impacts on Florida freight flows are unknown but it is anticipated that there will be some change in the demands on transportation networks, service, and operations. However, due to the high-value, time-sensitive, and lightweight nature of air cargo, the Panama Canal expansion will likely have little impact on air cargo flows in Florida.

4.6 Near Shoring

Some of the world’s largest companies have joined a steady stream of smaller companies in a concept known as near-shoring – moving operations to nearby countries. More U.S. businesses are opting to return manufacturing processes to North America from overseas in response to reduced cost advantages of manufacturing in low-cost countries as well as changes in supply chain management. An expectation of faster and more direct delivery of goods by the consumer as well as supply chains becoming more complex, are driving U.S. businesses to start strategizing for near-shoring. Near-shoring allows businesses to streamline their distribution processes so that they are leaner, more efficient, and more collaborative. However, increased investment in freight transportation infrastructure in the U.S., as well as Florida, will be needed to improve these supply chains. As manufacturing centers continue their shift to North America, Florida’s air cargo networks will likely adapt to accommodate the shift; however, the growth in air cargo traffic due to near shoring will be relatively minor and any additional stress on airport infrastructure will be negligible.

4.6.1 Back to North America

As the world economy grew more interconnected through the process of globalization, it became increasingly prevalent for corporations to capitalize on disparities in currencies and labor costs between developed and developing countries. This method, known as “offshoring,” involves relocating one or more business processes – typically an operational process such as manufacturing, accounting, administrative services, or technical support – to developing countries, primarily those in Asia and Southeast Asia. The corporations that employ offshoring can significantly lower manufacturing costs, resulting in a positive effect on their bottom lines.

In recent years, however, a trend in the opposite direction has been emerging where companies are moving some or all of their offshored processes back to North America. For American (and some European) companies, Mexico has been the primary target of this process. U.S. Companies have grown increasingly frustrated with the rising costs of labor, unwieldy natural disasters, high transportation costs, and higher risks associated with basing processes in Asia. In China, a shifting economic landscape including increasing salaries, currency appreciation, and property rights issues (including intellectual property security) are some of the motivating factors behind the nearshoring trend.

Mexico and Central America are attractive to U.S. companies due to relatively low wages, availability of skilled labor, and proximity to the U.S. Ford Motor Company, General Electric, and Apple are just some of the major companies that have moved operations either back to the U.S. or to Central America. As a result, Mexico’s industrial sector is thriving:

- It is the world’s fourth largest producer of light vehicles,
- It has a growing aerospace industry, and

- It is a major supplier of appliances (refrigerators, washers/dryers, air conditioners) and electronics including cell phones, pharmaceuticals, medical devices, power systems, and a variety of consumer products.

Mexico is now home to 21 vehicle assembly plants from 9 major automotive manufacturers.³⁴

4.6.2 Key Drivers

Mexico's location provides numerous other advantages in cost savings and quality control. Most of Mexico is in the U.S. Central time zone, meaning that communication is easier and travel to Mexico is only a few hours away by air. The language barrier is also less of a challenge, with strong English proficiency down through middle management levels in Mexican industry. Transportation costs are lower due to shorter shipping transit times. For example, products from Guadalajara can reach Dallas in 22 hours by truck versus 19 days from China by a boat, rail, or truck combination. Inventory turns are improved as shorter supply chains translate to less inventory in the delivery pipeline, which enables orders to be placed closer to the customer's need date. Products are then more likely to sell at full price. With production closer to the final delivery point there are fewer transfers, thereby fewer potential delays. Longer supply chains are more susceptible to disruptions (natural or manmade).

It is for these reasons that nearshoring by western corporations has accelerated in recent years. Mexico is not the only benefactor of nearshoring, but it is the most prominent example. The U.S. and Canada have also seen reinvestment and reestablishment of business processes previously based in Asia. An independent Mexican think tank predicts that 54 percent of major transnational corporations will be moving their production to the U.S. and neighboring countries through the next five years.³⁵

In recent years, Florida's business friendly climate has resulted in a significant number of manufacturing expansions or relocations to the state. These manufacturing expansions include biotech, telecommunications, automotive parts, and many other high-tech industries. Florida's infrastructure assets enable Florida manufacturers to easily bring in its raw materials and move its finished product to market.³⁶

4.6.3 Effect on Florida's Freight System

The effects of nearshoring on Florida's freight system are largely unknown. However, it can be speculated with a reasonable degree of certainty that an increase in Mexico's manufacturing output of goods destined for U.S. would lead to a corresponding increase, or at least a shift, in the patterns by which those goods are moved within the U.S. The most obvious candidates to see an increase in utilization are Florida's highway and rail infrastructure. The finished goods already produced in Mexico are transported primarily by rail and truck. An increase or shift in the output of these goods would further exacerbate existing U.S. highway and rail capacity constraints and create new bottlenecks. Without further investment, added usage would accelerate the deterioration of the aging highway infrastructure. In terms of rail lines, Southern Mexico has better connectivity to the Gulf Coast of the

³⁴ <http://www.naftanext.com/nafn14/>

³⁵ <http://www.naftanext.com/nafn14/>

³⁶ <https://www.manufacturingindustryadvisor.com/manufacturing-on-the-rise-in-florida/>

U.S. Northern Mexico’s rail lines are better connected to the Western U.S. and are less flexible in accommodating goods bound for the eastern half of the U.S.³⁷

Florida’s major air cargo players are also likely to see upticks in traffic generation from nearshoring. Aerospace assembly plants frequently require rapid delivery of high-value, time-sensitive parts and tooling. These deliveries are often accomplished via air freight. The growth of the aerospace sector, as well as other finished goods manufacturing capacity in Mexico, lends itself to potential increases in volumes seen at Florida’s major air cargo airports. As stated above, these increases are expected to be relatively minor and any additional stress on airport infrastructure will be negligible.

4.7 West Coast Maritime Port Issues Impacting Air Cargo – Case Study

As the global shipping industry has evolved, shippers have undertaken several strategies to adapt. Many West Coast ports have undertaken cost-cutting strategies such as forming carrier alliances, using larger ships, and outsourcing the management of truck trailer services. These changes resulted in longer unload times per ship and persistent port congestion, which ultimately led to a protracted labor strike by port longshoremen. These issues had a far-reaching impact on the entire supply chain of goods moved around the world and throughout the country, forcing companies to turn to air cargo to move their products.

4.7.1 Overview

Persistent shipping delays due to extended cargo ship backlog were experienced at many West Coast ports, but were felt most prominently in late 2014 and early 2015 at the Ports of Los Angeles and Long Beach. These are the two busiest U.S. container ports by volume and together account for 40 percent of U.S. inbound container cargo. The port gridlock started with a surge in imports that led to the use of mega-container ships. These mega ships carry containers from many different carrier lines, and the higher volume of mixed-line containers overwhelmed the docks.

Shipping companies outsourced the management of truck trailers in lieu of providing their own, which led to truck drivers going on hours-long “goose chases” to find the appropriate trailer and container. Worker frustration as a result of these infrastructure issues ultimately led to labor conflicts, including a months-long contract dispute between the shipping companies and the International Longshore and Warehouse Union. Shipping companies accused the dockworkers of staging a work slowdown to gain leverage in contract talks, while the union blamed the employers for failing to train enough crane operators to handle the higher workloads. Compounding the issue, maintenance of the newly outsourced trailer equipment was also a point of contention during contract talks.

The cargo backlogs created by these issues caused shipping companies to cut back on the rate of ship unloading by eliminating night shifts and the majority of shifts during President’s Day weekend to prevent overcrowding on already congested docks. This resulted in a steep drop in cargo container throughput at many West Coast ports. Import data for January and February of 2015 show an 18 percent drop in container volume arriving into West Coast ports when compared to the same period in

³⁷ http://www.al.com/business/index.ssf/2013/10/auburn_university_students_res.html

2014. Meanwhile, cargo arriving into East Coast ports increased by 10 percent. The ports of Los Angeles and Long Beach both saw declines of about 20 percent while the ports of Savannah and New Orleans saw increases of 20 percent and 52 percent, respectively. During those two months, the Port of New York and New Jersey imported more container cargo than the Port of Long Beach for the first time in a decade.

East Coast ports weren't the only beneficiaries of the West Coast port issues. Air Cargo carriers also saw an uptick in demand as businesses reliant upon West Coast ports, such as retailers and manufacturers, were forced to find workarounds for their shipments. Businesses on both sides of the Pacific clamored for space on air cargo freighters and in the bellies of international passenger jets. November 2014 air cargo shipments from the Asia-Pacific region to North America increased 17 percent from the previous year, with yields improving 9 percent. In one instance McDonald's turned to air cargo to ship nearly 3,000 tons of French fries to restaurants in Japan that could no longer wait for the West Coast ports. In another case, all-cargo carrier Kalitta Air saw a 1,479 percent increase in air cargo tons into and out of Rickenbacker International Airport in Columbus during February 2015 versus February 2014.

Many other companies such as Lululemon Athletica, Nissan, Honda, Subaru, Ann Taylor, and Chico's reportedly took similar measures to get goods in and out of the U.S. The need for the product simply outweighed the increased cost of transport. The demand for air cargo capacity and lower fuel prices led some air cargo carriers to reutilize older aircraft such as MD-11s and 747-400s that were idle or retired. UPS also offered U.S. customers a sea/air product shipment option where cargo is transported via ocean to the Dubai hub and then transferred to an aircraft for the second leg of the journey. UPS Preferred multimodal freight services has previously offered a sea/air option for shipments to Europe and Latin America. This product offering could have an impact on air cargo flows at Florida airports.

The dramatic drop in cargo at West Coast ports was temporary, but container flow through terminal yards will still be constrained by the pre-existing, systemic problems that originally led to the issue. For this reason, it is likely that some volumes of container flows have shifted away from West Coast ports permanently, and the soon-to-be complete Panama Canal expansion will likely continue to alter patterns of global trade. It is also possible some shippers and importers grew accustomed to the benefits of air cargo and have permanently shifted products to this mode. It is difficult to pinpoint the impact of this issue on Florida's air cargo system, but it is possible that there were marginal increases in air cargo throughput at the state's larger hub airports.

Chapter 5. AIR CARGO ISSUES RELATED TO OTHER FDOT PLANS

The issues and trends affecting airports and air cargo in the state have been investigated and addressed in a number of other Department studies and planning efforts. This section will identify ongoing and recently completed FDOT planning efforts that impact aviation and air cargo. As air cargo operations do not occur in isolation, it is important to understand the transportation and community issues surrounding airports. The issues and trends facing aviation air cargo may be divided into two categories,

- 1) those occurring outside the actual airport but with potential to affect it, and
- 2) those occurring within the airport.

The plans examined in this section contain policies addressing both categories.

5.1 Freight Mobility and Trade Plan Issues and Bottlenecks

The creation of the Freight, Logistics and Passenger Operations (FLP) Office at FDOT began an emphasis on freight affecting many of the Department's operations and programs. One of the initial efforts of the new office was the development and implementation of the Florida Freight Mobility and Trade Plan (FMTP). The FMTP was developed in accordance with both Florida state law (Section 334.044(33) F.S.) and the Moving Ahead for Progress in the 21st Century Act (MAP 21), Public Law 112-141. The FMTP includes a policy and an implementation element.

A large part of the effort to develop the FMTP centered on outreach and stakeholder involvement. Stakeholder outreach efforts included six regional listening sessions, a Florida Freight Leadership Forum, three Business Forums, and public comments obtained through a project website as well as other efforts of outreach. At the conclusion of these outreach efforts, over 750 members of the freight industry and FDOT agency partners provided process input. The result of this outreach provided FDOT with a clearer understanding of the needs of the freight industry in Florida and guided the Department's focus in developing freight objectives.

The FMTP Policy Element was adopted in June 2013 along with an Implementation Guide that assigns responsibilities for implementation to the various FDOT Offices. The Policy Element contains seven objectives designed to help guide policy and investment decisions. (**Exhibit 5-1**)



Exhibit 5-1: The Seven FMTP Objectives

FMTP OBJECTIVES

- 1** Capitalize on the Freight Transportation Advantages of Florida Through Collaboration on Economic Development, Trade, and Logistics Programs
- 2** Increase Operational Efficiency of Goods Movement
- 3** Minimize Costs in the Supply Chain
- 4** Align Public and Private Efforts for Trade and Logistics
- 5** Raise Awareness and Support for Freight Movement Investments
- 6** Develop a Balanced Transportation Planning and Investment Model That Considers and Integrates All Forms of Transportation
- 7** Transform the FDOT's Organizational Culture to Include Consideration of Supply Chain and Freight Movement Issues

Source: www.freightmovesflorida.com

The policy element also identified some of the issues and trends relating to the air cargo industry in the state. These include:

- Florida's air cargo system spans a wide variety of airports from major hub commercial service airports to remote general aviation (GA) airports.
- Almost all types of airports experience some sort of air cargo activity.
- On an annual basis, over 2.5 million tons of air cargo passes through Florida airports. That amount increased to over 2.7 million tons in 2014.
- Florida airports directly serve 55 domestic and 97 international destinations with either dedicated all-cargo or widebody passenger aircraft.
- GA airports play a significant role in air freight. Advantages of GA airports for smaller loads include: less congested airspace and surrounding roadway networks, quicker turn-around times, and closer proximity to certain markets. GA airports may also specialize in a niche freight market due to geographic proximity of a client base. Ocala International Airport is a prime example where racehorses from local horse farms are flown to other parts of the country and world.
- For airports that move significant amounts of freight on-airport warehouse facilities are vital. All Strategic Intermodal System (SIS) designated airports have at least one dedicated air cargo building.

- In order to provide for freight operations, there are basic airport infrastructure requirements that must be met. These include: all the flight support services necessary for operations; adequate runway lengths, lighting, aprons, and taxiways; access to aircraft and cargo processing facilities by trucks; and an adequate local roadway network.
- The functioning of the adjacent surface transportation network (roads and railways) is also an important factor in determining the viability of air cargo operations at an airport.

Completion of the Policy Element was followed by development of the FMTP Investment Element. The Investment Element was designed to build upon the Policy Element by:

- Identifying freight needs
- Identifying criteria for state investments in freight
- Prioritizing freight investments across modes
- Meeting the requirements of MAP-21

Chapter 2 of the FMTP Investment Element provides a summary of the performance of Florida’s freight system. This summary includes information regarding existing conditions, freight drivers, commodity movements, issues and bottlenecks. A variety of issues and bottlenecks were identified for aviation with some occurring both on and off airports. Several of the identified issues with potential to impact the air cargo system’s potential growth are largely outside the control of individual airports. The identification of these issues is important, as potential solutions will likely require coordination with governmental agencies, other private companies and industries. The issues identified by modal managers during the FMTP process are provided below:

- When commercial airports reach current capacity, there are constraints to further expansion at many key locations, which could impact freight movement.
- Need to invest in “soft infrastructure” to make sure that hard infrastructure projects are effectively followed by support industries, like freight forwarders. Without buy-in from private industry, infrastructure investments may be underutilized.
- Need to focus investments on arterial roads connecting hub airport cargo areas to major highways.
- Need to increase federal funding for air cargo security measures and availability and distribution of Customs and Border Patrol staff to improve cargo clearance times at gateway airports.
- The volume of traffic transiting the state’s major air corridors can reach levels which require extraordinary measures to de-conflict traffic. The implementation of NextGen and ADS-B technologies will facilitate more efficient handling of air traffic in these high-volume air corridors.
- Need to increase investments to ease highway congestion at peak periods to alleviate unnecessary idle times for trucks and vans transporting air cargo commodities.

- Positive economic impacts of the global air cargo industry on the lives of Florida residents must be communicated effectively to ensure public support.

Sources of on-site airport bottlenecks were also discussed during development of the implementation element. Most of the identified bottlenecks centered on the physical ability of an airport to accommodate the new larger aircraft entering cargo service. These identified bottlenecks include:

- Handling bigger and heavier aircraft. This includes extending runway length, pavement weight bearing capacity, and modifying the fillet radius (i.e., taxiway design) to accommodate the larger carriage of Group Five aircraft.
- Increasing ramp space to accommodate bigger aircraft and aid with airside congestion.
- Increasing on-site processing resources for goods to streamline movement of cargo off airport quickly.
- Increasing the size or number of terminals to handle future capacity needs. As many commercial airports are located in congested urban areas, expansion opportunities can be very limited. Some air cargo travels in passenger aircraft, and this possible capacity constraint could also limit freight.

As one of the primary freight modes, air cargo will play an important role in meeting the objectives of the FMTP Policy Element. This effort will also require addressing the issues and bottlenecks identified in the Investment Element.

5.1.1 [Freight Moves Florida](#)

Providing business opportunity, creating jobs, and bettering quality of life for all Floridians, the progression of trade and logistics activity within Florida is important to the growth of our state. Freight Moves Florida is a web portal managed by the Florida Department of Transportation Office of Freight, Logistics, and Passenger Operation. The site provides the latest information, resources, events, and news for the freight, trade and logistics industry. Visit the link below for more information.

<http://freightmovesflorida.com/>

5.2 Transportation Bottlenecks Around Airports

As mentioned in the FMTP issues and trends, bottlenecks occurring off site from airports also have the potential to negatively impact the ability of airports to expand air cargo service and capacity. This is due to the fact that the majority of air cargo is transferred to trucks for the final leg of its journey. Severe congestion of the roadway network with immediate connection to and adjacent to airports may cause a mismatch between the amount of freight arriving at an airport and the ability of the surface network to efficiently receive and distribute it.

5.2.1 Air Cargo Facilities in the FMTP

Chapter 2, of the FMTP Policy Element provides an overview of Florida’s freight system including reviews of each modal component. The review of aviation included the identification of airports with scheduled air cargo service.³⁸ The identification of these airports is important, as bottlenecks on the surface networks may hinder the growth of their air cargo services. The FMTP identifies these 15 airports as SIS Tier One and Tier Two Airports. These designations were first used in the 2006 Florida Air Cargo System Plan as a means of organizing air cargo lift in Florida. As the name indicates, the SIS Tier One Airports are all designated SIS Hubs. Tier Two Airports are comprised of Emerging SIS Airports and other airports in the state with scheduled air cargo service. The identification of these Tier One and Tier Two Airports provides an indication of areas in the state where bottlenecks may have the potential to negatively impact Florida’s air cargo system. It should be noted that the Tiers and their associated airports are represented as found in the current FMTP. Changes or modifications may result from ongoing and/or future plan updates. **Exhibit 5-2**, provides a listing of the SIS Tier One and Tier Two Airports as found in the FMTP.

Exhibit 5-2: SIS Tier One and Tier Two Airports

SIS Tier 1	Air Cargo*
Miami International	Yes
Orlando International	Yes
Fort Lauderdale-Hollywood International	Yes
Tampa International	Yes
Jacksonville International	Yes
Palm Beach International	Yes
Southwest Florida International	Yes
Tier 2	Air Cargo*
Pensacola International	Yes
Tallahassee International	Yes
Northwest Florida Beaches International	Yes
Gainesville Regional	Yes
Orlando Sanford International	Yes
St Petersburg-Clearwater International	Yes
Sarasota/Bradenton International	No
Key West International	Yes

*Dedicated freighters and/or passenger aircraft with containerized capabilities

Source: FDOT Freight and Mobility Trade Plan

³⁸ Dedicated freighters and/or passenger aircraft with containerized capabilities

5.2.2 Roadway Bottleneck Studies

Traffic congestion and bottlenecks are a major concern for transportation agencies at all levels. The negative impacts of congestion include, longer commute and delivery times, higher fuel consumption, increased air pollution, greater overall transportation costs, reduced safety and others. The need to recognize and address congestion is increasingly being recognized across the nation with particular emphasis in urbanized areas. For the purposes of the Air Cargo Study congestion is problematic when occurring in close proximity to air cargo facilities, impacting their ability to maintain or expand service. There are a variety of studies and reports that have recently been completed on the subject of congestion and bottlenecks. Two of these studies include a Florida-specific study completed by FDOT and a national study completed by the American Highway Users Alliance.

The *Bottlenecks on Florida's SIS* study was completed by the FDOT Systems Planning Office in 2013 using the latest available vehicle probe data (2011) and travel time reliability measures to identify bottlenecks on SIS roadways. The study identified the top 20 bottlenecks across the state and the top 5 bottlenecks in each FDOT District. The results of the study showed congestion or bottlenecks near almost all of the SIS and Emerging SIS Airports across the state. The Systems Planning Office has recently begun the process of updating this study which is scheduled for completion by December 31, 2016.

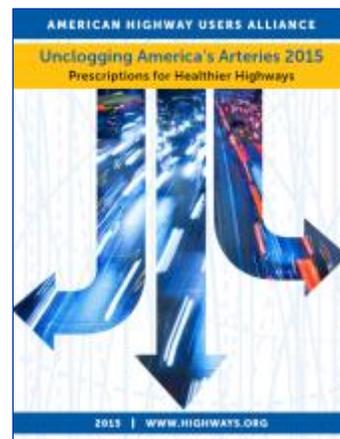
For additional information, including the methodology used and maps of the congested areas by FDOT District, please download *Bottlenecks on Florida's SIS 2011* at:

<http://www.dot.state.fl.us/planning/systems/programs/mspi/pdf/Executive%20Summary-letter%202015-13.pdf>

In 2015, the American Highway Users Alliance published a study that analyzed traffic bottlenecks on the nation's highway system. Much like the SIS Bottleneck study, this study shows locations on the highway network that have the potential to negatively impact the adjacent airports and their ability to expand air cargo service. The *Unclogging America's Arteries 2015* study identified the 50 worst bottlenecks in the country. Of the 50 identified, 4 were located in Florida (3 in Miami and 1 in Tampa). The three locations in Miami are all located in the immediate area of Miami International Airport

For additional information including methodology used and the full report visit:

<http://www.highways.org/2015/11/unclogging-study2015/>



5.3 Florida Transportation Plan

The Florida Transportation Plan (FTP) is Florida’s statewide long-range transportation plan required by **Section 339.155(1), F.S.** The plan establishes the Department’s long range goals and provides a policy framework for expenditure of federal and state transportation funds. It defines Florida’s future transportation vision and identifies the goals, objectives and strategies necessary to carry out the vision. The Plan is updated every five years with the current version (2060 Florida Transportation Plan) adopted in 2010. FDOT is currently in the process of updating the FTP to be completed in 2016.

The 2060 FTP and associated update is comprised of three main elements: a Vision Element, a Policy Element and an Implementation Element. The Vision Element provides a longer-term view of the major trends, uncertainties, opportunities, and desired outcomes shaping the future of Florida’s transportation system over the next 50 years. The Policy Element builds off of the direction provided by the Vision Element and input from the steering committee and public. It includes the goals and objectives necessary to guide FDOT towards the vision over the next 25 years. The final Element of the FTP is the Implementation Element which provides important specific direction and action items to be taken in order for the Department and state to meet the goals and objectives provided in the Policy Element.



5.3.1 Air Cargo and the FTP Goals

The FTP Policy Element contains seven long-range goals with corresponding objectives and emphasis areas. The goals are not ranked in priority order given their interrelatedness and equal role in creating Florida’s transportation future. The goals are as follows:

- Safety and security for residents, visitors, and businesses
- Agile, resilient, and quality infrastructure
- Efficient and reliable mobility for people and freight
- More transportation choices for people and freight
- Transportation solutions that support Florida’s global economic competitiveness
- Transportation solutions that support quality places to live, learn, work, and play
- Transportation solutions that enhance Florida’s environment and conserve energy.

The FTP Goals are high level general statements applying to the Department and state as a whole, and air cargo will play a role in achieving them. Moreover, some of the more specific long range objectives, indicators, emphasis areas and ideas for innovation, collaboration, customers and data processes specifically reference air cargo. The FTP was reviewed to identify the areas that reference aviation and air cargo. **Appendix C** provides a summary table of these identified areas.

For additional information and details on the FTP please visit the link below:

<http://floridatransportationplan.com/index.html>

5.4 Strategic Intermodal System (SIS) Policy Plan

Created by state law in 2002 (Section 339.61, F.S.), the Strategic Intermodal System (SIS) is a statewide network of high priority transportation facilities. It includes the state's largest and most significant airports, spaceports, deepwater seaports, freight rail terminals, passenger rail and intercity bus terminals, rail corridors, waterways and highways. These facilities are the primary means for moving people and freight within and out of Florida. In a similar manner to the FTP, FDOT is required by statute to adopt a SIS Plan with updates every five years (Section 339.64, F.S.).

In a coordinated effort, the SIS Policy Plan was updated in 2016 to be consistent with the guidance provided by the FTP. The SIS Policy Plan provides specific direction in order to address changing trends and take advantage of future opportunities. The policies and objectives also serve as guidance for investment decisions over the five years of the plan.

The SIS Policy Plan is based on three of the FTP goals that provide specific guidance to the SIS objectives. The three FTP and corresponding SIS Policy goals are provided below.



- The FTP sets a goal of efficient and reliable mobility for people and freight. The corresponding SIS objective is to ensure the efficiency and reliability of multimodal transportation connectivity between Florida's economic regions and between Florida and other states and nations.
- The FTP sets a goal of more transportation choices for people and freight. The corresponding SIS objective is to expand transportation choices and integrate modes for interregional trips.
- The FTP sets a goal of transportation solutions that support Florida's global economic competitiveness. The corresponding SIS objective is to provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment.

These SIS objectives also form the basis for three new SIS areas of emphasis or objectives (interregional connectivity, intermodal connectivity, and economic development). Each of these three objectives of the SIS Policy Plan have corresponding approaches that were reviewed to identify any references to aviation and air cargo. **Appendix D** provides a summary of the identified approaches.

For additional information and details regarding the SIS Policy Plan visit the link below:

<http://floridatransportationplan.com/policyplan.html>

5.5 Other FDOT and Regional Plans

In addition to the FMTP, FTP and SIS Policy Plan there are a variety of other freight planning efforts underway around the state. These include FDOT District and Metropolitan Planning Organizations (MPO) plans and studies with a regional or local focus. These efforts may be an excellent source of information regarding local conditions for airports as they are produced to a more detailed level than a statewide plan. A listing of these plans with summary bullets of their impact to aviation and air cargo, and links for additional information are provided below.

5.5.1 [FDOT District 7 – Tampa Bay Regional Strategic Freight Plan](#)

The Tampa Bay Regional Strategic Freight Plan is a comprehensive vision of the context, needs, strategies, and implementation of short- and long-term improvements to the region’s freight infrastructure. The Plan will be updated periodically as land use and travel conditions evolve and new freight mobility and accessibility challenges arise.

Chapter 6 of the plan identifies several issues that are impacting aviation and air cargo.

- The overall health and condition of freight infrastructure, across all modes, and as a connected system is a concern.
- Freight commonly moves on large cargo jets and in the belly of passenger jets. Their access to an area can be limited by the airport infrastructure. For instance, runway length restricts access to certain large aircraft at Hernando County Regional Airport and Zephyrhills Airport.
- The lack of a sufficient supply of transportation infrastructure, as well as congestion, are often an issue. This can be a temporary situation brought about by peak periods of demand, or a long-running problem created by a bottleneck in the system or lack of infrastructure. Capacity constraints increase the amount of time it takes for a freight shipment to move through an area, therefore increasing cost.
- Another capacity issue affecting airports is storage space for freight, and the trucks and airplanes that move it.
- Stronger security measures enacted after 9/11 have impacted the movement of freight in and out of airports. The Transportation Security Administration (TSA) now inspects all freight traveling in the belly of cargo planes, which also slows down the movement of freight and makes this efficient use of space on passenger jets less attractive.

For additional information on the Tampa Bay Regional Freight Plan please visit:

<http://tampabayfreight.com/strategic-freight-plan-web-document/>

5.5.2 Southeast Florida Regional Freight Plan – 2014 Update

The Southeast Florida Regional Freight Plan (SFRFP) is a regional effort completed by the Miami-Dade, Broward, and Palm Beach County MPOs and FDOT. The SFRFP provides an updated overview of the freight transportation system; presents an overview of key logistics infrastructure elements; identifies key state, national and international developments and initiatives impacting the region; documents the economic impacts of the freight industry in Southeast Florida; presents a current list of prioritized freight needs; and provides strategies and key next steps.

Key findings of the SFRFP as they relate to air cargo include:

- The regions three commercial service airports, Miami Intl (MIA), Fort Lauderdale-Hollywood Intl (FLL) and Palm Beach Intl (PBI) all provide dedicated all-cargo carrier, integrated express carrier, and commercial passenger carrier services.
- The region also has three GA airports, Opa-Locka Executive (OPF), Fort Lauderdale Executive (FXE), and Palm Beach County Park Airport (LNA) that see occasional cargo activity.
- The major express carriers, FedEx, UPS and DHL, all operate in the regions airports.
- All-cargo carriers in the region are highly dependent on the freight forwarding industry to market, broker and deliver freight off-airport.
- The international routes featuring widebody aircraft tend to move the majority of commercial passenger carrier freight.
- The majority of needs identified reflect improvements that will benefit overall airport capacity, airport access, or airport operations.
- There are few on-airport improvements identified that are exclusively cargo related.
- Commercial service airport specific findings include:
 - Miami International Airport, has recently completed major expansion to its cargo infrastructure. The \$500 million Cargo Development Program included 17 new cargo buildings with over 3.5 million square feet.
 - Fort Lauderdale-Hollywood International has focused on its new runway and passenger terminal improvements and expansion.
 - Palm Beach International also has focused more on general improvements and capacity expansion.

For a full copy of the final report including additional details on the region’s air cargo system, please visit:

<http://seftc.org/pages/regional-information>

5.5.3 MetroPlan Orlando - 2013 Regional Freight Study

This regional freight study updates and builds upon the original 2002 MetroPlan Orlando Freight Plan. One of the studies main objectives was to identify current problems and emerging future needs for

moving freight, goods and services in the region. The study also included an Air Cargo Profile and Forecast.

The Air Cargo Profile and Forecast identified the following issues for air cargo in the region:

- Freight forwarder traffic originating or destined for the study area often transit Atlanta-Hartsfield International and Miami International Airport versus the region’s airports due to several factors, including:
 - Greater range of destinations, frequency, and capacity at the competing airports;
 - Block space arrangements with carriers (i.e., guaranteed pre-purchased space on aircraft);
 - Greater concentration of support services; and
 - Less seasonality/fluctuations of widebody capacity.
- I-4 congestion near tourist attractions and north to Orlando Sanford International Airport (SFB) is an issue.
- New shipping and import/export regulations are increasingly burdensome to freight forwarders and are hampering the efficiency of their operations.
- Security regulations and secure shipper requirements are driving smaller and infrequent shippers from commercial passenger carriers to the integrated express carriers.
- Outbound capacity to Latin American destinations (particularly Brazil) is limited; tourists returning to Latin America purchase significant amounts of consumer goods in Orlando that occupy much of the belly space on return flights.
- Seasonality of widebody flights, coinciding with tourist traffic, affects the ability to market air cargo capacity, particularly out of SFB.

For additional details on the challenges identified in the Air Cargo Market Analysis, please visit:

<https://metroplanorlando.org/wp-content/uploads/regional-freight-study-2013-air-cargo-profile-and-forecast.pdf>

For additional details and information on the 2013 Regional Freight Study as a whole, please visit:

<https://www.metroplanorlando.com/plans/regional-freight-plan>

5.6 Summary

There are a variety of issues and trends with the potential to impact the ability of Florida’s airports to maintain and/or increase air cargo service in the state. These issues have been identified and examined in several state and local planning efforts. These include, the Florida Freight Mobility and Trade Plan, Florida Transportation and Strategic Intermodal System Policy Plans, FDOT District freight planning efforts and MPO plans and studies. One of the key identified issues is bottlenecks occurring both on and adjacent to airports. These bottlenecks limit the ability of airports to service the new larger cargo aircraft entering service. Bottlenecks on the surface network may delay and hinder intermodal connections with Heavy Trucks often used for the last leg of freight delivery.

FDOT has recently completed updates to the Florida Transportation Plan and Strategic Intermodal System Policy Plan. These plans provide high level policy direction as well as goals and objectives for Department offices to meet. Many of the goals and objectives relate to increasing the efficiency and competitiveness of freight across all modes in the state. Aviation will have a key role in making progress toward these goals. An understanding of the issues and trends facing air cargo, combined with strategies and plans to mitigate them, will be required to achieve success.

Chapter 6. AIR CARGO DATA SOURCES – PLANNING

Various air cargo data are collected from several sources for different purposes including planning, forecasts, freight flow, and economic impacts. Planning needs compare lift-capacity estimates to current volume by airport. Forecasts build upon current tonnage volumes, lift-capacity constraints, and other factors to identify airport needs. A freight flow analysis evaluates statewide tonnage and value movements by commodity type and direction. Economic impacts assess what share of Florida’s air cargo tonnage and value originates/terminates in Florida and the associated economic impact.

This section identifies the various data sources to be used, terms and details provided, as well as advantages and limitations. Subsequent sections address how these data sources are to be used.

6.1 Overview

Exhibit 6-1 provides an overview of air cargo data by source used. Terms measured include:

- aircraft landing weight
- air carrier operations
- aircraft types
- air cargo tonnage (both freight and mail)
- air freight value

Air freight detail includes:

- *Trade Geography* – Domestic versus foreign detail varies by source, which complicates comparison. Additionally, other nuances in data tabulation further complicate the comparison process.
- *Direction* – Description varies by source with tonnage categorized as enplaned/deplaned (by airports), versus import/export (by Census, which excludes domestic movements), versus inbound/outbound/intrastate (by Freight Analysis Framework (FAF) and TRANSEARCH).
- *Analysis Location* – While most sources provide data at the airport level, FAF and TRANSEARCH only provide data at the state or Bureau of Economic Analysis (BEA) region level.
- *Commodity Code* – The three sources (Census, FAF, TRANSEARCH) used to evaluate freight flows (in tonnage and value terms) by commodity type utilize three different commodity code classifications.
- *Years* – In addition to specifying the range of available years, comparative years vary by source. While the most recent comparative year is typically sought, evaluation for economic impact purposes might seek to use an earlier year to correspond with the most recent IMPLAN economic model year (2014).

Exhibit 6-1: Air Cargo Data by Source

Data Dimension	FL Airports ¹	ACI-NA ²	FAA-ACAIS ³	OAG ⁴	T100 ⁵	CASS ⁶	CENSUS ⁷	FAF V4.1 ⁸	Transearch ⁹
Terms Measured									
Aircraft Landed Weight	Varies	-	lbs.	-	-	-	-	-	-
Aircraft Carrier Operations	Varies	-	-	Flight Sched.	X	X	-	-	-
Aircraft Type	Varies	ended in 2012	-	Cargo Cap. By type	X	X	-	-	-
Air Cargo Tons ¹⁰	Varies	Freight, Mail (M)	-	-	Freight, Mail (S)	Freight, Mail (S)	Freight (M)	Freight (S)	Freight (S)
Air Freight Value	MIA ¹¹	-	-	-	-	-	Current \$	Current \$	Current \$
Air Freight Detail									
Trade Geography	Various	na	-	-	Dom./Foreign	Foreign	Foreign	Dom./Foreign	Dom./NAFTA
Direction	Enplaned/deplaned	ended in 2012	-	-	Origin/Destination	Export	Import/Export	In, Out, Intra-region	In, Out, Intrastate
Analysis Location	Airport	Reporting Airports only	Airport	Airport	Airport	na	Port/District	BEA Region/State	County State
Commodity Code	na	na	-	-	na	na	HS/SITC	SCTG	STCC
Years Available	Various	2006-2014	2000-2013	Annually reported	1990-2015	2012-2016 (Spring)	2003-2015	2012-2015 +5-year incr.	2011, 2040
Comparative Year	2015	2014	2013	2015	2015	2015	2014, 2015	2014, 2015	2011
Other Information									
Update Frequency	Annual/Monthly	Annual	Annual	Monthly	Annual/Qtr./Mo.	Quarterly	Annual/Qtr./Mo.	5 years	Annual
Cost	Free	Free	Free	\$\$\$	Free	Free	Free	Free	\$\$\$
Study Purpose/Use	Planning, Forecasts, Freight Flow	Planning	Planning	Planning, Forecasts	Planning, Forecasts	Planning, Forecasts	Planning, Economic	Forecasts, Freight Flow, Economic	Forecasts, Freight Flow, Economic

¹ Individual Florida airport data

² Airport Council International - North America (Top 50 Only): <http://www.aci-na.org/content/airport-traffic-reports>

³ FAA all-cargo aircraft landed weight, from Air Carrier Activity Information System (ACAIS): http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/

⁴ Official Airline Guide-Air Cargo Guide: <http://www.oag.com/markets/cargo>

⁵ USDOT Bureau of Transportation Statistics (BTS) Data T100: https://www.transtats.bts.gov/tables.asp?db_id=111&DB_Name ⁶ CASS-USA Market Monitor: <http://www.cncs.net/publications/pages/focus.aspx>

⁷ USA Trade Online customs data: <https://usatrade.census.gov>

⁸ Freight Analysis Framework, USDOT: <http://faf.ornl.gov/fafweb/Extraction1.aspx>

⁹ IHS Global Insight

¹⁰ Air Cargo Tons = Air Freight + Air Mail: metric (M): short(S)

¹¹ Information for international freight through Miami only, which comes from Census

Air cargo planning and forecasts will draw upon most sources in some fashion, ranging from specific use to general comparison. Conversely, the freight flow analysis will primarily draw upon the Census, FAF, and TRANSEARCH. Subsequent chapters will explain rationale for sources used, notable limitations, and how hurdles are addressed.

6.2 Source Description

The nine primary sources used to gather air cargo planning, forecast, and freight flow data are described below.

Airport Records and Statistics – Virtually all U.S. commercial service airports internally track total cargo volume, as well as subsets such as freight (including express) and mail on a directional (inbound and outbound) basis. Commonly, these data sets are maintained by airport accounting departments, being compiled from monthly operations reports used to settle landing fees and satisfy other carrier reporting requirements. Whether or not disseminated publicly, this data may be kept by the airport on a carrier-level basis which can be organized into market share by individual carrier and/or type (all-cargo aircraft versus passenger belly compartment). Cargo may also be organized into domestic and international increments. In addition to tonnage data, monthly airline reports provide critical inputs pursuant to monthly frequencies (take offs and landings) and aircraft types. There is no standard for how, or if, airports generate public or internal reports from this and other data. While the web page of the Miami International Airport contains extensive monthly data on airport operations and Customs entries (i.e., by country and commodity), other airports may include nothing more than a single entry for total annual cargo in their public reports.

Airports Council International – Almost all member airports report annual tonnages to Airports Council International – North America (ACI-NA), which publishes a Top 50 data set by year on its web site. A more extensive set for members only, or for purchase by nonmembers, is also compiled. However, U.S. airports are not compelled to join ACI-NA and some major cargo airports, such as UPS's regional hub in Rockford, IL are not found in ACI-NA's statistics. Also, some airports may miss the reporting deadline and not have a published air cargo traffic for that year. Through 2011 ACI-NA provided air cargo metric tonnage for U.S. airports. This data was divided into enplaned and deplaned tonnage (i.e., by direction) for freight, mail, and total annual cargo aircraft operations. From 2012 onward, ACI-NA only provided totals for freight, mail, and all air cargo – and not a breakout by direction. All ACI-NA traffic tonnage is in metric tons.

FAA All-Cargo Aircraft Landed Weight – The Air Carrier Activity Information System (ACAIS) contains commercial passenger and all-cargo aircraft landed-weight data. Cargo-relevant data is limited to aircraft operations dedicated to the exclusive transportation of cargo, which combines aircraft weight, fuel onboard, and cargo payload. This measure has been used by the FAA for decades and is a fairly easy data point to collect since most airports collect landing fees and, when doing so, collect the aircraft type and weight from the air carrier. The FAA collects the data via Form 5100-108 and it includes maximum landed weight by aircraft model, cargo carrier and carrier code. The database also supports the FAA's Airport Improvement Program (AIP) apportionment formula calculations.

However, passenger aircraft also move air cargo, especially on widebody international flights. This cargo volume is not collected since passenger carriers are exempt from completing the FAA's air cargo landed weight forms. Airports like Miami and Orlando move a substantial amount of cargo in the belly of widebody passenger airlines. Freighters are projected to carry more than half of the world's air cargo for the next 20 years, even as lower-hold passenger cargo capacity expands faster than freighter capacity.³⁹

Official Airline Guide (OAG), Air Cargo Guide – This guide provides flight schedule, flight frequency, and aircraft information for cargo routes, widebody passenger flights, and road feeder truck schedules. However, various data holes exist. First, only cargo airlines that volunteer scheduled flight information on a monthly basis are presented in the OAG Air Cargo Guide. Second, some airports with cargo activity, such as Key West International (EYW), do not appear in the guide because carriers operating there choose not to report any available capacity. Third, scheduled flights operated by integrated express carrier UPS are only captured on a limited basis in the OAG; while FedEx Express does not report flights.

An alternative source of information is the FAA instrument flight rule (IFR) database which provides landing activity by airport, passenger and cargo carriers, and aircraft type. To ensure full visibility of international flight activity, air carrier timetables may be posted online which identify aircraft schedule and equipment types on routes. These data are useful in determining the total air cargo capacity of scheduled passenger and all cargo routes.

USDOT Data T100 – U.S. DOT's Bureau of Transportation Statistics (BTS) maintains the passenger and air cargo databases. The BTS falls under the Office of the Assistant Secretary for Research and Technology (OST-R) which is part of the Office of the Secretary of Transportation (OST).⁴⁰ The bureau's website (<http://www.rita.dot.gov/bts/>) contains U.S. DOT reports and databases as well as commercial organizations that provide U.S. DOT data. One of the most popular databases for air cargo data is the T100 which combines domestic and international market data reported by U.S. air carriers. The T100 contains market data by carrier, origin/destination, and service class for enplaned passengers, freight, and mail. It should be noted that flights with both origin and destination in a foreign country are not included in this database.

CASS-USA Market Monitor – Cargo Accounts Settlement System (CASS) is a division of the International Air Transport Association (IATA), with 78 member airlines, that provides internet-based billing, invoice presentment, and payment service used to process financial transactions between carriers and agents. CASS' Market Monitor uses such data to provide monthly air cargo export tonnages by global region. While the data does not capture the entire universe of air cargo activity, it does provide a sample of U.S. export trends within the industry. Data in the *CNS Air Cargo Focus* magazine, published by Cargo Network Services Corporation (an IATA Company), provides the most recent quarterly highlights of year-to-date activity and monthly traffic originating from the U.S. Data is presented for eight world regions: Africa, Asia Pacific, Commonwealth of Independent States, Europe, Latin America & The Caribbean, Middle East & North Africa, North Asia, and North Atlantic & North America.

³⁹ Boeing World Air Cargo Forecast 2014–2015

⁴⁰ Previously administered by the Research and Innovative Technology Administration (RITA)

US Census, USA Trade Online – The U.S. Census Bureau monitors foreign trade (U.S. Customs data) in tonnage and value by direction, country (except Canada), and commodity type. Data is tabulated by point of entry and/or exit, which includes water ports and airports. Legally, the U.S. Code, Title 13, requires program participation by all shippers, and is assisted by the Treasury Department. Import/export data is collected on goods shipped by individuals and organizations (including importers, exporters, freight forwarders, and carriers) valued at more than \$2,500 per commodity.

Census data is made available for public use through the USA Trade Online tool.⁴¹ This tool provides foreign trade tonnage and value by direction, country (except Canada), and commodity type. Volume data are presented in metric tons, and values are presented in current dollars. The tool presents data from two perspectives: *Through-airport* data may include other state freight that transits through Florida airport; and *Statewide* data may include freight that transits through other state airports. This nuance is important since neither provides Florida volumes through Florida airports.

Lastly, Census international data is specifically used by Miami International Airport, and is also incorporated into the FAF.

Freight Analysis Framework v4.1 – Freight Analysis Framework (FAF) is an integrated database of freight movement for all primary transportation modes (truck, rail, water, air, pipeline) produced by the Federal Highway Administration (FHWA) in collaboration with the BTS.⁴² This data is based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the Census. It is searchable by direction, origin/destination geography, mode, year, terms, etc. The most recent version, 4.1, was queried for both year 2014 and 2015.

Two major constraints regarding air cargo freight flow concern temporal updates and commodity detail. Year 2014 and 2015 data are estimated based on the year 2012 update and year 2040 forecast. Unlike the 500+ commodity type detail provided by the Census and TRANSEARCH, FAF only offers a consolidated commodity summary (40+ type).

TRANSEARCH – Developed by IHS Global Insight, TRANSEARCH is a comprehensive database of North American freight flows, compiled from more than 100 industry, commodity, and proprietary data sources.⁴³ TRANSEARCH combines primary shipment data obtained from the nation’s largest rail and truck freight carriers with information from public, commercial, and proprietary sources to generate a base year estimate of freight flows at the county level. As the database is mostly oriented to surface transportation modes, the applicability to airborne data is limited. In particular, the database only includes NAFTA-related (i.e., Canada and Mexico) international trade partners, thereby limiting comparability of airborne trade data to other comprehensive sources. Purchased for the previous Florida Freight Plan, the source is dated (year 2011 flows). Nonetheless, the source provides a good reference/comparison to the other freight flow sources

⁴¹ <https://usatrade.census.gov/>

⁴² http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm

⁴³ <https://www.ihs.com/products/transearch-freight-transportation-research.html>

6.3 Source Comparison

No single source provides all information for all planning, forecasts, or freight flow analyses. In order to provide the most complete picture possible, combinations of data sources are compiled and collated to take full advantage of each resource while minimizing their limitations in study analyses. The approach for doing so will be outlined in subsequent chapters. Nonetheless, data source advantages and limitations are summarized in **Appendix E**. Additionally, individual examples of Air Cargo Source Data Sheets have been prepared for each data source used in the 2016 Florida Air Cargo Study. These sheets summarize each source's properties and depict graphs representing sample data from the respective source. The sheets are provided in **Appendix F**.

Chapter 7. AIR CARGO LIFT CAPACITY ANALYSIS

This chapter presents an analysis, taken from a one-week sample of airline schedule data for June 2016, of the most current outbound air cargo lift⁴⁴ capacity available at Florida’s 20 commercial service airports. Air cargo lift capacity is the available space on an aircraft for carrying freight and mail. Trends in air cargo activity are analyzed and compared to information provided previously in the Air Cargo Lift Capacity Analysis published in the 2012 Florida Air Cargo System Plan. The estimated total available statewide air and ground capacity for 2016 is compared against 2012 levels. Further, this chapter highlights significant changes in carrier activity in each Florida market, as well as changes in aircraft type and associated cargo capacity available. This update provides government officials, the general public, and industry stakeholders insight into Florida’s trends in air cargo demand and carrier activity.

7.1 Introduction

Florida’s system of commercial service airports enplaned and deplaned a combined total of 2,710,994 tons of cargo in 2014. This represents an increase of 1.8 percent over the 2,661,946 tons processed in 2012. Overall, Florida’s air cargo tonnage has increased annually by an average of 4.4 percent since 2009. Florida’s commercial service airports are classified by the FAA as either Large Hub, Medium Hub, Small Hub, or Nonhub Primary Commercial Service. These airports serve a wide variety of roles from major international gateways, located in major metropolitan areas, to regional and secondary airports, serving small and medium size metropolitan areas. Florida’s 20 commercial service airports are:

- Daytona Beach International Airport (DAB)
- Destin-Ft. Walton Beach Airport (VPS)
- Ft. Lauderdale/Hollywood International Airport (FLL)
- Gainesville Regional Airport (GNV)
- Jacksonville International Airport (JAX)
- Key West International Airport (EYW)
- Melbourne International Airport (MLB)
- Miami International Airport (MIA)
- Northeast Florida Regional Airport (SGJ)
- Northwest Florida Beaches International Airport (ECP)
- Orlando International Airport (MCO)
- Orlando Sanford International Airport (SFB)
- Palm Beach International Airport (PBI)
- Pensacola International Airport (PNS)
- Punta Gorda Airport (PGD)
- Sarasota/Bradenton International Airport (SRQ)
- Southwest Florida International (RSW)
- St. Pete-Clearwater International Airport (PIE)

⁴⁴ “Lift” should be considered synonymous with outbound; therefore, “lift capacity” = “outbound capacity”

- Tallahassee International Airport (TLH)
- Tampa International Airport (TPA)

The volume of air cargo moving between origin and destination points as well as the amount of cargo transferring through an airport is closely related to an airport’s infrastructure capacity. Most of Florida’s commercial service airports are located near major metropolitan areas that produce consistent air cargo traffic. Consequently, these facilities must be able to support aircraft capable of accommodating market demand.

The airports located near Florida’s medium sized metro areas should have infrastructure capable of supporting smaller-scale air cargo operations. These airports can be, and often are, used to move cargo traffic to larger airports both within and outside of Florida. This movement takes place via feeder aircraft, freight forwarders, or Road Feeder Service (RFS) trucking. These airports are critical for maintaining connectivity to air cargo business networks, particularly for the integrated express operators.

Unlike passenger carriers, air cargo aircraft load factors are not reported to the U.S. DOT nor are they published by the carriers. Analysis of available outbound cargo capacity (or “lift”) on scheduled flights provides insight on the demand for air cargo in an airport’s market area. Air cargo schedules provided by the Official Airline Guide (OAG), FAA records, and FlightAware.com were utilized in this analysis to ascertain outbound air cargo lift capacity available at airports and thereby provide a metric of air cargo demand.

For the purposes of this study, “lift” should be considered synonymous with “outbound.” Outbound lift capacity is the standard industry metric since it is what shippers and freight forwarders consider when seeking to arrange for shipment of goods from “Point A” to “Point B.” Although this analysis does not focus on inbound capacity, it is worth noting that inbound air cargo capacity is identical to outbound (lift) in terms of available volume.

Of the 20 Florida commercial service airports, 6 did not have scheduled air cargo activity on all-cargo aircraft, integrated express carriers, or widebody passenger aircraft during the one-week data sample timeframe. These airports were:

- Daytona Beach International Airport (DAB)
- Melbourne International Airport (MLB)
- Destin-Ft. Walton Beach Airport (VPS)
- Sarasota/Bradenton International Airport (SRQ)
- Northeast Florida Regional Airport (SGJ)
- Punta Gorda Airport (PDG)

Although narrowbody passenger aircraft⁴⁵ can accommodate air cargo, the complexities of available space in their baggage compartments is difficult to determine. As a result of the unpredictable and inconsistent nature of narrowbody passenger aircraft belly cargo capacity, for consistency this analysis

⁴⁵ Narrow body aircraft are designed with a single aisle on the main deck

and the four previous Air Cargo System Plans for FDOT do not to measure cargo capacity on narrowbody passenger aircraft. Widebody passenger jets, on the other hand, allow for cargo containers in the belly hold of the aircraft and are specifically designed to accommodate air cargo. It is important to note, however, that while this analysis does not consider the lift capacity provided by narrowbody passenger aircraft, narrowbody passenger flights carry cargo and do therefore contribute to air cargo tonnage trends observed at Florida airports. Consequently, it is possible for an airport to see a decrease in capacity despite an increase in overall tonnage as the correlation between cargo capacity and actual tonnage is much stronger for dedicated freighter aircraft than for passenger aircraft.

7.2 Statewide Air Cargo & RFS Capacity at Florida Airports

This section of this document evaluates the available outbound cargo capacity at each of Florida’s commercial service airports supporting scheduled⁴⁶ cargo activity. Capacity is presented in terms of air cargo lift available and also in terms of available Road Feeder Service (RFS) truck capacity.

7.2.1 Methodology

In order to determine the air cargo lift capacity at Florida’s commercial service airports, three primary data sources were used. The OAG Cargo Guide provided flight information for dedicated cargo flights, widebody passenger flights, and road feeder truck schedules.⁴⁷ Not all scheduled flights by cargo airlines are recorded in OAG. Only airlines that volunteer the information on a monthly basis are presented. There are airports with cargo activity, such as Key West International (EYW), that do not appear in the OAG Cargo Guide. Scheduled flights operated by integrated express carriers (DHL, FedEx, UPS) are captured on a limited basis in OAG. An alternative source of information is the FAA instrument flight rule (IFR) database which provides landing activity by airport, carrier, and aircraft type.⁴⁸ To ensure full visibility of international flight activity, carrier time tables were also used to determine air cargo lift availability and equipment types on routes.

The data used in this analysis was taken for a one-week sample of outbound segments in mid-June 2016. The month of June was selected since it provides a representative sample of average air cargo industry activity – that is, not too low as seen in late winter/early spring, but not over-inflated as seen during the peak of holiday season.

Air cargo schedules are calibrated by day of the week to align with guaranteed delivery times. For instance, a product shipped on Thursday afternoon from Boston, due for Monday delivery in Kansas City, can be transported via RFS trucks over the weekend and still make its scheduled delivery on Monday. A similar shipment sent on Monday afternoon sold for Wednesday delivery, however, would need to be placed on an aircraft in order to reach the customer by the deadline.

Commercial passenger schedules for domestic routes operate fairly consistently throughout the week, but international flights fluctuate by day of the week based on passenger demand. For this analysis, flight schedules for Wednesday provide a proxy for understanding the amount of lift capacity available at Florida’s commercial service airports. Wednesday is selected since it is the busiest day of the week in

⁴⁶ Ad hoc cargo (occasional/as needed) operations are not considered in this analysis

⁴⁷ www.oag.com. OAG, first published in 1929, stands for ‘Official Aviation Guide of the Airways.

⁴⁸ www.flightwise.com; www.flightaware.com

the air cargo industry and provides a “snapshot” of air cargo activity. It is also easily replicable for providing analysis on an annual basis.

This analysis quantifies the average daily outbound air cargo lift capacity provided by integrated express carriers, all-cargo carriers, and widebody passenger aircraft. Lift capacity available for both domestic and international routes from Florida airports is presented. It is important to note that cargo carried on integrated express carriers between points in the U.S. may include international air cargo volumes as well. For example, a FedEx MD-11 route from Miami to Memphis may contain material exported from Miami that will be sorted at the hub in Memphis and then transported to its final international destination on a different aircraft/flight.

Air cargo aircraft utilization on the main deck and belly compartments seldom reaches 100 percent capacity due to the density and bulkiness of packages. In addition, the sloped contours of Unit Load Devices⁴⁹ (ULDs) often prevent the aircraft from reaching 100 percent load factor based on weight capacity. With this in mind, an 80 percent load factor in available lift (in pounds and cubic feet) is assumed in the analysis. In other words, full aircraft cubic utilization is usually reached before the maximum aircraft weight capacity is reached. The same 80 percent load factor assumption is applied to widebody passenger aircraft using lower deck containers to move cargo.

Truck transport connections offered via scheduled Road Feeder Service (RFS) are also presented. The sole data source for this activity is the OAG Cargo Guide. Shippers near major airports often utilize RFS networks to move cargo via surface transport. This avoids placing cargo on a more expensive flight and saves significantly on a cost per pound basis. Each RFS route utilizes a 53-foot trailer which carries 5 standard air cargo Unit Load Devices (ULDs) with 3,000 pounds of capacity per container. ULDs are designed to fit within the aircraft fuselage but also fit well in truck trailers. Five ULDs equates to just over 33 percent of the main deck weight capacity on a Boeing 757 (B757) freighter, a common aircraft to the air cargo industry.

7.2.2 Air Cargo Capacity

Air cargo lift capacity varies throughout the week based on the air and trucking schedules of dedicated cargo carriers and passenger airlines. Outbound air cargo lift capacity was measured for a typical Wednesday, presented as the “average daily lift capacity,” taken from a one-week sample of airline schedule data during the month of June 2016. This methodology is consistent with the one used in the 2012 effort. Of Florida’s 20 commercial service airports, the 14 airports found to have scheduled air cargo lift capacity during the sample timeframe provide a combined total of over 13.6 million pounds of outbound air cargo lift capacity on a typical Wednesday. Statewide, average daily air cargo lift capacity increased from nearly 13.59 million pounds in 2012 to over 13.67 million pounds in 2016, representing an increase of 87,487 pounds, or 0.6 percent. In terms of total capacity, Miami International Airport remains the state’s capacity leader by a wide margin. MIA’s over 9.6 million pounds of daily lift capacity accounts for 70 percent of the statewide total which is in line with Miami’s 2012 share of the statewide total. Orlando International has the second largest share of available air cargo capacity in Florida with 12

⁴⁹ A Unit Load Device (ULD) is a container used for transporting cargo.

percent; up from its 11 percent share in 2012. Tampa International and Ft. Lauderdale/Hollywood International rank third and fourth, with 6 percent and 5 percent, respectively.

Miami’s growth of approximately 243,000 pounds of lift leads all Florida airports and represents an increase of 3 percent over the nearly 9.4 million pounds seen in 2012. Six airports saw a higher percentage of growth than Miami between 2012 and 2016: Gainesville Regional (230 percent), Tampa International (30 percent), St. Pete-Clearwater International (22 percent), Northwest Florida Beaches International (14 percent), and Orlando International (12 percent). In terms of average daily pounds of lift capacity, Tampa International and Orlando International were the only airports to see gains nearing that of Miami International. Although Gainesville Regional experienced the highest *percentage* growth of any airport, its net gain of average daily lift capacity was only 1,879 pounds.

Eight airports experienced a decline in average daily lift capacity. The most significant decline was seen by Palm Beach International (57 percent) which was followed by Ft. Lauderdale/Hollywood International (38 percent), combining for a loss of more than 522,000 pounds. Sarasota/Bradenton International lost all lift capacity over the same time frame. **Exhibit 7-1** presents a comparison of total air cargo lift capacity for 2012 and 2016 (data is presented by airport in descending order by percent of 2016 statewide total).

Exhibit 7-1: Average Daily Air Cargo Lift Capacity at Florida Airports 2012 vs 2016 (in Pounds)

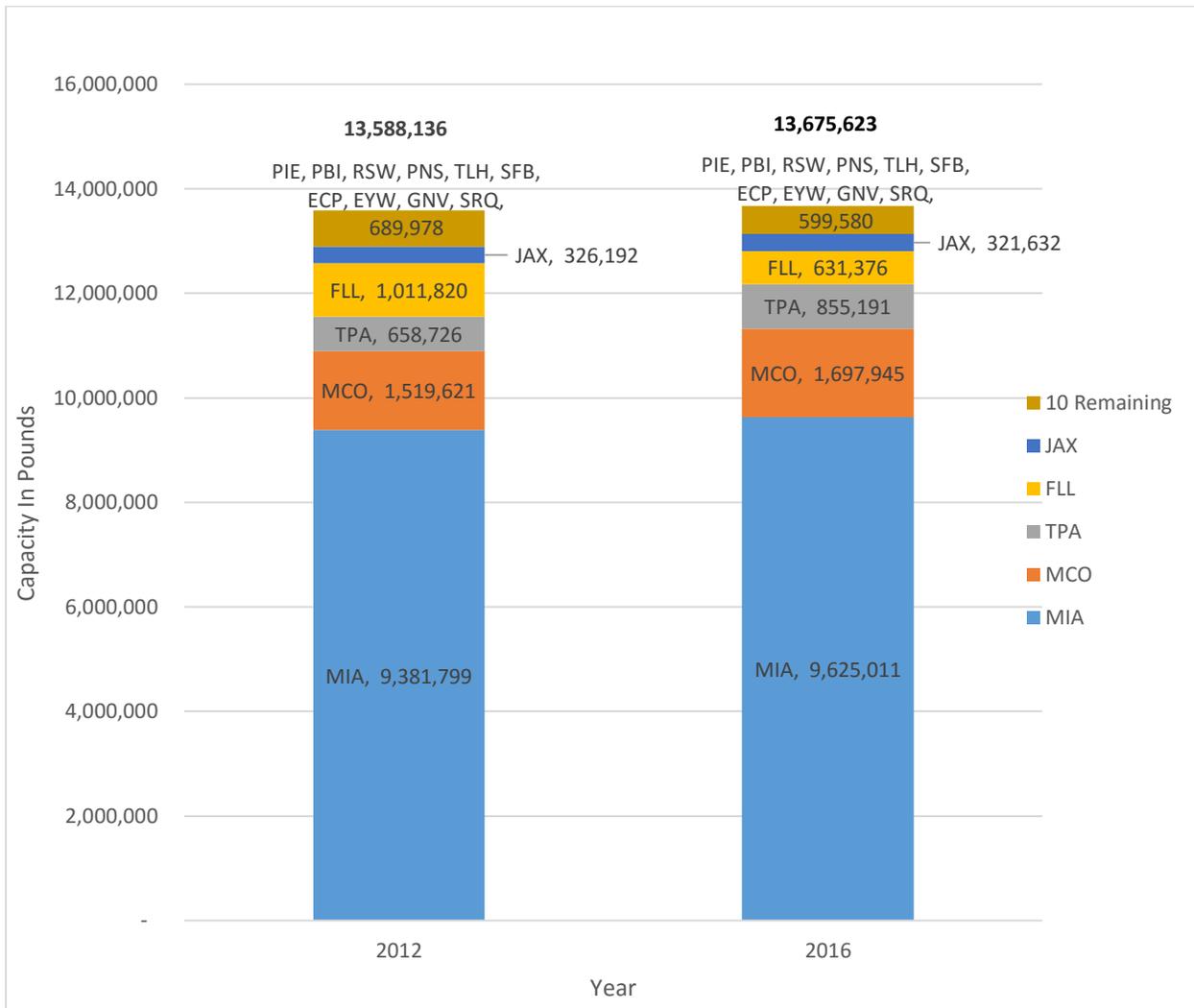
Airport	2012		2016		Change 2012-2016	Percent Change 2012-2016
	Average Daily Air Cargo Lift Capacity (lbs)	Percent of Total	Average Daily Air Cargo Lift Capacity (lbs)	Percent of Total		
Miami International	9,381,799	69.8%	9,625,011	70.4%	243,212	3%
Orlando International	1,519,621	11.2%	1,697,945	12.4%	178,324	12%
Tampa International	658,726	4.9%	855,191	6.3%	196,465	30%
Ft. Lauderdale/Hollywood International	1,011,820	7.5%	631,376	4.6%	(380,444)	-38%
Jacksonville International	326,192	2.4%	321,632	2.4%	(4,560)	-1%
St. Pete-Clearwater International	136,192	1.0%	165,496	1.2%	29,304	22%
Palm Beach International	248,548	1.8%	106,527	0.8%	(142,021)	-57%
Southwest Florida International	104,909	0.8%	90,608	0.7%	(14,301)	-14%
Pensacola International	81,403	0.6%	73,545	0.5%	(7,858)	-10%
Tallahassee International	61,934	0.5%	52,730	0.4%	(9,204)	-15%
Orlando Sanford International	42,240	0.3%	39,200	0.3%	(3,040)	-7%
Northwest Florida Beaches International	7,056	0.1%	8,066	0.1%	1,010	14%
Key West International	5,600	0.0%	5,600	0.0%	-	0%
Gainesville Regional	816	0.0%	2,695	0.0%	1,879	230%
Daytona Beach International	-	0.0%	-	0.0%		
Melbourne International	-	0.0%	-	0.0%		
Destin-Ft. Walton Beach	-	0.0%	-	0.0%		
Sarasota/Bradenton International	1,280	0.0%	-	0.0%	(1,280)	-100%
Northeast Florida Regional	-	0.0%	-	0.0%	-	
Punta Gorda	-	0.0%	-	0.0%	-	
Total	13,588,136	100%	13,675,623	100%	87,487	0.6%

Sources: OAG, FlightAware, and IFR Records; CDM Smith

Exhibit 7-2 depicts the change in average daily lift capacity for Florida’s top airports between 2012 and 2016.

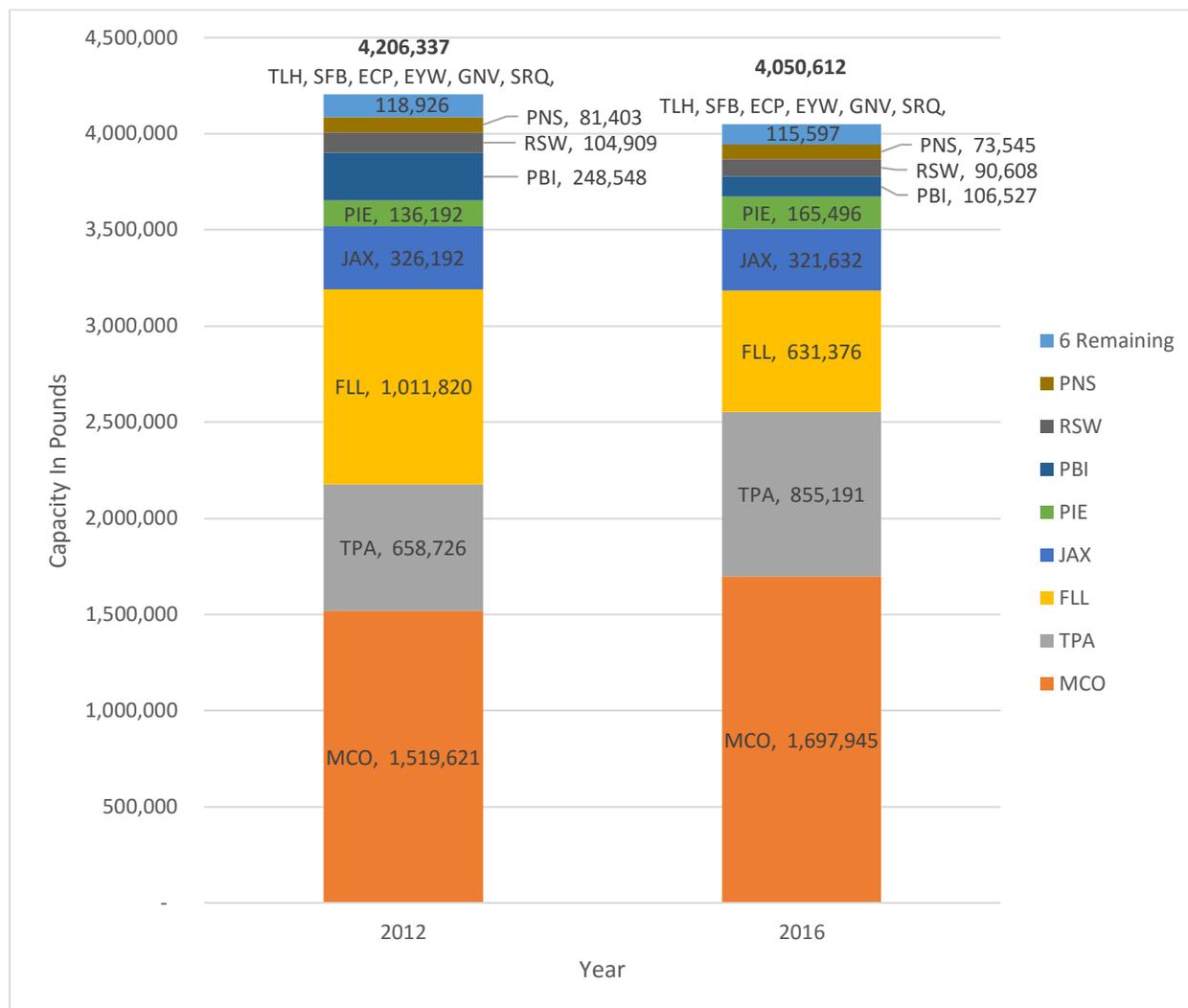
To better highlight airports with smaller shares of the total statewide capacity, **Exhibit 7-3** depicts the same change in average daily lift capacity, as in **Exhibit 7-2**; however, Miami International is excluded.

Exhibit 7-2: Average Daily Air Cargo Lift Capacity 2012 vs 2016



Sources: OAG, FlightAware, and IFR Records

Exhibit 7-3: Average Daily Air Cargo Lift Capacity 2012 vs 2016 (excluding MIA)



Sources: OAG, FlightAware, and IFR Records

7.2.3 Road Feeder Service (RFS) Capacity

Scheduled RFS service is offered by a cargo operator, such as an air freight forwarder, to move carried goods to and from the aircraft and/or terminal by truck. RFS allows a carrier, such as a passenger airline, to offer services to a city to which it does not fly. Many RFS services are allocated an airline flight number for a truck route connecting two airports. RFS schedule data is provided by OAG in addition to the flight schedules.

According to OAG RFS schedules, seven of Florida’s commercial service airports currently have scheduled RFS service. On average, Florida airports offer more than 24.36 million pounds of scheduled RFS cargo capacity each week. This represents a 36 percent increase over Florida’s 2012 weekly RFS capacity of 17.86 million pounds. Strong growth in RFS services is directly tied to increases in air carrier fuel costs experienced earlier in this decade and an overall modal shift toward trucking. Although the

average cost of Jet A fuel has declined from \$2.68 per gallon in June 2012 to \$1.41 in June 2016,⁵⁰ after the economic recession of 2007 to 2009, many shippers reevaluated the value of shipping by air. The continued growth in RFS capacity is evidence of reduced overall dependence on air cargo. The fuel surcharges implemented by air cargo carriers and passenger airlines during the summer months of 2008 persist today. These charges forced many shippers to switch to trucking. Industry guidelines indicate trucking is typically 7 to 10 times less expensive per pound than shipping by air.

Exhibit 7-4 and **Exhibit 7-5** represent the weekly RFS capacity at Florida airports during 2012 and 2016. As shown in the tables, Miami International averages over 11 million pounds of available weekly RFS capacity, comprising 45 percent of the statewide total. This represents an increase of 3.6 million pounds or 48 percent over 2012. Orlando International ranks second in weekly RFS capacity with over 6.1 million pounds, or 25 percent of the statewide total. Tampa International, Jacksonville International, and Pensacola International follow with 14 percent, 9 percent, and 5 percent of the statewide total, respectively. Pensacola International has experienced the largest percentage change, growing by 159 percent since 2012. Ft. Lauderdale/Hollywood International declined by 17 percent; however, its 150,000 pounds of weekly capacity make up less than one percent of the statewide total. From 2012 to 2016, Southwest Florida International gained RFS service while Palm Beach International lost RFS service entirely. Table 2 provides the RFS capacity available at Florida airports from 2012 to 2016 (data is presented by airport in descending order by percent of 2016 statewide total). Figure 3 depicts the change in weekly RFS capacity for Florida’s the top airports between 2012 and 2016.

**Exhibit 7-4: Weekly Road Feeder Service
Cargo Capacity at Florida Airports 2012 vs 2016 (in Pounds)**

Airport	2012		2016		Change 2012-2016	Percent Change 2012-2016
	Weekly RFS Capacity (lbs)	Percent of Total	Weekly RFS Capacity (lbs)	Percent of Total		
Miami International	7,425,000	41.5%	11,025,000	45.3%	3,600,000	48%
Orlando International	5,250,000	29.3%	6,105,000	25.1%	855,000	16%
Tampa International	2,790,000	15.6%	3,495,000	14.3%	705,000	25%
Jacksonville International	1,740,000	9.7%	2,235,000	9.2%	495,000	28%
Pensacola International	480,000	2.7%	1,245,000	5.1%	765,000	159%
Ft. Lauderdale/Hollywood International	180,000	1.0%	150,000	0.6%	(30,000)	-17%
Southwest Florida International	-	0.0%	105,000	0.4%	105,000	100%
Palm Beach International	30,000	0.2%	-	0.0%	(30,000)	-100%
Total	17,895,000	100.0%	24,360,000	100.0%		36%

Source: OAG

⁵⁰ According to the US Energy Information Administration.

Exhibit 7-5: Weekly RFS Capacity 2012 vs 2016



Sources: OAG, FlightAware, and IFR Records

7.2.4 Statewide Air Carrier and RFS Aggregated Capacity

In 2016, aircraft from 14 of Florida’s commercial service airports and RFS service from 7 of the 14 airports provided over 17.7 million pounds of daily cargo lift capacity. Sample schedule data from June 2016 shows that approximately 77 percent of the total lift capacity was offered on cargo aircraft, and the remaining 23 percent was provided on scheduled RFS carriers. The air carrier share of total daily lift capacity from Florida airports has decreased by seven percent from 2012, as shown in **Exhibit 7-6**.

Exhibit 7-6: Statewide Aggregated Aircraft and RFS Capacity Trends at Florida Airports (in Pounds)

Year	Average Daily Lift Capacity (lbs)	Percent Share
Air Carrier		
2012	13,588,136	84%
2016	13,675,623	77%
RFS		
2012	2,552,200	16%
2016	4,080,000	23%
Total		
2012	16,128,267	100%
2016	17,755,623	100%

Sources: OAG, FlightAware, and IFR Records

7.3 Historic Air Cargo Tonnage at Florida Commercial Service Airports

To quantify actual air cargo processed at each of Florida’s commercial service airports, total air cargo tonnages were collected for each facility from 2010 through 2014. The most recent available data (2014) was collected from individual airport records, if available. Otherwise tonnages were sourced from the Airports Council International-North America (ACI-NA) database, which compiles airport traffic statistics reported directly by the airports themselves. Total enplaned and deplaned tons of freight and mail combine to make up total air cargo for each airport. At the time of writing this report, not all airports had published 2015 air cargo tonnage data; therefore, 2014 was used as most recent year as it was most widely available.

Florida’s total statewide air cargo tonnage grew at an average annual rate of 2.1 percent from nearly 2.5 million tons in 2010 to over 2.7 million tons in 2014.⁵¹ According to ACI-NA records, 2014 marks the first time Florida’s total statewide air cargo tonnage has exceeded 2.7 million tons since 2007. This is largely due to Miami International, which accounted for over 81 percent of total statewide tonnage in 2014. Miami International posted the biggest tonnage gains from 2010 to 2014, growing by more than 180,000 tons to a total of over 2.2 million tons. Orlando International, which makes up 6.4 percent of total statewide tonnage, grew by 23,000 tons. Jacksonville International, Palm Beach International, Pensacola International, and St. Pete-Clearwater International also experienced significant growth. Total tonnage declined for seven Florida airports, of which Ft. Lauderdale/Hollywood International experienced the most significant decline. **Exhibit 7-7** presents the total air cargo tonnage trends from 2010 to 2014 for Florida’s 20 commercial service airports (data is presented by airport in descending order by percent of 2014 statewide total). **Exhibit 7-8** depicts total statewide air cargo tonnage change between 2010 and 2014.

⁵¹ As of June 2016, 2014 is the most recent year for which data is widely available

Exhibit 7-7: Historic Air Cargo Tonnage at Florida Commercial Service Airports,
2010-2014 (in U.S. Short Tons)

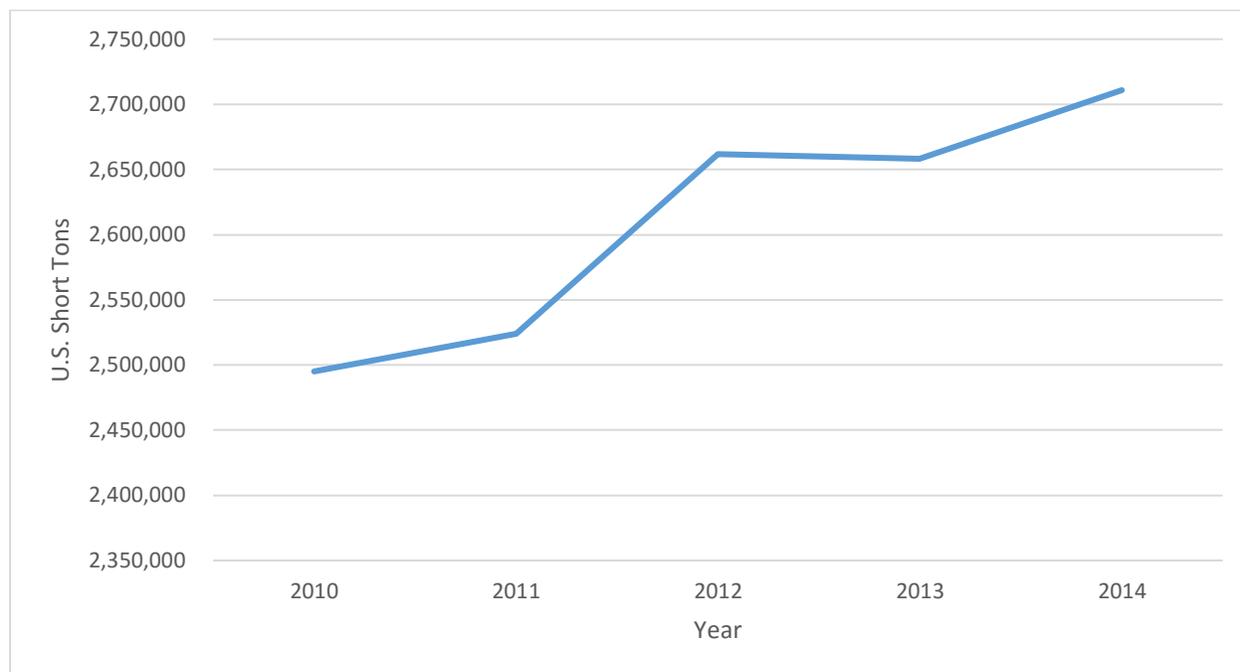
Airport	2010	2011	2012	2013	2014	Percent of Total (2014)	2012-2014 CAGR	2010-2014 CAGR
Miami International	2,024,032	2,030,793	2,127,772	2,144,007	2,144,445	81.3%	1.8%	2.1%
Orlando International	149,798	161,462	190,647	187,015	172,869	6.4%	-4.8%	3.6%
Tampa International	96,873	95,876	94,253	93,557	93,684	3.5%	-0.3%	-0.8%
Ft. Lauderdale/Hollywood International	98,067	95,931	96,935	84,115	85,945	3.2%	-5.8%	-3.2%
Jacksonville International	59,962	72,658	74,897	73,061	71,308	2.6%	-2.4%	4.4%
St. Pete-Clearwater International	15,591	15,060	18,784	19,844	21,570	0.8%	7.2%	8.5%
Palm Beach International	19,014	20,118	20,613	21,889	27,642	1.0%	15.8%	9.8%
Southwest Florida International	17,087	16,278	16,931	16,088	16,747	0.6%	-0.5%	-0.5%
Pensacola International	305	1,456	6,444	6,506	6,668	0.2%	1.7%	116.2%
Tallahassee International	10,417	10,688	9,929	8,439	7,893	0.3%	-10.8%	-6.7%
Orlando Sanford International	3,919	3,331	3,504	3,431	1,793	0.1%	-28.5%	-17.8%
Northwest Florida Beaches International	-	-	-	-	51	0.0%	100.0%	100.0%
Key West International	500	440	456	497	503	0.0%	5.0%	0.1%
Gainesville Regional	117	31	2	3	1	0.0%	-29.3%	-69.6%
Daytona Beach International	93	108	139	155	146	0.0%	2.5%	11.9%
Melbourne International	79	554	783	-	134	0.0%	-58.6%	14.1%
Destin-Ft. Walton Beach	-	-	-	-	-	0.0%	-	-
Sarasota/Bradenton International	406	324	293	258	314	0.0%	3.5%	6.2%
Northeast Florida Regional	-	-	-	-	-	0.0%	-	-
Punta Gorda	-	-	-	-	-	0.0%	-	-
Total	2,496,262	2,525,108	2,662,377	2,659,304	2,710,994	100%	0.9%	2.1%

Notes:

- 1) One U.S. Short Ton is equivalent to 2,000 lbs
- 2) CAGR = compound annual growth rate
- 3) 2014 (base year) uses a combination of the above sources; 2009-2014 uses ACI-NA due to data availability

Source: Airport Records, Airports Council International, CDM Smith

Exhibit 7-8: Statewide Historic Air Cargo Tonnage 2010-2014



Source: Airport Records, Airports Council International, CDM Smith

7.4 Air Cargo Lift Capacity Analysis

The previous section identified actual air cargo tonnage activity at Florida commercial service airports. This section highlights where and how air cargo is transported by carrier type (integrated express, all-cargo carrier, widebody passenger, RFS). The goal is to identify how much outbound aircraft and truck “lift” capacity is available among the carriers operating at Florida’s airports. A reasonable process for tracking air cargo lift capacity is provided by identifying new or discontinued air routes at Florida’s commercial service airports. Airport tonnage reports identify the quantity of air cargo handled (enplaned and deplaned) at a particular airport, but they do not provide enough information or rationale to determine how the tonnage is being moved. This lift capacity analysis identifies statewide patterns for the 14 airports with scheduled air cargo lift capacity and the 7 airports with scheduled RFS capacity.

7.4.1 Schedule Analysis Findings

This section discusses the top international and domestic air cargo markets served by Florida commercial service airports. The top RFS destinations from Florida are also identified.

7.4.1.1 Scheduled Air Cargo Activity

An analysis of the top international trade lanes by lift capacity from Florida airports determined that Miami International is the point of origin for each of the top ten trade lanes. This is consistent with what was observed in 2012 and not surprising given Miami’s role as an international air cargo gateway. MIA provides more lift to more international destinations than any other Florida airport.

Exhibit 7-9 lists the top ten international destinations served by Florida airports and the associated air cargo trade lane lift in pounds for both 2012 and 2016. Seven of the top 10 trade lanes are from Miami International to markets located in Latin America and the Caribbean, which is a decrease from 2012 when all ten of the top international trade lanes were destined for this region. Air cargo lift capacity to Bogotá, Colombia remains as the largest trade lane, followed by Cotopaxi, Ecuador; Buenos Aires, Argentina; and Lima, Peru. Interestingly, Caracas, Venezuela; Santiago, Chile; Quito, Ecuador; Manaus, Brazil; and Santo Domingo, Dominican Republic, are no longer in the top ten trade lanes from MIA as seen in 2012. In 2016, Amsterdam, London, and Hong Kong are now among the top ten trade lanes served from Miami International. The sum of total trade lane lift for the top 10 trade lanes decreased by 14 percent from 2012 to 2016, indicating that perhaps lift capacity is being dispersed more widely among more destinations and/or capacity has been shifted to other days of the week.

**Exhibit 7-9: Air Cargo Capacity for Top 10 International Trade Lanes
Average Wednesday (in Pounds)**

Origin Airport	Destination Airport	2012 Trade Lane Lift (lbs)	Origin Airport	Destination Airport	2016 Trade Lane Lift (lbs)
MIA	Bogotá	919,692	MIA	Bogotá	833,107
MIA	Caracas	684,608	MIA	Cotopaxi, Ecuador	505,630
MIA	Santiago	585,015	MIA	Buenos Aires	472,955
MIA	Campinas / São Paulo	483,815	MIA	Lima	463,278
MIA	Quito	462,300	MIA	London-Heathrow	332,664
MIA	Buenos Aires	371,616	MIA	Amsterdam	307,630
MIA	Manaus	347,600	MIA	Campinas / São Paulo	285,815
MIA	Panama City	333,912	MIA	Medellín	264,000
MIA	Medellín	198,000	MIA	Hong Kong	247,904
MIA	Santo Domingo, DR	194,904	MIA	Panama City	243,304
Total		4,581,462			3,956,287

Source: OAG, FAA IFR Records, CDM Smith

As the leader in the Americas in international freight and the world's largest gateway to Latin America and the Caribbean, MIA controls the north-south cargo flows in the Western Hemisphere. In 2014, Miami International handled 84 percent of all air imports and 81 percent of all exports from the Latin American and Caribbean region. Miami International is the leading airport in the U.S. for international freight, and ranks 10th globally. Its total air trade for 2014 was valued at \$61.6 billion, or 96 percent of the dollar value of Florida's total air imports and exports (or 40 percent of the state's total (air and sea) trade with the world).⁵²

According to Miami International's Cargo Brochure, Colombia was Miami's largest trade partner in 2014 with 242,000 tons, while Chile and Peru follow with 158,000 tons and 133,000 tons, respectively. In terms of value, MIA's largest trade partner in 2014 was Brazil with \$12.9 billion, while the second largest trade partner was Colombia with \$6.7 billion in trade value. Of all airports in the U.S. with perishable imports, Miami has the largest market share by far (70 percent). Within the perishable imports, Miami

⁵² MIA Cargo Brochure 2015-2016

also has the largest market share for each of the following categories: flower (91 percent), fruit & vegetable (78 percent), and fish (52 percent). The primary commodities exported from Miami are computers/peripherals, industrial machinery/parts, telecommunications equipment, metals and metal products, and vehicle parts/tires. The primary commodities imported through Miami include flowers, fish/crustaceans, vegetable & roots, fruits & juices, and telecommunications equipment.

To provide perspective on the amount of lift available on these top 10 air trade lanes, it is often beneficial to compare the amount of lift in pounds to the actual capacity of a Boeing 777 Freighter (B77F) aircraft, an aircraft commonly utilized by all-cargo carriers. A B77F accommodates approximately 180,000 pounds of air cargo. When applying this ratio to the total daily lift capacity on the Miami to Bogota route, it equates to over four-and-a-half B77F aircraft. The Cotopaxi route equates to nearly three B77F aircraft.

The top ten domestic trade lanes from Florida airports by average daily lift capacity are presented in **Exhibit 7-10**. As shown, air cargo capacity to Memphis remains strong in 2016 as it is included as the destination point in 5 of the top 10 trade lanes. However, whereas Memphis previously occupied the top 4 trade lane destinations, in 2016 it is now spread throughout the ranking. FedEx Express capacity between Florida airports and its Memphis hub has declined from 2,034,200 pounds in 2012 to 1,797,488 pounds in 2016. This decline can be attributed to increased competition from domestic widebody passenger carrier routes and the continued increase in RFS capacity. UPS activity at Florida airports remains strong on routes feeding its hub in Louisville, as both routes from Orlando and Miami have seen growth in lift capacity from 2012 to 2016. Although DHL’s hub in Cincinnati continues to grow, lift capacity from Florida airports to Cincinnati has declined from 2012 to 2016.

Exhibit 7-10: Air Cargo Capacity for Top 10 Domestic Trade Lanes
Average Wednesday (in Pounds)

Origin Airport	Destination Airport	2012 Trade Lane Lift (lbs)	Origin Airport	Destination Airport	2016 Trade Lane Lift (lbs)
TPA	Memphis	575,200	TPA	Memphis	594,000
FLL	Memphis	487,800	MCO	Louisville	456,096
MIA	Memphis	396,000	MIA	New York (JFK)	417,678
MCO	Memphis	396,000	MIA	Memphis	388,992
MCO	Louisville	396,000	MCO	Memphis	377,200
MIA	Cincinnati	330,000	MIA	Los Angeles	264,095
MIA	Anchorage	307,630	FLL	Memphis	239,296
FLL	Ft Worth (AFW)	264,052	MIA	Cincinnati	198,000
MIA	Atlanta	221,600	JAX	Memphis	198,000
JAX	Memphis	179,200	MIA	Louisville	177,304
Total		3,553,482			3,310,661

Source: OAG, FAA IFR Records, CDM Smith

As shown in **Exhibit 7-10**, Tampa to Memphis remains the largest domestic trade lane from Florida, while the next largest domestic trade lanes are Orlando to Louisville and Miami to New York (JFK). Ft. Lauderdale to Memphis dropped from the second largest domestic trade lane in 2012 to the seventh largest in 2016. The three major integrated express hubs are included as destinations on 8 of the top 10 domestic trade lanes from Florida: Memphis (FedEx), Louisville (UPS), and Cincinnati (DHL). The remaining destination markets included in the top ten domestic trade lanes are New York (JFK) and Los Angeles – two major international gateways for both passengers and air cargo.

When considering the extensive reach of Florida commercial service airports, it becomes evident that air cargo can reach virtually any point in the globe in a matter of hours. With scheduled nonstop air cargo service to four continents and many sub regions, virtually any point on the globe can be reached from Florida with only a single connection. The statewide average daily lift capacity of over 13.6 million pounds is spread among many destination markets, both domestic and international. As shown in **Exhibit 7-11**, all-cargo carriers are responsible for 38 percent of the statewide lift capacity, while integrated express and widebody passenger carriers make up 36 percent and 26 percent, respectively. Domestically, integrated express carriers dominate the available lift capacity, and internationally it is all-cargo carriers that account for the most available lift capacity. The largest single share of international lift capacity is provided by all-cargo carriers to South America (18 percent). The second largest share of international lift capacity is provided by widebody passenger carriers to Europe (13 percent), followed by widebody passenger carriers to South America (8 percent) and all-cargo carriers to Latin America/the Caribbean. **Exhibit 7-11** breaks down the share of average daily lift capacity from Florida by destination region and carrier type.

**Exhibit 7-11: Share of Statewide Average Daily Lift Capacity
by Destination World Region and Carrier Type**

Destination Region	All Cargo Carrier	Integrated Express	Passenger	Grand Total
Domestic	6.4%	30.0%	3.9%	40.3%
Lat Am/Carib ⁵³ .	0.5%	0.4%	<0.1%	0.9%
North America	5.9%	29.6%	3.9%	39.4%
International	31.6%	5.7%	22.3%	59.7%
Asia	4.1%	<0.1%	<0.1%	4.1%
Europe	2.2%	<0.1%	12.7%	14.9%
Lat Am/Carib.	7.4%	3.3%	0.1%	10.8%
Middle East	<0.1%	<0.1%	0.8%	0.8%
North America	<0.1%	<0.1%	0.5%	0.5%
South America	18.0%	2.4%	8.2%	28.5%
Grand Total	38.1%	35.7%	26.2%	100.0%

Source: OAG, CDM Smith

7.4.1.2 Scheduled Road Feeder Service (RFS) Activity

In 2016, seven Florida airports had more than 24 million pounds of available capacity each week on RFS truck routes. The top 10 RFS routes totaled nearly 16.7 million pounds of available capacity. This equates

⁵³ Puerto Rico makes up domestic air cargo service to Latin America/the Caribbean

to more than 92 B77F aircraft per week, or about 13 aircraft per day. Of the 16.7 million pounds of RFS capacity provided, 24 percent is related to RFS truck routes within the State of Florida and the remaining 76 percent moves to markets outside the state. This is an increase from the 20 percent of RFS capacity remaining in-state in 2012. **Exhibit 7-12** details the weekly RFS capacity offered from Florida to the top 10 U.S. destination cities.

Exhibit 7-12: Florida Weekly RFS Cargo Capacity to the Top 10 U.S. Destinations (in Pounds)

Destination City	2012 Weekly Capacity (lbs)	Percent of Total	Destination City	2016 Weekly Capacity (lbs)	Percent of Total
Atlanta	1,950,000	18%	Atlanta	3,585,000	21%
New York^	1,500,000	14%	New York^	2,670,000	10%
Chicago	1,350,000	12%	Miami	1,680,000	16%
Miami	1,125,000	10%	Orlando	1,515,000	9%
Orlando	1,050,000	9%	Chicago	1,455,000	9%
Washington DC	1,005,000	9%	Washington DC	1,155,000	7%
Houston	840,000	8%	Dallas-Ft. Worth	1,020,000	6%
New Orleans	765,000	7%	New Orleans	1,020,000	6%
Los Angeles	765,000	7%	Houston	870,000	5%
Charlotte	750,000	7%	Los Angeles	855,000	5%
			Tampa	855,000	5%
	11,100,000	100%		16,680,000	100%

[^]Includes RFS routes to JFK and EWR airports

Source: OAG, CDM Smith

As shown in **Exhibit 7-12**, Atlanta remains the top market for RFS capacity in 2016, with a 21 percent share of the total capacity for the top 10 destinations. Total available RFS capacity to Atlanta increased by 84 percent from 2012 to 2016. New York remains as the second largest destination market for RFS capacity, and likewise is significantly increasing its available capacity. Miami and Orlando rank third and fourth, supplanting Chicago which ranked third in 2012 and fifth in 2016. Washington DC, Dallas-Ft. Worth, New Orleans, Houston, and Los Angeles remain in the bottom half of the top ten RFS destinations. Tampa emerged as the only new entrant to the top ten ranking, supplanting Charlotte at 10th.

By destination state, the majority of available outbound RFS capacity from Florida commercial service airports is intra-state (19 percent). This is not surprising given the fact that it is generally more cost-efficient to truck the majority of air freight over distances of less than 500 miles.⁵⁴ The second highest share of Florida's outbound RFS capacity is destined for Georgia (15 percent), followed by Texas (9 percent), New York (9 Percent), California (7 percent), and Illinois (6 percent). **Exhibit 7-13** lists the top 20 destination states by share of weekly outbound RFS capacity from Florida commercial service airports.

⁵⁴ US DOT Bureau of Transportation Statistics

Exhibit 7-13: Share of Statewide Weekly RFS Capacity by Destination State (Top 20)

RFS Destination State	Share of Statewide Average Weekly Capacity
Florida	18.7%
Georgia	14.7%
Texas	8.7%
New York	8.6%
California	7.0%
Illinois	6.0%
District of Columbia	4.7%
New Jersey	4.6%
North Carolina	4.2%
Louisiana	4.2%
Ohio	3.0%
Missouri	2.6%
Tennessee	2.1%
South Carolina	1.7%
Oklahoma	1.2%
Pennsylvania	1.2%
Washington	1.1%
Indiana	0.9%
Alabama	0.9%
Oregon	0.7%

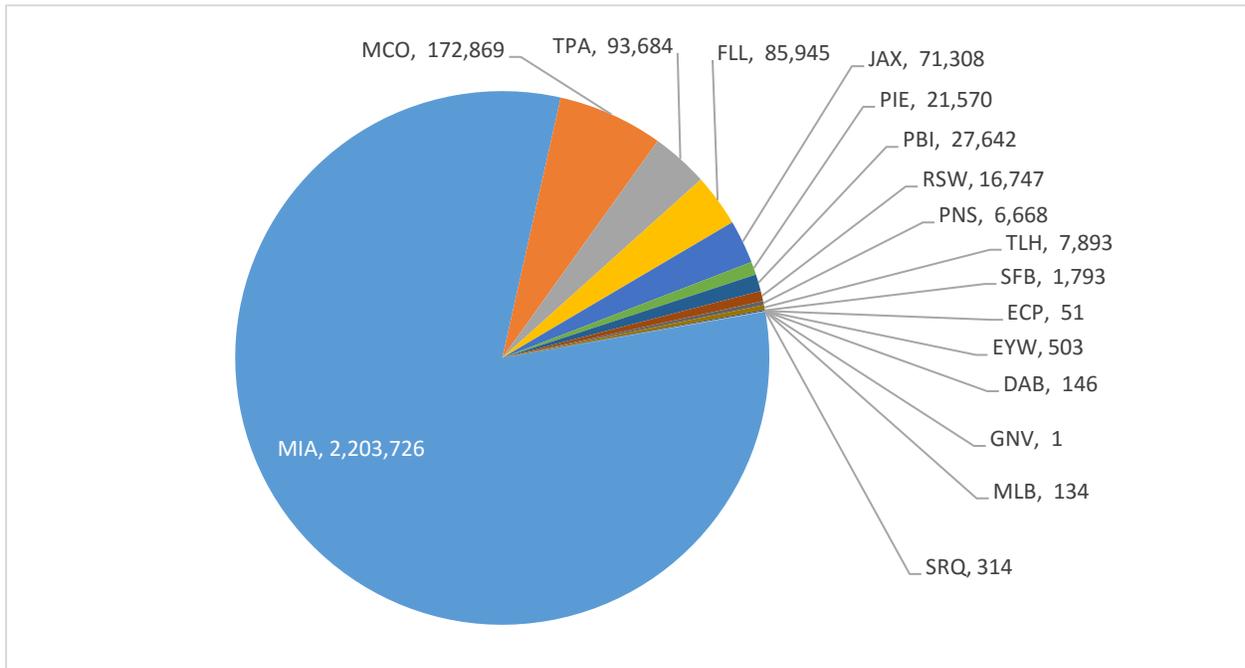
Source: OAG, CDM Smith

7.5 Summary of Findings

Overall, actual air cargo tonnage enplaned and deplaned at Florida’s commercial service airports increased at an average annual growth rate of 2.1 percent from 2010 to 2014. Of the 15 airports with measurable tonnage, 9 saw increases in enplaned and deplaned air cargo tonnage for a net gain of nearly 216,000 tons. The 6 airports that experienced decreases in air cargo tonnage combined for a loss of approximately 20,000 tons. As shown in **Exhibit 7-14**, Miami International Airport continues to be the major driver of air cargo tonnage growth.

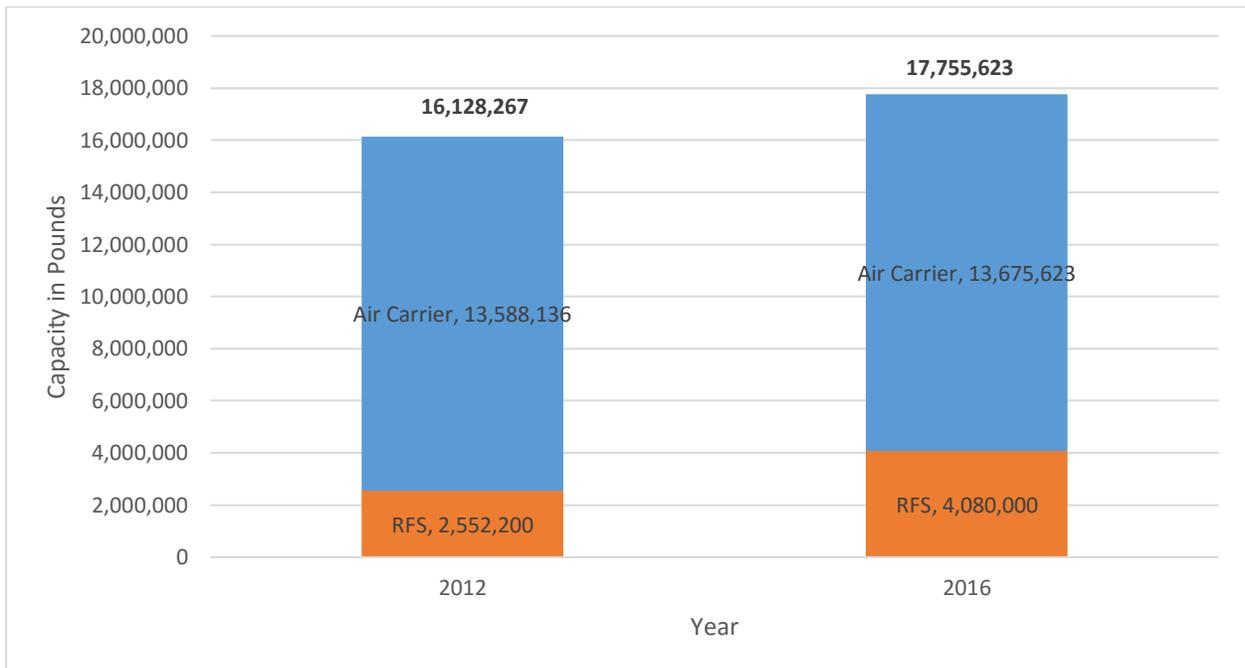
Road Feeder Service (RFS) continues to grow rapidly and acts as air cargo’s primary competition, as available RFS capacity has grown by 36 percent between 2012 and 2016. Rising fuel prices that began in 2008 and remained high through 2014 caused shippers to seek alternative modes and reduce overall dependence on shipping by air. As of June 2016, Florida offers a total weekly RFS capacity of over 24.3 million pounds from 7 airports. The top RFS destinations from Florida airports are Atlanta, New York, Miami, Orlando, Chicago, Washington DC, Dallas, and New Orleans. **Exhibit 7-15** depicts Florida’s air cargo and RFS aggregated average daily capacity.

Exhibit 7-14: 2014 Air Cargo Tonnage at Florida Commercial Service Airports (in U.S. Short Tons)



Source: Airport Records, Airports Council International, CDM Smith

Exhibit 7-15: Statewide Air and RFS Aggregated Average Daily Capacity (in Pounds)



Source: CDM Smith

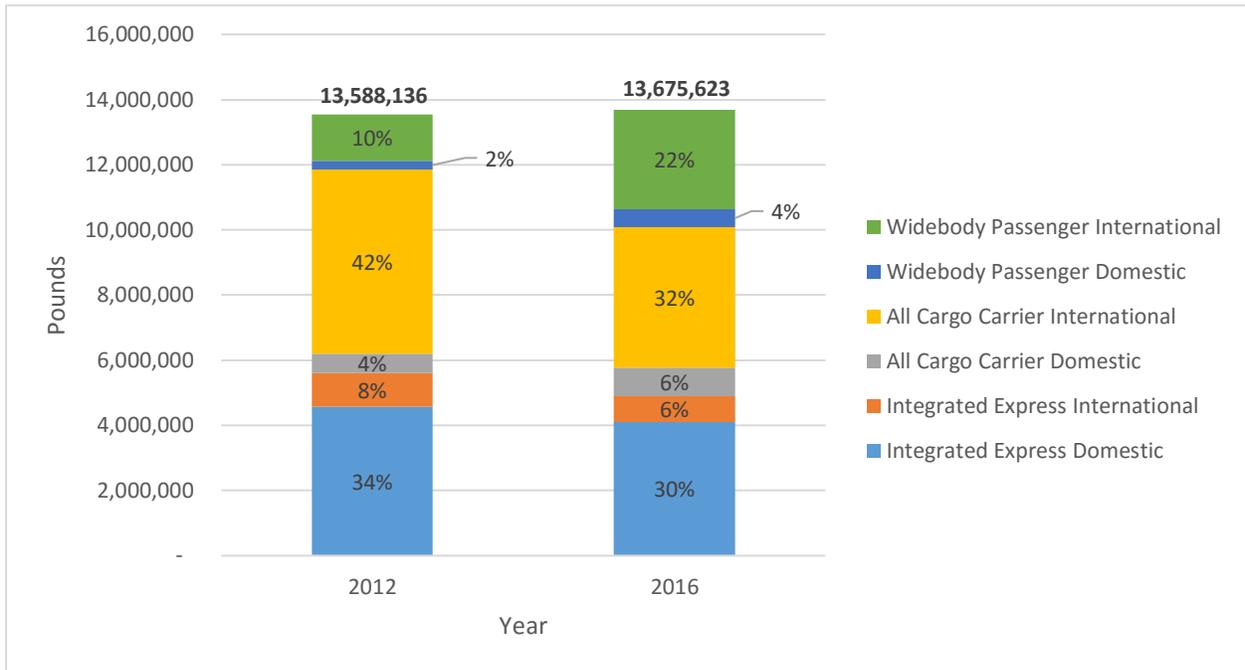
In addition to air cargo tonnage growth, available lift capacity also exhibited moderate growth despite increased competition from available RFS. Florida’s commercial service airports reviewed in this analysis offer a total of over 13.6 million pounds of air cargo lift capacity on a typical Wednesday, the busiest day in the air cargo industry workweek. This represents an increase of 0.6 percent since 2012. Eight airports exhibited growth in average daily lift capacity, while seven did not. The biggest gains were seen at Miami International, Tampa International, and Orlando International, while the biggest drops in lift capacity were at Ft. Lauderdale/Hollywood International, Palm Beach International, and Southwest Florida International.

With a 70 percent share of the statewide total, Miami remains the primary driver of air cargo lift capacity growth. Miami International is the origin airport for all of the top ten international trade lanes determined by average daily lift capacity, the destinations of which are Bogotá followed by Cotopaxi, Buenos Aires, Lima, Amsterdam, and London. Domestically, the top trade lanes by average daily lift capacity primarily consist of routes to integrator hubs such as Tampa to Memphis and Orlando to Louisville, or routes to major international gateway airports such as Miami to New York and Los Angeles.

Widebody passenger lift capacity increased significantly both domestically and internationally. Domestically, airlines are using more passenger widebodies (such as Boeing 767s) to increase passenger capacity between large hubs and slot-limited airports. In Florida, Miami International and Orlando International see the majority of widebody passenger aircraft; however, Southwest Florida International, Tampa International, and Orlando-Sanford International also accommodate international widebody passenger operations. At Miami International, between 2012 and 2016, American Airlines increased total weekly widebody passenger departures from 44 to 131.

Internationally, commercial airline passenger demand continues to grow, as evidenced by the increase in lift capacity by widebody passenger aircraft. Widebody passenger aircraft not only increase available seats for passengers, but they also dramatically increase the availability of belly cargo space. Higher volumes of available belly cargo space, designed to accommodate containers/ULDs, creates enhanced opportunity to increase revenue for passenger airlines. This increase in widebody passenger lift capacity competes with all-cargo and integrated express carrier capacity for freight, which has exhibited a corresponding decline in lift capacity – domestic and internationally. These patterns in statewide air cargo lift capacity by carrier composition are depicted in **Exhibit 7-16**.

Exhibit 7-16: Statewide Average Daily Lift Capacity Carrier Composition (in Pounds)



Source: OAG, FAA IFR Records, CDM Smith

Chapter 8. AIR CARGO FORECASTS – COMMERCIAL SERVICE AIRPORTS

Airport managers, airport boards, and other stakeholders recognize air cargo as an important aviation activity for airports. One regularly scheduled air cargo flight by an air cargo carrier, such as FedEx Express, can carry thousands of pounds' worth of parcels for hundreds of shippers and receivers on a routine basis, and is a vital link to the national and global economy. This chapter presents air cargo activity forecasts for Florida's commercial service airports. The forecasts include estimates of annual air cargo (freight and mail) tonnage and dedicated cargo aircraft operations. The development of air cargo activity projections is a key step in assessing the need for and phasing of future air cargo-related development requirements. Projections are useful to evaluate the future capacity of the air cargo system as well as to plan for future airside and landside facilities. For this analysis, projections were developed for a 5-, 10-, and 20-year forecast horizon, with 2014 serving as the base year. The air cargo forecasts are presented in the following sections:

- Historic Air Cargo Activity in Florida
- Florida Air Cargo Forecasts
- Comparison of Forecasts
- Preferred Forecasts
- Summary

8.1 Historic Air Cargo Activity in Florida

Air cargo activity at Florida's commercial service airports from 2005 to 2014, including enplaned and deplaned freight and mail tonnage, as well as airport market share, is presented in **Exhibit 8-1**. Converting tonnage data to average weight in pounds per business day (five days per week) provides a clearer picture of the air cargo activity that takes place on an average business day and is useful when comparing to aircraft capacities. (see **Exhibit 8-2**) Historic data was obtained primarily from airport management. Where airport management data was not available, Airports Council International – North America (ACI-NA) and T-100 data from the United States Department of Transportation's (U.S. DOT) Bureau of Transportation Statistics (BTS) were used.

As shown in Table 1, air cargo tonnage on a statewide level grew at a compound annual growth rate (CAGR) of 0.3 percent from 2005 to 2014. During this period, tonnage decreased at 14 airports and increased at only 3. Growth during the 2005 to 2014 period was significantly impacted by the global recession of 2007 to 2009. When examining the post-recession period of 2010 to 2014, however, a different picture emerges. Statewide air cargo volume during this period increased at a CAGR of 2.1 percent, with 10 airports experiencing growth in tonnage and only 7 losing tonnage.

**Exhibit 8-1: Historic Freight and Mail Tonnage
at Florida’s Commercial Service Airports (Short Tons), 2005-2014**

ID	Associated City	Airport Name	Measure	2005	2010	2014	2005-14 CAGR	2010-14 CAGR
DAB	Daytona Beach	Daytona Beach International	Total Tonnage	212	93	146	-4.1%	11.8%
			Market Share	0.01%	0.00%	0.01%		
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Total Tonnage	175,497	98,067	85,945	-7.6%	-3.2%
			Market Share	6.66%	3.93%	3.17%		
RSW	Fort Myers	Southwest Florida International	Total Tonnage	19,964	17,087	16,747	-1.9%	-0.5%
			Market Share	0.76%	0.68%	0.62%		
GNV	Gainesville	Gainesville Regional	Total Tonnage	545	117	1	-50.3%	-69.6%
			Market Share	0.02%	0.00%	0.00%		
JAX	Jacksonville	Jacksonville International	Total Tonnage	83,959	59,962	71,308	-1.8%	4.4%
			Market Share	3.18%	2.40%	2.63%		
EYW	Key West	Key West International	Total Tonnage	563	500	503	-1.2%	0.1%
			Market Share	0.02%	0.02%	0.02%		
MLB	Melbourne	Melbourne International	Total Tonnage	329	79	134	-9.5%	14.0%
			Market Share	0.01%	0.00%	0.00%		
MIA	Miami	Miami International	Total Tonnage	1,934,150	2,024,032	2,203,726	1.5%	2.1%
			Market Share	73.37%	81.08%	81.29%		
MCO	Orlando	Orlando International	Total Tonnage	249,025	149,798	172,869	-4.0%	3.6%
			Market Share	9.45%	6.00%	6.38%		
SFB	Orlando	Orlando Sanford International	Total Tonnage	9,322	3,919	1,793	-16.7%	-17.7%
			Market Share	0.35%	0.16%	0.07%		
ECP	Panama City	Northwest Florida Beaches International	Total Tonnage	0	0	51	100.0%	100.0%
			Market Share	0.00%	0.00%	0.00%		
PNS	Pensacola	Pensacola International	Total Tonnage	3,479	305	6,668	7.5%	116.2%
			Market Share	0.13%	0.01%	0.25%		
PGD	Punta Gorda	Punta Gorda	Total Tonnage	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
SRQ	Sarasota	Sarasota/Bradenton International	Total Tonnage	313	406	314	0.0%	-6.2%
			Market Share	0.01%	0.02%	0.01%		
SGJ	St. Augustine	Northeast Florida Regional	Total Tonnage	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Total Tonnage	25,268	15,591	21,570	-1.7%	8.5%
			Market Share	0.96%	0.62%	0.80%		
TLH	Tallahassee	Tallahassee International	Total Tonnage	12,980	10,417	7,893	-5.4%	-6.7%
			Market Share	0.49%	0.42%	0.29%		
TPA	Tampa	Tampa International	Total Tonnage	100,439	96,873	93,684	-0.8%	-0.8%
			Market Share	3.81%	3.88%	3.46%		
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Total Tonnage	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PBI	West Palm Beach	Palm Beach International	Total Tonnage	19,355	19,014	27,642	4.0%	9.8%
			Market Share	0.73%	0.76%	1.02%		
Total			Total Tonnage	2,635,401	2,496,262	2,710,994	0.3%	2.1%
			Market Share	100.00%	100.00%	100.00%		

Note 1: Data for 2005-2009 is for Panama City-Bay County International Airport, which closed in 2010. Data for 2010-2014 is for Northwest Florida Beaches International Airport.

Source: Airports Council International – North America, airport management data, and US DOT BTS T-100 data

**Exhibit 8-2: Historic Freight and Mail Average Weight per Business Day
at Florida's Commercial Service Airports (In Pounds), 2005-2014**

ID	Associated City	Airport Name	Measure	2005	2010	2014	2005-14 CAGR	2010-14 CAGR
DAB	Daytona Beach	Daytona Beach International	Total Pounds	1,634	719	1,123	-4.1%	11.8%
			Market Share	0.01%	0.00%	0.01%		
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Total Pounds	1,349,979	754,365	661,115	-7.6%	-3.2%
			Market Share	6.66%	3.93%	3.17%		
RSW	Fort Myers	Southwest Florida International	Total Pounds	153,569	131,438	128,823	-1.9%	-0.5%
			Market Share	0.76%	0.68%	0.62%		
GNV	Gainesville	Gainesville Regional	Total Pounds	4,189	902	8	-50.3%	-69.6%
			Market Share	0.02%	0.00%	0.00%		
JAX	Jacksonville	Jacksonville International	Total Pounds	645,835	461,245	548,523	-1.8%	4.4%
			Market Share	3.18%	2.40%	2.63%		
EYW	Key West	Key West International	Total Pounds	4,331	3,846	3,869	-1.2%	0.1%
			Market Share	0.02%	0.02%	0.02%		
MLB	Melbourne	Melbourne International	Total Pounds	2,527	611	1,031	-9.5%	14.0%
			Market Share	0.01%	0.00%	0.00%		
MIA	Miami	Miami International	Total Pounds	14,878,075	15,569,477	16,951,738	1.5%	2.1%
			Market Share	73.37%	81.08%	81.29%		
MCO	Orlando	Orlando International	Total Pounds	1,915,577	1,152,296	1,329,762	-4.0%	3.6%
			Market Share	9.45%	6.00%	6.38%		
SFB	Orlando	Orlando Sanford International	Total Pounds	71,710	30,144	13,796	-16.7%	-17.7%
			Market Share	0.35%	0.16%	0.07%		
ECP	Panama City	Northwest Florida Beaches International	Total Pounds	0	0	392	100.0%	100.0%
			Market Share	0.00%	0.00%	0.00%		
PNS	Pensacola	Pensacola International	Total Pounds	26,761	2,349	51,292	7.5%	116.2%
			Market Share	0.13%	0.01%	0.25%		
PGD	Punta Gorda	Punta Gorda	Total Pounds	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
SRQ	Sarasota	Sarasota/Bradenton International	Total Pounds	2,408	3,123	2,415	0.0%	-6.2%
			Market Share	0.01%	0.02%	0.01%		
SGJ	St. Augustine	Northeast Florida Regional	Total Pounds	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Total Pounds	194,371	119,931	165,923	-1.7%	8.5%
			Market Share	0.96%	0.62%	0.80%		
TLH	Tallahassee	Tallahassee International	Total Pounds	99,849	80,129	60,715	-5.4%	-6.7%
			Market Share	0.49%	0.42%	0.29%		
TPA	Tampa	Tampa International	Total Pounds	772,609	745,179	720,646	-0.8%	-0.8%
			Market Share	3.81%	3.88%	3.46%		
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Total Pounds	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PBI	West Palm Beach	Palm Beach International	Total Pounds	148,888	146,262	212,631	4.0%	9.8%
			Market Share	0.73%	0.76%	1.02%		
Total			Total Pounds	20,272,312	19,202,015	20,853,804	0.3%	2.1%
			Market Share	100.00%	100.00%	100.00%		

Note 1: Data for 2005-2009 is for Panama City-Bay County International Airport, which closed in 2010. Data for 2010-2014 is for Northwest Florida Beaches International Airport.

Source: Airports Council International – North America, airport management data, and US DOT BTS T-100 data

Exhibit 8-3 depicts the growth in air cargo tonnage on a statewide level during the 2005 to 2014 period. Air cargo tonnage peaked at nearly 2.8 million tons in 2007 before dropping in 2009 (as a result of the global recession) to its lowest level (2.2 million tons) during the 10-year period. Tonnage has returned to a growth trajectory since 2010, with total tonnage in 2014 (2.7 million tons) nearly reaching the 2007 peak. It is important to note that Miami International Airport (MIA) on average accounted for 78 percent of Florida’s enplaned and deplaned air cargo tonnage during the 2005 to 2014 period. MIA’s historic tonnage is shown in Figure 1 to illustrate that airport’s prominence in the Florida air cargo landscape.

Exhibit 8-3: Air Cargo Tonnage Enplaned and Deplaned at Florida’s Commercial Service Airports, 2005-2014



Source: Airports Council International – North America, airport management data, and US DOT BTS T-100 data

Compiled from US DOT BTS T-100 data, **Exhibit 8-4** presents historic dedicated cargo aircraft operations data for Florida’s commercial service airports from 2005 to 2014. As shown in the table, the effect of the global recession on statewide dedicated cargo operations is evident.⁵⁵ Total operations decreased at a CAGR of 1.8 percent during the overall 2005 to 2014 period, but grew at a CAGR of 1.1 percent from 2010 to 2014 as the economy rebounded. At the individual airport level, nine airports experienced negative growth in operations and four airports experienced positive growth from 2005 to 2014. From 2010 to 2014, however, five airports saw negative growth and seven airports saw positive growth. Note

⁵⁵ It should be noted that US DOT BTS T-100 data does not include all regional air cargo carriers and feeder airlines (only carriers with \$20 million or more in operating revenue). It is, however, the best available source for dedicated air cargo aircraft operations data on an annual basis.

that the vast majority of dedicated cargo aircraft operations in Florida occur at MIA, where operations increased from approximately 36,400 operations in 2005 to approximately 37,400 operations in 2014.

Exhibit 8-4: Historic Dedicated Air Cargo Aircraft Operations at Florida’s Commercial Service Airports, 2005-2014

ID	Associated City	Airport Name	Measure	2005	2010	2014	2005-14 CAGR	2010-14 CAGR
DAB	Daytona Beach	Daytona Beach International	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Operations	5,277	3,902	3,903	-3.3%	0.0%
			Market Share	7.98%	7.23%	6.94%		
RSW	Fort Myers	Southwest Florida International	Operations	1,946	1,071	1,110	-6.0%	0.9%
			Market Share	2.94%	1.98%	1.97%		
GNV	Gainesville	Gainesville Regional	Operations	628	199	4	-43.0%	-62.3%
			Market Share	0.95%	0.37%	0.01%		
JAX	Jacksonville	Jacksonville International	Operations	3,850	2,567	2,300	-5.6%	-2.7%
			Market Share	5.82%	4.76%	4.09%		
EYW	Key West	Key West International	Operations	806	711	739	-1.0%	1.0%
			Market Share	1.22%	1.32%	1.31%		
MLB	Melbourne	Melbourne International (Note 1)	Operations	0	2	2	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
MIA	Miami	Miami International	Operations	36,360	35,030	37,430	0.3%	1.7%
			Market Share	55.00%	64.89%	66.57%		
MCO	Orlando	Orlando International	Operations	8,379	4,896	4,804	-6.0%	-0.5%
			Market Share	12.67%	9.07%	8.54%		
SFB	Orlando	Orlando Sanford International (Note 2)	Operations	0	1	5	22.3%	49.5%
			Market Share	0.00%	0.00%	0.01%		
ECP	Panama City	Northwest Florida Beaches International (Note 3)	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PNS	Pensacola	Pensacola International (Note 4)	Operations	509	0	535	0.6%	56.1%
			Market Share	0.77%	0.00%	0.95%		
PGD	Punta Gorda	Punta Gorda	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
SRQ	Sarasota	Sarasota/Bradenton International	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
SGJ	St. Augustine	Northeast Florida Regional	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Operations	3,022	794	798	-13.8%	0.1%
			Market Share	4.57%	1.47%	1.42%		
TLH	Tallahassee	Tallahassee International	Operations	1,852	1,586	1,416	-2.9%	-2.8%
			Market Share	2.80%	2.94%	2.51%		
TPA	Tampa	Tampa International	Operations	1,668	1,647	1,984	1.9%	4.8%
			Market Share	2.52%	3.05%	3.53%		
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Operations	0	0	0	0.0%	0.0%
			Market Share	0.00%	0.00%	0.00%		
PBI	West Palm Beach	Palm Beach International	Operations	1,811	1,575	1,287	-3.7%	-4.9%
			Market Share	2.74%	2.92%	2.29%		
Total			Total Operations	66,108	53,981	56,317	-1.8%	1.1%
			Market Share	100.00%	100.00%	100.00%		

Note 1: The 2005-14 compound annual growth rate (CAGR) is calculated using operations (2) in 2006, since there were no operations at MLB in 2005.

Note 2: The 2005-14 CAGR is calculated using operations (1) in 2006, since there were no operations at SFB in 2005.

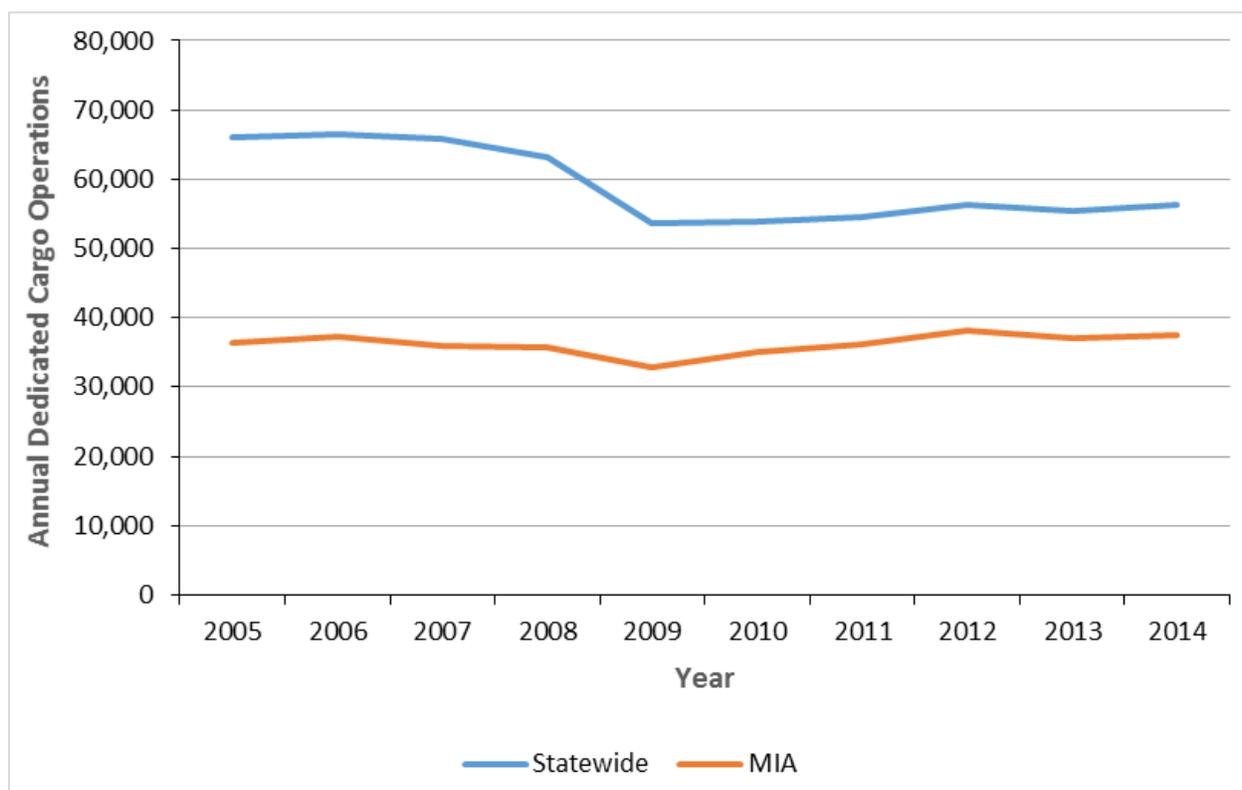
Note 3: Data for 2005-2009 is for Panama City-Bay County International Airport, which closed in 2010. Data for 2010-2014 is for Northwest Florida Beaches International Airport.

Note 4: The 2010-14 CAGR is calculated using operations (90) in 2011, since there were no operations at PNS in 2010.

Source: US DOT BTS T-100 data

Exhibit 8-5 graphically identifies the overall trend of the data in Table 3. Dedicated air cargo operations were at their highest level at over 66,000 operations from 2005 to 2007 before the global recession. Operations dipped below 54,000 in 2009, their lowest level during the 10-year period. However, Growth in operations, although gradual, has resumed since 2009. This overall decline in dedicated cargo aircraft operations can be attributed to several factors including a modal shift towards trucking, an increase in average aircraft size (larger cargo aircraft), and an increase in passenger airline belly cargo capacity due to “up-gauging” aircraft size and growth in widebody aircraft fleets. Operations rose from nearly 53,600 in 2009 to more than 56,300 in 2014. Similar to **Exhibit 8-3**, MIA is included in **Exhibit 8-5** since it plays such a significant role in Florida’s air cargo system. MIA accommodated 67 percent of the dedicated cargo operations at Florida’s commercial service airports in 2014, up from 55 percent in 2005.

Exhibit 8-5: Dedicated Air Cargo Aircraft Operations at Florida’s Commercial Service Airports, 2005-2014



Source: US DOT BTS T-100 data

8.2 Florida Air Cargo Forecasts

Prior to forecasting the demand for air cargo, several assumptions were developed based on historic air cargo trends in the state and recent trends in the industry. These trends reflect the current logistics modes used by integrated express operators. The following assumptions were used to forecast air cargo volumes and dedicated cargo operations at the commercial service airports in Florida:

- Integrated express carriers will generally operate using the same mode of transport throughout the planning period.

- Air cargo growth in Florida is a result of the state’s growing reliance on air cargo and reliance on international trade.
- The FedEx Express/USPS mail contract continues throughout the 20-year planning period.
- By the end of the planning period, the air cargo aircraft fleet mix will consist increasingly of more fuel-efficient aircraft such as the Boeing 767, Boeing 777, Boeing 787, and Airbus A350, and fewer less fuel efficient aircraft such as the Boeing 747, MD-11, and DC-10.
- Integrated express operators’ route structures will remain unchanged.

Several resources were consulted to develop reasonable forecasting methodologies for projecting future air cargo tonnage (freight and mail) and dedicated cargo aircraft operations for Florida’s commercial service airports. These resources were as follows:

- *Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-7 – The Airport System Planning Process*
- *Forecasting Aviation Activity by Airport*, prepared by the FAA’s Office of Aviation Policy and Plans in January 2001
- *Air Cargo Guide*, prepared by ACI-NA in December 2013

FAA AC 150/5070-7 – The Airport System Planning Process states that the FAA’s report *Forecasting Aviation Activity by Airport* should be consulted to determine what approach to use in system planning forecasting efforts. Examples of common forecasting techniques discussed in the report include regression and trend analysis, share analysis, and comparison with other airports. The report explains “the discussion is not all-inclusive, and additional techniques might be acceptable. A forecast effort could involve a number of techniques.”⁵⁶

ACI-NA’s *Air Cargo Guide* was consulted, since it provides guidance specifically for developing air cargo demand forecasts. According to the *Air Cargo Guide*, the most common air cargo forecasting techniques include a simple growth rate methodology, time series analysis, and an econometric approach. The *Air Cargo Guide* explains that “each of these techniques has its own set of advantages and drawbacks, and they may be used independently or in combination. No one approach is always the best.”⁵⁷ It further states that “the most appropriate forecasting methodology is typically determined based on the available data.”⁵⁸

Based on a review of these resources and consideration of the availability of data, it was determined that the simple growth rate methodology was a reasonable technique to forecast air cargo activity for the 2016 Florida Air Cargo Study. The simple growth rate methodology applies a broad-based growth rate to an air cargo statistic such as tonnage transported or aircraft operations. The assumption is that the forecast growth rate applies to the study airports. In this forecasting effort four variations of the

⁵⁶ *Forecasting Aviation Activity by Airport*, prepared by GRA, Incorporated for the FAA Office of Aviation Policy and Plans, July 2001, page 11.

⁵⁷ *Air Cargo Guide*, Airports Council International-North America, December 2013, page 18.

⁵⁸ Ibid.

simple growth rate methodology were used, each based on a different data source. The four variations of the simple growth rate methodology are as follows.

1. Historic Growth Rate Methodology

The historic growth rate methodology assumes that air cargo tonnage and dedicated air cargo operations at each commercial service airport in Florida will grow at the statewide growth rates observed for tonnage and operations during the post-global recession period of 2010-2014.

2. Population Growth Methodology

ACI-NA's *Air Cargo Guide* explains that links between the level of aviation activity and economic growth within a catchment area, which is the area and population from which a facility or region attracts business, is well documented. Air cargo traffic increases in a catchment area as population, income, employment, and business activity grow. Projected population data readily available from Florida's Office of Economic and Demographic Research for the 2014-2034 period was used to derive a growth rate to forecast air cargo tonnage and dedicated cargo operations at the commercial service airports throughout the planning period.

3. Boeing World Air Cargo Forecast Methodology

According to ACI-NA's *Air Cargo Guide*, cargo forecasts prepared by Boeing and Airbus can be useful in forecasting cargo demand. Boeing's *World Air Cargo Forecast* is released on a biennial basis and provides a comprehensive overview of the air cargo industry, including identification of major trends, summaries of the world's major air trade markets, and forecasts of future activity and demand for freighter aircraft. For this study, growth rates from Boeing's *World Air Cargo Forecast 2014-2015* (most recent published version) were readily available and used to project future air cargo activity.

4. FAA Aerospace Forecast Methodology

ACI-NA's *Air Cargo Guide* and the FAA's *Forecasting Aviation Activity by Airport* report identify the *FAA Aerospace Forecast* as a useful data source for forecasting aviation activity. This forecast provides the FAA's official 20-year outlook of the air cargo industry and projected domestic and international growth in activity. Similar to the Boeing World Air Cargo Forecast Methodology, growth rates from the *FAA Aerospace Forecast FY2016-2036* (the FAA's most recent forecast) were readily available and applied to this study's base year data from 2014 to project future air cargo activity.

It should be noted that a review of available Florida commercial service airport master plans was conducted to determine if it was appropriate to incorporate any of the air cargo forecasts from those studies. Following this review, it was decided that in order to develop statewide forecasts using a consistent methodology based on 2014 cargo tonnage and dedicated cargo operations data, no air cargo forecasts from these master plans would be used in the 2016 Florida Air Cargo Study.

8.2.1 Historic Growth Rate Methodology

The historic CAGRs for total air cargo tonnage and dedicated cargo aircraft operations at Florida’s commercial service airports were used to project growth in air cargo tonnage and dedicated cargo aircraft operations, respectively, at each location. As identified in **Exhibit 8-6** and **Exhibit 8-7**, total air cargo tonnage and dedicated air cargo aircraft operations at each commercial service airport grew at CAGRs of 2.1 percent and 1.1 percent, respectively, during the 2010 to 2014 period. Using these growth rates to forecast future activity, total air cargo tonnage for Florida’s commercial service airports is projected to reach more than 3.0 million tons by 2019 and nearly 4.1 million tons by the end of the planning period in 2034 (CAGR of 2.1 percent). Total dedicated cargo aircraft operations are projected to increase from 56,317 operations in 2014 to nearly 59,390 operations by 2019 and over 69,500 operations by 2034 (CAGR of 1.1 percent).

**Exhibit 8-6: Air Cargo Tonnage Forecast for Florida Commercial Service Airports
Historic (2010-2014) Growth Rate Methodology, in Short Tons**

ID	Associated City	Airport Name	Measure	Historic CAGR, 2010-14	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	<u>Freight</u>					
			Domestic	2.1%	146	160	180	220
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			Total		146	160	180	220
Market Share		0.01%	0.01%	0.01%	0.01%			
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	<u>Freight</u>					
			Domestic	2.1%	81,974	90,910	100,810	123,990
			International	2.1%	727	810	890	1,100
			<u>Mail</u>					
			Domestic	2.1%	3,244	3,600	3,990	4,910
			International	2.1%	0.1	0.1	0.1	0.1
			Total		85,945	95,320	105,690	130,000
Market Share		3.2%	3.2%	3.2%	3.2%			
RSW	Fort Myers	Southwest Florida International	<u>Freight</u>					
			Domestic	2.1%	13,692	15,180	16,830	20,690
			International	2.1%	3,043	3,370	3,740	4,600
			<u>Mail</u>					
			Domestic	2.1%	12	13	14	17
			International	2.1%	0	0	0	0
			Total		16,747	18,560	20,580	25,310
Market Share		0.6%	0.6%	0.6%	0.6%			
GNV	Gainesville	Gainesville Regional	<u>Freight</u>					
			Domestic	2.1%	1.0	1.1	1.2	1.5
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			Total		1	1	1	2
Market Share		0.00004%	0.00004%	0.00004%	0.00004%			

ID	Associated City	Airport Name	Measure	Historic CAGR, 2010-14	2014	2019	2024	2034
JAX	Jacksonville	Jacksonville International	<u>Freight</u>					
			Domestic	2.1%	66,961	74,260	82,350	101,280
			International	2.1%	89	100	110	130
			<u>Mail</u>					
			Domestic	2.1%	4,259	4,720	5,240	6,440
			International	2.1%	0	0	0	0
			Total		71,308	79,080	87,700	107,850
Market Share		2.6%	2.6%	2.6%	2.6%			
EYW	Key West	Key West International	<u>Freight</u>					
			Domestic	2.1%	503	560	620	760
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			Total		503	560	620	760
Market Share		0.02%	0.02%	0.02%	0.02%			
MLB	Melbourne	Melbourne International	<u>Freight</u>					
			Domestic	2.1%	102	110	130	150
			International	2.1%	32	40	40	50
			<u>Mail</u>					
			Domestic	2.1%	0.1	0.1	0.1	0.1
			International	2.1%	0	0	0	0
			Total		134	150	170	200
Market Share		0.005%	0.005%	0.005%	0.005%			
MIA	Miami	Miami International	<u>Freight</u>					
			Domestic	2.1%	256,896	284,820	315,780	388,160
			International	2.1%	1,917,316	2,125,730	2,356,800	2,897,020
			<u>Mail</u>					
			Domestic	2.1%	20,958	23,240	25,760	31,670
			International	2.1%	8,556	9,490	10,520	12,930
			Total		2,203,726	2,443,280	2,708,860	3,329,780
Market Share		81.3%	81.3%	81.3%	81.3%			
MCO	Orlando	Orlando International	<u>Freight</u>					
			Domestic	2.1%	139,592	154,800	171,680	211,130
			International	2.1%	27,250	30,220	33,510	41,220
			<u>Mail</u>					
			Domestic	2.1%	6,027	6,680	7,410	9,120
			International	2.1%	0	0	0	0
			Total		172,869	191,700	212,600	261,470
Market Share		6.4%	6.4%	6.4%	6.4%			
SFB	Orlando	Orlando Sanford International	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	1,793	1,990	2,210	2,710
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			Total		1,793	1,990	2,210	2,710
Market Share		0.1%	0.1%	0.1%	0.1%			

ID	Associated City	Airport Name	Measure	Historic CAGR, 2010-14	2014	2019	2024	2034
ECP	Panama City	Northwest Florida Beaches International	<u>Freight</u>					
			Domestic	2.1%	51	60	60	80
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
Total				51	60	60	80	
Market Share				0.002%	0.002%	0.002%	0.002%	
PNS	Pensacola	Pensacola International	<u>Freight</u>					
			Domestic	2.1%	6,609	7,330	8,130	10,000
			International	2.1%	59	70	70	90
			<u>Mail</u>					
			Domestic	2.1%	0.6	0.7	0.7	0.9
			International	2.1%	0	0	0	0
Total				6,668	7,400	8,200	10,090	
Market Share				0.2%	0.2%	0.2%	0.2%	
PGD	Punta Gorda	Punta Gorda	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
Total				0	0	0	0	
Market Share				0.0%	0.0%	0.0%	0.0%	
SRQ	Sarasota	Sarasota/Bradenton International	<u>Freight</u>					
			Domestic	2.1%	307	340	380	460
			International	2.1%	2	2	2	3
			<u>Mail</u>					
			Domestic	2.1%	5	5	6	7
			International	2.1%	0	0	0	0
Total				314	350	390	470	
Market Share				0.01%	0.01%	0.01%	0.01%	
SGJ	St. Augustine	Northeast Florida Regional	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
Total				0	0	0	0	
Market Share				0.0%	0.0%	0.0%	0.0%	
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	<u>Freight</u>					
			Domestic	2.1%	20,497	22,720	25,190	30,970
			International	2.1%	171	190	210	260
			<u>Mail</u>					
			Domestic	2.1%	902	1,000	1,110	1,360
			International	2.1%	0	0	0	0
Total				21,570	23,910	26,510	32,590	
Market Share				0.8%	0.8%	0.8%	0.8%	

ID	Associated City	Airport Name	Measure	Historic CAGR, 2010-14	2014	2019	2024	2034
TLH	Tallahassee	Tallahassee International	<u>Freight</u>					
			Domestic	2.1%	7,877	8,740	9,690	11,910
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	16	18	20	24
			International	2.1%	0	0	0	0
			Total		7,893	8,760	9,710	11,930
			Market Share		0.3%	0.3%	0.3%	0.3%
TPA	Tampa	Tampa International	<u>Freight</u>					
			Domestic	2.1%	83,027	92,080	102,110	125,580
			International	2.1%	5,519	6,120	6,790	8,350
			<u>Mail</u>					
			Domestic	2.1%	5,138	5,700	6,320	7,770
			International	2.1%	0	0	0	0
			Total		93,684	103,900	115,220	141,700
			Market Share		3.5%	3.5%	3.5%	3.5%
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	2.1%	0	0	0	0
			Total		0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	<u>Freight</u>					
			Domestic	2.1%	25,989	28,820	31,960	39,310
			International	2.1%	214	240	260	320
			<u>Mail</u>					
			Domestic	2.1%	1,439	1,600	1,770	2,180
			International	2.1%	0	0	0	0
			Total		27,642	30,660	33,990	41,810
			Market Share		1.0%	1.0%	1.0%	1.0%
TOTAL			<u>Freight</u>					
			Domestic	2.1%	704,224	780,740	865,560	1,063,880
			International	2.1%	1,956,215	2,168,780	2,404,390	2,955,310
			<u>Mail</u>					
			Domestic	2.1%	42,000	46,580	51,620	63,440
			International	2.1%	8,556	9,490	10,520	12,930
			Total		2,710,994	3,005,590	3,332,090	4,095,560
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: Airports Council International – North America, airport management data, US DOT BTS T-100 data, and CDM Smith

Exhibit 8-7: Dedicated Cargo Operations Forecast for Florida Commercial Service Airports
Historic Growth Rate Methodology (2010-2014)

ID	Associated City	Airport Name	Measure	Historic CAGR, 2010-14	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	Cargo Operations	1.1%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Cargo Operations	1.1%	3,903	4,120	4,340	4,820
			Market Share		6.9%	6.9%	6.9%	6.9%
RSW	Fort Myers	Southwest Florida International	Cargo Operations	1.1%	1,110	1,170	1,230	1,370
			Market Share		2.0%	2.0%	2.0%	2.0%
GNV	Gainesville	Gainesville Regional	Cargo Operations	1.1%	4	4	4	5
			Market Share		0.01%	0.01%	0.01%	0.01%
JAX	Jacksonville	Jacksonville International	Cargo Operations	1.1%	2,300	2,430	2,560	2,840
			Market Share		4.1%	4.1%	4.1%	4.1%
EYW	Key West	Key West International	Cargo Operations	1.1%	739	780	820	910
			Market Share		1.3%	1.3%	1.3%	1.3%
MLB	Melbourne	Melbourne International	Cargo Operations	1.1%	2	2	2	2
			Market Share		0.004%	0.004%	0.004%	0.004%
MIA	Miami	Miami International	Cargo Operations	1.1%	37,430	39,470	41,610	46,260
			Market Share		66.5%	66.5%	66.5%	66.5%
MCO	Orlando	Orlando International	Cargo Operations	1.1%	4,804	5,070	5,340	5,940
			Market Share		8.5%	8.5%	8.5%	8.5%
SFB	Orlando	Orlando Sanford International	Cargo Operations	1.1%	5	5	6	6
			Market Share		0.01%	0.01%	0.01%	0.01%
ECP	Panama City	Northwest Florida Beaches International	Cargo Operations	1.1%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PNS	Pensacola	Pensacola International	Cargo Operations	1.0%	535	560	590	660
			Market Share		1.0%	0.9%	0.9%	1.0%
PGD	Punta Gorda	Punta Gorda	Cargo Operations	1.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SRQ	Sarasota	Sarasota/Bradenton International	Cargo Operations	1.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SGJ	St. Augustine	Northeast Florida Regional	Cargo Operations	1.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Cargo Operations	1.0%	798	840	880	980
			Market Share		1.4%	1.4%	1.4%	1.4%
TLH	Tallahassee	Tallahassee International	Cargo Operations	1.0%	1,416	1,490	1,570	1,750
			Market Share		2.5%	2.5%	2.5%	2.5%
TPA	Tampa	Tampa International	Cargo Operations	1.0%	1,984	2,090	2,200	2,430
			Market Share		3.5%	3.5%	3.5%	3.5%
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Cargo Operations	1.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	Cargo Operations	1.0%	1,287	1,350	1,430	1,580
			Market Share		2.3%	2.3%	2.3%	2.3%
TOTAL			Cargo Operations	1.0%	56,317	59,390	62,600	69,590
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: US DOT BTS T-100 data and CDM Smith

8.2.2 Population Growth Methodology

From 2014 to 2034, Florida’s population is forecast to grow from 19.5 million to 25.0 million at a CAGR of 1.2 percent, according to projections from Florida’s Office of Economic and Demographic Research.⁵⁹ This growth rate was applied to the 2014 total air cargo tonnage and dedicated cargo aircraft operations for each commercial service airport to forecast future activity. Based on this growth rate, total air cargo tonnage is projected to climb from over 2.7 million tons in 2014 to nearly 2.9 million tons by 2019. By 2034, air cargo tonnage is forecast to reach nearly 3.5 million tons (see **Exhibit 8-8**), representing a CAGR of 1.2 percent. Dedicated air cargo aircraft operations are projected to increase from 56,317 operations in 2014 to more than 59,900 operations by 2019 and more than 72,100 operations by 2034 (see **Exhibit 8-9**). This growth occurs at a CAGR of 1.2 percent.

**Exhibit 8-8: Air Cargo Tonnage Forecast for Florida Commercial Service Airports
2014-2034 Population Growth Methodology, in Short Tons**

ID	Associated City	Airport Name	Measure	Population Growth CAGR, 2014-34	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	Freight					
			Domestic	1.2%	146	160	170	190
			International	1.2%	0	0	0	0
			Mail					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		146	160	170	190
Market Share		0.01%	0.01%	0.01%	0.01%			
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Freight					
			Domestic	1.2%	81,974	87,210	92,790	105,030
			International	1.2%	727	770	820	930
			Mail					
			Domestic	1.2%	3,244	3,450	3,670	4,160
			International	1.2%	0.1	0.1	0.1	0.1
			Total		85,945	91,430	97,280	110,120
Market Share		3.2%	3.2%	3.2%	3.2%			
RSW	Fort Myers	Southwest Florida International	Freight					
			Domestic	1.2%	13,692	14,570	15,500	17,540
			International	1.2%	3,043	3,240	3,440	3,900
			Mail					
			Domestic	1.2%	12	12	13	15
			International	1.2%	0	0	0	0
			Total		16,747	17,820	18,950	21,450
Market Share		0.6%	0.6%	0.6%	0.6%			
GNV	Gainesville	Gainesville Regional	Freight					
			Domestic	1.2%	1.0	1.0	1.1	1.2
			International	1.2%	0	0	0	0
			Mail					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		1	1	1	1
Market Share		0.00004%	0.00004%	0.00004%	0.00004%			

⁵⁹ http://edr.state.fl.us/Content/population-demographics/data/CountyPopulation_2015.pdf

ID	Associated City	Airport Name	Measure	Population Growth CAGR, 2014-34	2014	2019	2024	2034
JAX	Jacksonville	Jacksonville International	<u>Freight</u>					
			Domestic	1.2%	66,961	71,240	75,790	85,790
			International	1.2%	89	90	100	110
			<u>Mail</u>					
			Domestic	1.2%	4,259	4,530	4,820	5,460
			International	1.2%	0	0	0	0
			Total		71,308	75,860	80,710	91,360
Market Share		2.6%	2.6%	2.6%	2.6%			
EYW	Key West	Key West International	<u>Freight</u>					
			Domestic	1.2%	503	540	570	640
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		503	540	570	640
Market Share		0.02%	0.02%	0.02%	0.02%			
MLB	Melbourne	Melbourne International	<u>Freight</u>					
			Domestic	1.2%	102	110	120	130
			International	1.2%	32	30	40	40
			<u>Mail</u>					
			Domestic	1.2%	0.1	0.1	0.1	0.1
			International	1.2%	0	0	0	0
			Total		134	140	160	170
Market Share		0.005%	0.005%	0.005%	0.005%			
MIA	Miami	Miami International	<u>Freight</u>					
			Domestic	1.2%	256,896	273,320	290,780	329,140
			International	1.2%	1,917,316	2,039,860	2,170,230	2,456,500
			<u>Mail</u>					
			Domestic	1.2%	20,958	22,300	23,720	26,850
			International	1.2%	8,556	9,100	9,680	10,960
			Total		2,203,726	2,344,580	2,494,410	2,823,450
Market Share		81.3%	81.3%	81.3%	81.3%			
MCO	Orlando	Orlando International	<u>Freight</u>					
			Domestic	1.2%	139,592	148,510	158,010	178,850
			International	1.2%	27,250	28,990	30,840	34,910
			<u>Mail</u>					
			Domestic	1.2%	6,027	6,410	6,820	7,720
			International	1.2%	0	0	0	0
			Total		172,869	183,910	195,670	221,480
Market Share		6.4%	6.4%	6.4%	6.4%			
SFB	Orlando	Orlando Sanford International	<u>Freight</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	1,793	1,910	2,030	2,300
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		1,793	1,910	2,030	2,300
Market Share		0.1%	0.1%	0.1%	0.1%			
ECP	Panama City	Northwest Florida Beaches International	<u>Freight</u>					
			Domestic	1.2%	51	50	60	70
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		51	50	60	70
Market Share		0.002%	0.002%	0.002%	0.002%			

ID	Associated City	Airport Name	Measure	Population Growth CAGR, 2014-34	2014	2019	2024	2034
PNS	Pensacola	Pensacola International	<u>Freight</u>					
			Domestic	1.2%	6,609	7,030	7,480	8,470
			International	1.2%	59	60	70	80
			<u>Mail</u>					
			Domestic	1.2%	0.6	0.6	0.7	0.8
			International	1.2%	0	0	0	0
			Total		6,668	7,090	7,550	8,550
Market Share		0.2%	0.2%	0.2%	0.2%			
PGD	Punta Gorda	Punta Gorda	<u>Freight</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
SRQ	Sarasota	Sarasota/ Bradenton International	<u>Freight</u>					
			Domestic	1.2%	307	330	350	390
			International	1.2%	2	2	2	3
			<u>Mail</u>					
			Domestic	1.2%	5	5	5	6
			International	1.2%	0	0	0	0
			Total		314	340	360	400
Market Share		0.01%	0.01%	0.01%	0.01%			
SGJ	St. Augustine	Northeast Florida Regional	<u>Freight</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
PIE	St. Petersburg/ Clearwater	St. Pete-Clearwater International	<u>Freight</u>					
			Domestic	1.2%	20,497	21,810	23,200	26,260
			International	1.2%	171	180	190	220
			<u>Mail</u>					
			Domestic	1.2%	902	960	1,020	1,160
			International	1.2%	0	0	0	0
			Total		21,570	22,950	24,410	27,640
Market Share		0.8%	0.8%	0.8%	0.8%			
TLH	Tallahassee	Tallahassee International	<u>Freight</u>					
			Domestic	1.2%	7,877	8,380	8,920	10,090
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	16	17	18	21
			International	1.2%	0	0	0	0
			Total		7,893	8,400	8,940	10,110
Market Share		0.3%	0.3%	0.3%	0.3%			
TPA	Tampa	Tampa International	<u>Freight</u>					
			Domestic	1.2%	83,027	88,330	93,980	106,380
			International	1.2%	5,519	5,870	6,250	7,070
			<u>Mail</u>					
			Domestic	1.2%	5,138	5,470	5,820	6,580
			International	1.2%	0	0	0	0
			Total		93,684	99,670	106,050	120,030
Market Share		3.5%	3.5%	3.5%	3.5%			

ID	Associated City	Airport Name	Measure	Population Growth CAGR, 2014-34	2014	2019	2024	2034
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	<u>Freight</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			<u>Mail</u>					
			Domestic	1.2%	0	0	0	0
			International	1.2%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
PBI	West Palm Beach	Palm Beach International	<u>Freight</u>					
			Domestic	1.2%	25,989	27,650	29,420	33,300
			International	1.2%	214	230	240	270
			<u>Mail</u>					
			Domestic	1.2%	1,439	1,530	1,630	1,840
			International	1.2%	0	0	0	0
			Total		27,642	29,410	31,290	35,410
Market Share		1.0%	1.0%	1.0%	1.0%			
TOTAL			<u>Freight</u>					
			Domestic	1.2%	704,224	749,240	797,140	902,270
			International	1.2%	1,956,215	2,081,230	2,214,250	2,506,330
			<u>Mail</u>					
			Domestic	1.2%	42,000	44,690	47,540	53,810
			International	1.2%	8,556	9,100	9,680	10,960
			Total		2,710,994	2,884,260	3,068,610	3,473,370
Market Share		100.0%	100.0%	100.0%	100.0%			

Source: Airports Council International – North America, airport management data, US DOT BTS T-100 data, Florida Office of Economic and Demographic Research, and CDM Smith

Exhibit 8-9: Dedicated Cargo Operations Forecast for Florida Commercial Service Airports 2014-2034 Population Growth Methodology

ID	Associated City	Airport Name	Measure	Population Growth CAGR, 2014-34	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Cargo Operations	1.2%	3,903	4,150	4,420	5,000
			Market Share		6.9%	6.9%	6.9%	6.9%
RSW	Fort Myers	Southwest Florida International	Cargo Operations	1.2%	1,110	1,180	1,260	1,420
			Market Share		2.0%	2.0%	2.0%	2.0%
GNV	Gainesville	Gainesville Regional	Cargo Operations	1.2%	4	4	5	5
			Market Share		0.01%	0.01%	0.01%	0.01%
JAX	Jacksonville	Jacksonville International	Cargo Operations	1.2%	2,300	2,450	2,600	2,950
			Market Share		4.1%	4.1%	4.1%	4.1%
EYW	Key West	Key West International	Cargo Operations	1.2%	739	790	840	950
			Market Share		1.3%	1.3%	1.3%	1.3%
MLB	Melbourne	Melbourne International	Cargo Operations	1.0%	2	2	2	3
			Market Share		0.004%	0.004%	0.004%	0.004%
MIA	Miami	Miami International	Cargo Operations	1.0%	37,430	39,820	42,370	47,960
			Market Share		66.6%	66.6%	66.6%	66.6%
MCO	Orlando	Orlando International	Cargo Operations	1.2%	4,804	5,110	5,440	6,150
			Market Share		8.5%	8.5%	8.5%	8.5%
SFB	Orlando	Orlando Sanford International	Cargo Operations	1.2%	5	5	6	6
			Market Share		0.01%	0.01%	0.01%	0.01%
ECP	Panama City	Northwest Florida Beaches International	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PNS	Pensacola	Pensacola International	Cargo Operations	1.2%	535	570	610	690
			Market Share		1.0%	1.0%	1.0%	1.0%
PGD	Punta Gorda	Punta Gorda	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SRQ	Sarasota	Sarasota/Bradenton International	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SGJ	St. Augustine	Northeast Florida Regional	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Cargo Operations	1.2%	798	850	900	1,020
			Market Share		1.4%	1.4%	1.4%	1.4%
TLH	Tallahassee	Tallahassee International	Cargo Operations	1.2%	1,416	1,510	1,600	1,810
			Market Share		2.5%	2.5%	2.5%	2.5%
TPA	Tampa	Tampa International	Cargo Operations	1.2%	1,984	2,110	2,250	2,540
			Market Share		3.5%	3.5%	3.5%	3.5%
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Cargo Operations	1.2%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	Cargo Operations	1.2%	1,287	1,370	1,460	1,650
			Market Share		2.3%	2.3%	2.3%	2.3%
TOTAL			Cargo Operations	1.2%	56,317	59,920	63,760	72,150
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: US DOT BTS T-100 data, Florida Office of Economic and Demographic Research, and CDM Smith

8.2.3 Boeing World Air Cargo Forecast Methodology

According to Boeing's *World Air Cargo Forecast 2014-2015*, domestic U.S. air cargo is anticipated to grow at a CAGR of 2.1 percent (base growth estimate) from 2013 to 2033. International air cargo, to and from the U.S., is estimated to grow at a CAGR of 4.7 percent during the same period.⁶⁰ These growth rates were used to develop additional air cargo volume forecast scenarios for Florida's commercial service airports. For each airport's operations forecast, the appropriate CAGR from Boeing's forecast was used depending on whether the airport accommodated domestic, international, both domestic and international, or no air cargo activity. If an airport accommodated both domestic and international air cargo, a CAGR of 3.4 percent was used, which is an average of 2.1 percent (domestic) and 4.7 percent (international).

Exhibit 8-10 and **Exhibit 8-11** present the forecasts for the commercial service airports using growth rates as discussed above. As shown in Table 8, air cargo is projected to more than double its 2014 volume of 2.7 million tons over the planning period, approaching 6.1 million tons by 2034 (CAGR of 4.1 percent). Table 9 shows that dedicated cargo aircraft operations nearly double their 2014 level, reaching more than 109,000 operations by 2034 (CAGR of 3.4 percent).

**Exhibit 8-10: Air Cargo Tonnage Forecast for Florida Commercial Service Airports
Boeing World Air Cargo Forecast Methodology, in Short Tons**

ID	Associated City	Airport Name	Measure	Boeing Forecast CAGR	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	<u>Freight</u>					
			Domestic	2.1%	146	160	180	220
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		146	160	180	220
Market Share		0.005%	0.005%	0.004%	0.004%			
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	<u>Freight</u>					
			Domestic	2.1%	81,974	90,950	100,910	124,220
			International	4.7%	727	920	1,150	1,830
			<u>Mail</u>					
			Domestic	2.1%	3,244	3,600	3,990	4,920
			International	4.7%	0.1	0.1	0.1	0.1
			Total		85,945	95,470	106,050	130,970
Market Share		3.2%	2.9%	2.6%	2.2%			
RSW	Fort Myers	Southwest Florida International	<u>Freight</u>					
			Domestic	2.1%	13,692	15,190	16,850	20,750
			International	4.7%	3,043	3,830	4,830	7,660
			<u>Mail</u>					
			Domestic	2.1%	12	13	14	18
			International	4.7%	0	0	0	0
			Total		16,747	19,030	21,690	28,430
Market Share		0.6%	0.6%	0.5%	0.5%			

⁶⁰ The CAGR of 4.7 percent is an average of the growth rates for inbound and outbound air cargo transported between the U.S. and Latin America; the U.S. and Europe; the U.S. and Africa; and the U.S. and Asia.

ID	Associated City	Airport Name	Measure	Boeing Forecast CAGR	2014	2019	2024	2034
GNV	Gainesville	Gainesville Regional	<u>Freight</u>					
			Domestic	2.1%	1.0	1.1	1.2	1.5
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		1	1	1	2
Market Share		0.00004%	0.00003%	0.00003%	0.00002%			
JAX	Jacksonville	Jacksonville International	<u>Freight</u>					
			Domestic	2.1%	66,961	74,290	82,430	101,470
			International	4.7%	89	110	140	220
			<u>Mail</u>					
			Domestic	2.1%	4,259	4,730	5,240	6,450
			International	4.7%	0	0	0	0
			Total		71,308	79,130	87,810	108,140
Market Share		2.6%	2.4%	2.2%	1.8%			
EYW	Key West	Key West International	<u>Freight</u>					
			Domestic	2.1%	503	560	620	760
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		503	560	620	760
Market Share		0.02%	0.02%	0.02%	0.01%			
MLB	Melbourne	Melbourne International	<u>Freight</u>					
			Domestic	2.1%	102	110	130	150
			International	4.7%	32	40	50	80
			<u>Mail</u>					
			Domestic	2.1%	0.1	0.1	0.1	0.1
			International	4.7%	0	0	0	0
			Total		134	150	180	230
Market Share		0.005%	0.005%	0.004%	0.004%			
MIA	Miami	Miami International	<u>Freight</u>					
			Domestic	2.1%	256,896	285,030	316,240	389,290
			International	4.7%	1,917,316	2,415,160	3,042,270	4,827,260
			<u>Mail</u>					
			Domestic	2.1%	20,958	23,250	25,800	31,760
			International	4.7%	8,556	10,780	13,580	21,540
			Total		2,203,726	2,734,220	3,397,890	5,269,850
Market Share		81.3%	82.8%	84.2%	86.7%			
MCO	Orlando	Orlando International	<u>Freight</u>					
			Domestic	2.1%	139,592	154,880	171,840	211,530
			International	4.7%	27,250	34,330	43,240	68,610
			<u>Mail</u>					
			Domestic	2.1%	6,027	6,690	7,420	9,130
			International	4.7%	0	0	0	0
			Total		172,869	195,900	222,500	289,270
Market Share		6.4%	5.9%	5.5%	4.8%			
SFB	Orlando	Orlando Sanford International	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	1,793	2,260	2,850	4,520
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		1,793	2,260	2,850	4,520
Market Share		0.1%	0.1%	0.1%	0.1%			

ID	Associated City	Airport Name	Measure	Boeing Forecast CAGR	2014	2019	2024	2034
ECP	Panama City	Northwest Florida Beaches International	<u>Freight</u>					
			Domestic	2.1%	51	60	60	80
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
International	4.7%	0	0	0	0			
			Total		51	60	60	80
			Market Share		0.002%	0.002%	0.001%	0.001%
PNS	Pensacola	Pensacola International	<u>Freight</u>					
			Domestic	2.1%	6,609	7,330	8,140	10,010
			International	4.7%	59	70	90	150
			<u>Mail</u>					
			Domestic	2.1%	0.6	0.7	0.7	0.9
			International	4.7%	0	0	0	0
						Total	6,668	7,400
			Market Share	0.2%	0.2%	0.2%	0.2%	
PGD	Punta Gorda	Punta Gorda	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
						Total	0	0
			Market Share	0.0%	0.0%	0.0%	0.0%	
SRQ	Sarasota	Sarasota/ Bradenton International	<u>Freight</u>					
			Domestic	2.1%	307	340	380	470
			International	4.7%	2	2	3	5
			<u>Mail</u>					
			Domestic	2.1%	5	5	6	7
			International	4.7%	0	0	0	0
						Total	314	350
			Market Share	0.01%	0.01%	0.01%	0.01%	
SGJ	St. Augustine	Northeast Florida Regional	<u>Freight</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
						Total	0	0
			Market Share	0.0%	0.0%	0.0%	0.0%	
PIE	St. Petersburg/ Clearwater	St. Pete-Clearwater International	<u>Freight</u>					
			Domestic	2.1%	20,497	22,740	25,230	31,060
			International	4.7%	171	220	270	430
			<u>Mail</u>					
			Domestic	2.1%	902	1,000	1,110	1,370
			International	4.7%	0	0	0	0
						Total	21,570	23,960
			Market Share	0.8%	0.7%	0.7%	0.5%	
TLH	Tallahassee	Tallahassee International	<u>Freight</u>					
			Domestic	2.1%	7,877	8,740	9,700	11,940
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	2.1%	16	18	20	24
			International	4.7%	0	0	0	0
						Total	7,893	8,760
			Market Share	0.3%	0.3%	0.2%	0.2%	

ID	Associated City	Airport Name	Measure	Boeing Forecast CAGR	2014	2019	2024	2034
TPA	Tampa	Tampa International	Freight					
			Domestic	2.1%	83,027	92,120	102,210	125,820
			International	4.7%	5,519	6,950	8,760	13,900
			Mail					
			Domestic	2.1%	5,138	5,700	6,320	7,790
			International	4.7%	0	0	0	0
			Total		93,684	104,770	117,290	147,510
Market Share		3.5%	3.2%	2.9%	2.4%			
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Freight					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Mail					
			Domestic	2.1%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
PBI	West Palm Beach	Palm Beach International	Freight					
			Domestic	2.1%	25,989	28,830	31,990	39,380
			International	4.7%	214	270	340	540
			Mail					
			Domestic	2.1%	1,439	1,600	1,770	2,180
			International	4.7%	0	0	0	0
			Total		27,642	30,700	34,100	42,100
Market Share		1.0%	0.9%	0.8%	0.7%			
TOTAL			Freight					
			Domestic	2.1%	704,224	781,330	866,910	1,067,150
			International	4.7%	1,956,215	2,464,160	3,103,990	4,925,200
			Mail					
			Domestic	2.1%	42,000	46,610	51,690	63,650
			International	4.7%	8,556	10,780	13,580	21,540
			Total		2,710,994	3,302,880	4,036,170	6,077,540
Market Share		100.0%	100.0%	100.0%	100.0%			

Source: Airports Council International – North America, airport management data, US DOT BTS T-100 data, Boeing World Air Cargo Forecast 2014-2015, and CDM Smith

**Exhibit 8-11: Dedicated Cargo Operations Forecast for Florida Commercial Service Airports
Boeing World Air Cargo Forecast Methodology**

ID	Associated City	Airport Name	Measure	Boeing Forecast CAGR	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	Cargo Operations	2.1%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Cargo Operations	3.4%	3,903	4,620	5,460	7,640
			Market Share		6.9%	7.0%	7.0%	7.0%
RSW	Fort Myers	Southwest Florida International	Cargo Operations	3.4%	1,110	1,310	1,550	2,170
			Market Share		2.0%	2.0%	2.0%	2.0%
GNV	Gainesville	Gainesville Regional	Cargo Operations	2.1%	4	4	5	6
			Market Share		0.01%	0.01%	0.01%	0.01%
JAX	Jacksonville	Jacksonville International	Cargo Operations	3.4%	2,300	2,720	3,220	4,500
			Market Share		4.1%	4.1%	4.1%	4.1%
EYW	Key West	Key West International	Cargo Operations	2.1%	739	820	910	1,120
			Market Share		1.3%	1.2%	1.2%	1.0%
MLB	Melbourne	Melbourne International	Cargo Operations	3.4%	2	2	3	4
			Market Share		0.004%	0.004%	0.004%	0.004%
MIA	Miami	Miami International	Cargo Operations	3.4%	37,430	44,270	52,350	73,230
			Market Share		66.6%	66.7%	66.8%	67.1%
MCO	Orlando	Orlando International	Cargo Operations	3.4%	4,804	5,680	6,720	9,400
			Market Share		8.5%	8.6%	8.6%	8.6%
SFB	Orlando	Orlando Sanford International	Cargo Operations	4.7%	5	6	8	13
			Market Share		0.01%	0.01%	0.01%	0.01%
ECP	Panama City	Northwest Florida Beaches International	Cargo Operations	2.1%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PNS	Pensacola	Pensacola International	Cargo Operations	3.4%	535	630	750	1,050
			Market Share		1.0%	0.9%	1.0%	1.0%
PGD	Punta Gorda	Punta Gorda	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SRQ	Sarasota	Sarasota/Bradenton International	Cargo Operations	3.4%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SGJ	St. Augustine	Northeast Florida Regional	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Cargo Operations	3.4%	798	940	1,120	1,560
			Market Share		1.4%	1.4%	1.4%	1.4%
TLH	Tallahassee	Tallahassee International	Cargo Operations	2.1%	1,416	1,570	1,740	2,150
			Market Share		2.5%	2.4%	2.2%	2.0%
TPA	Tampa	Tampa International	Cargo Operations	3.4%	1,984	2,350	2,780	3,880
			Market Share		3.5%	3.5%	3.5%	3.6%
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	Cargo Operations	3.4%	1,287	1,520	1,800	2,520
			Market Share		2.3%	2.3%	2.3%	2.3%
TOTAL			Cargo Operations		56,317	66,440	78,420	109,240
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: US DOT BTS T-100 data, Boeing World Air Cargo Forecast 2014-2015, and CDM Smith

8.2.4 FAA Aerospace Forecast Methodology

Major assumptions regarding the demand for air cargo in the most recent *FAA Aerospace Forecast FY2016-2036* include the following:

- Security restrictions on air cargo transportation instituted by the FAA and Transportation Security Administration (TSA) will remain in place;
- The shift from air to other modes of transport (especially truck) that has been observed in the air cargo industry is mostly complete; and
- Long-term cargo activity will be tied to economic growth.

Based on these assumptions, the FAA anticipates total revenue-ton-miles (RTMs) for domestic air cargo to grow at a CAGR of 0.5 percent from 2015 to 2036. Total RTMs for international air cargo arriving and departing the U.S. is projected to grow at a CAGR of 4.7 percent during the same period. These growth rates were adjusted to fit this study's 2014-2034 planning period, resulting in CAGRs of 0.6 percent for domestic RTMs and 4.7 percent for international RTMs. For each airport's operations forecast, the appropriate CAGR from the *FAA Aerospace Forecast* was used depending on whether the airport accommodated domestic, international, both domestic and international, or no air cargo activity. If an airport accommodated both domestic and international air cargo, a CAGR of 2.6 percent was used, which is an average of 0.6 percent (domestic) and 4.7 percent (international).

Forecasts of total air cargo volume and dedicated cargo aircraft operations at Florida's commercial service airports were prepared using the adjusted growth rates from the *FAA Aerospace Forecast FY2016-2036* and are presented in **Exhibit 8-12** and **Exhibit 8-13**. As shown in **Exhibit 8-12**, over 3.2 million tons of air cargo are anticipated to be accommodated at the commercial service airports by 2019, increasing to greater than 5.7 million tons by 2034, more than doubling the 2014 volume. This growth occurs at a CAGR of 3.8 percent. Dedicated cargo aircraft operations are projected to reach over 63,900 operations by 2019 and approximately 93,800 operations by 2034, representing a CAGR of 2.6 percent.

Exhibit 8-12: Air Cargo Tonnage Forecast for Florida Commercial Service Airports
FAA Aerospace Forecast Methodology, in Short Tons

ID	Associated City	Airport Name	Measure	FAA Aerospace Forecast CAGR	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	<u>Freight</u>					
			Domestic	0.6%	146	150	160	170
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		146	150	160	170
Market Share		0.005%	0.005%	0.004%	0.003%			
FLL	Fort Lauderdale	Fort Lauderdale/ Hollywood International	<u>Freight</u>					
			Domestic	0.6%	81,974	84,650	87,420	93,230
			International	4.7%	727	910	1,150	1,810
			<u>Mail</u>					
			Domestic	0.6%	3,244	3,350	3,460	3,690
			International	4.7%	0.1	0.1	0.1	0.1
			Total		85,945	88,910	92,030	98,730
Market Share		3.2%	2.7%	2.4%	1.7%			
RSW	Fort Myers	Southwest Florida International	<u>Freight</u>					
			Domestic	0.6%	13,692	14,140	14,600	15,570
			International	4.7%	3,043	3,820	4,800	7,560
			<u>Mail</u>					
			Domestic	0.6%	12	12	12	13
			International	4.7%	0	0	0	0
			Total		16,747	17,970	19,410	23,140
Market Share		0.6%	0.6%	0.5%	0.4%			
GNV	Gainesville	Gainesville Regional	<u>Freight</u>					
			Domestic	0.6%	1.0	1.0	1.0	1.1
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		1	1	1	1
Market Share		0.00004%	0.00003%	0.00003%	0.00002%			
JAX	Jacksonville	Jacksonville International	<u>Freight</u>					
			Domestic	0.6%	66,961	69,150	71,410	76,160
			International	4.7%	89	110	140	220
			<u>Mail</u>					
			Domestic	0.6%	4,259	4,400	4,540	4,840
			International	4.7%	0	0	0	0
			Total		71,308	73,660	76,090	81,220
Market Share		2.6%	2.3%	2.0%	1.4%			
EYW	Key West	Key West International	<u>Freight</u>					
			Domestic	0.6%	503	520	540	570
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		503	520	540	570
Market Share		0.02%	0.02%	0.01%	0.01%			

ID	Associated City	Airport Name	Measure	FAA Aerospace Forecast CAGR	2014	2019	2024	2034
MLB	Melbourne	Melbourne International	<u>Freight</u>					
			Domestic	0.6%	102	110	110	120
			International	4.7%	32	40	50	80
			<u>Mail</u>					
			Domestic	0.6%	0.1	0.1	0.1	0.1
			International	4.7%	0	0	0	0
Total					134	150	160	200
Market Share					0.005%	0.005%	0.004%	0.003%
MIA	Miami	Miami International	<u>Freight</u>					
			Domestic	0.6%	256,896	265,300	273,970	292,170
			International	4.7%	1,917,316	2,406,950	3,021,630	4,762,000
			<u>Mail</u>					
			Domestic	0.6%	20,958	21,640	22,350	23,840
			International	4.7%	8,556	10,740	13,480	21,250
Total					2,203,726	2,704,630	3,331,430	5,099,260
Market Share					81.3%	83.6%	85.6%	89.0%
MCO	Orlando	Orlando International	<u>Freight</u>					
			Domestic	0.6%	139,592	144,160	148,870	158,760
			International	4.7%	27,250	34,210	42,950	67,680
			<u>Mail</u>					
			Domestic	0.6%	6,027	6,220	6,430	6,850
			International	4.7%	0	0	0	0
Total					172,869	184,590	198,250	233,290
Market Share					6.4%	5.7%	5.1%	4.1%
SFB	Orlando	Orlando Sanford International	<u>Freight</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	1,793	2,250	2,830	4,450
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
Total					1,793	2,250	2,830	4,450
Market Share					0.1%	0.1%	0.1%	0.1%
ECP	Panama City	Northwest Florida Beaches International	<u>Freight</u>					
			Domestic	0.6%	51	50	50	60
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
Total					51	50	50	60
Market Share					0.002%	0.002%	0.001%	0.001%
PNS	Pensacola	Pensacola International	<u>Freight</u>					
			Domestic	0.6%	6,609	6,820	7,050	7,520
			International	4.7%	59	70	90	150
			<u>Mail</u>					
			Domestic	0.6%	0.6	0.6	0.6	0.7
			International	4.7%	0	0	0	0
Total					6,668	6,890	7,140	7,670
Market Share					0.2%	0.2%	0.2%	0.1%

ID	Associated City	Airport Name	Measure	FAA Aerospace Forecast CAGR	2014	2019	2024	2034
PGD	Punta Gorda	Punta Gorda	<u>Freight</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
SRQ	Sarasota	Sarasota/ Bradenton International	<u>Freight</u>					
			Domestic	0.6%	307	320	330	350
			International	4.7%	2	2	3	5
			<u>Mail</u>					
			Domestic	0.6%	5	5	5	5
			International	4.7%	0	0	0	0
			Total		314	330	340	360
Market Share		0.01%	0.01%	0.01%	0.01%			
SGJ	St. Augustine	Northeast Florida Regional	<u>Freight</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		0	0	0	0
Market Share		0.0%	0.0%	0.0%	0.0%			
PIE	St. Petersburg/ Clearwater	St. Pete-Clearwater International	<u>Freight</u>					
			Domestic	0.6%	20,497	21,170	21,860	23,310
			International	4.7%	171	210	270	420
			<u>Mail</u>					
			Domestic	0.6%	902	930	960	1,030
			International	4.7%	0	0	0	0
			Total		21,570	22,310	23,090	24,760
Market Share		0.8%	0.7%	0.6%	0.4%			
TLH	Tallahassee	Tallahassee International	<u>Freight</u>					
			Domestic	0.6%	7,877	8,130	8,400	8,960
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	16	17	17	18
			International	4.7%	0	0	0	0
			Total		7,893	8,150	8,420	8,980
Market Share		0.3%	0.3%	0.2%	0.2%			
TPA	Tampa	Tampa International	<u>Freight</u>					
			Domestic	0.6%	83,027	85,740	88,540	94,430
			International	4.7%	5,519	6,930	8,700	13,710
			<u>Mail</u>					
			Domestic	0.6%	5,138	5,310	5,480	5,840
			International	4.7%	0	0	0	0
			Total		93,684	97,980	102,720	113,980
Market Share		3.5%	3.0%	2.6%	2.0%			

ID	Associated City	Airport Name	Measure	FAA Aerospace Forecast CAGR	2014	2019	2024	2034
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	<u>Freight</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			<u>Mail</u>					
			Domestic	0.6%	0	0	0	0
			International	4.7%	0	0	0	0
			Total		0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	<u>Freight</u>					
			Domestic	0.6%	25,989	26,840	27,720	29,560
			International	4.7%	214	270	340	530
			<u>Mail</u>					
			Domestic	0.6%	1,439	1,490	1,540	1,640
			International	4.7%	0	0	0	0
			Total		27,642	28,600	29,600	31,730
			Market Share		1.0%	0.9%	0.8%	0.6%
TOTAL			<u>Freight</u>					
			Domestic	0.6%	704,224	727,250	751,030	800,940
			International	4.7%	1,956,215	2,455,770	3,082,950	4,858,610
			<u>Mail</u>					
			Domestic	0.6%	42,000	43,370	44,800	47,770
			International	4.7%	8,556	10,740	13,480	21,250
			Total		2,710,994	3,237,130	3,892,260	5,728,570
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: Airports Council International – North America, airport management data, US DOT BTS T-100 data, FAA Aerospace Forecast FY2016-2036, and CDM Smith

Exhibit 8-13: Dedicated Cargo Operations Forecast for Florida Commercial Service Airports
FAA Aerospace Forecast Methodology

ID	Associated City	Airport Name	Measure	FAA Aerospace Forecast CAGR	2014	2019	2024	2034
DAB	Daytona Beach	Daytona Beach International	Cargo Operations	0.6%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
FLL	Fort Lauderdale	Fort Lauderdale/Hollywood International	Cargo Operations	2.6%	3,903	4,450	5,070	6,580
			Market Share		6.9%	7.0%	7.0%	7.0%
RSW	Fort Myers	Southwest Florida International	Cargo Operations	2.6%	1,110	1,270	1,440	1,870
			Market Share		2.0%	2.0%	2.0%	2.0%
GNV	Gainesville	Gainesville Regional	Cargo Operations	0.6%	4	4	4	5
			Market Share		0.007%	0.006%	0.006%	0.005%
JAX	Jacksonville	Jacksonville International	Cargo Operations	2.6%	2,300	2,620	2,990	3,880
			Market Share		4.1%	4.1%	4.1%	4.1%
EYW	Key West	Key West International	Cargo Operations	0.6%	739	760	790	840
			Market Share		1.3%	1.2%	1.1%	0.9%
MLB	Melbourne	Melbourne International	Cargo Operations	2.6%	2	2	3	3
			Market Share		0.004%	0.004%	0.004%	0.004%
MIA	Miami	Miami International	Cargo Operations	2.6%	37,430	42,660	48,620	63,150
			Market Share		66.6%	66.8%	67.0%	67.4%
MCO	Orlando	Orlando International	Cargo Operations	2.6%	4,804	5,480	6,240	8,100
			Market Share		8.5%	8.6%	8.6%	8.6%
SFB	Orlando	Orlando Sanford International	Cargo Operations	4.7%	5	6	8	12
			Market Share		0.01%	0.01%	0.01%	0.01%
ECP	Panama City	Northwest Florida Beaches International	Cargo Operations	0.6%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PNS	Pensacola	Pensacola International	Cargo Operations	2.6%	535	610	690	900
			Market Share		1.0%	1.0%	1.0%	1.0%
PGD	Punta Gorda	Punta Gorda	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SRQ	Sarasota	Sarasota/Bradenton International	Cargo Operations	2.6%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
SGJ	St. Augustine	Northeast Florida Regional	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International	Cargo Operations	2.6%	798	910	1,040	1,350
			Market Share		1.4%	1.4%	1.4%	1.4%
TLH	Tallahassee	Tallahassee International	Cargo Operations	0.6%	1,416	1,460	1,510	1,610
			Market Share		2.5%	2.3%	2.1%	1.7%
TPA	Tampa	Tampa International	Cargo Operations	2.6%	1,984	2,260	2,580	3,350
			Market Share		3.5%	3.5%	3.6%	3.6%
VPS	Valparaiso	Destin-Ft. Walton Beach/Eglin AFB	Cargo Operations	0.0%	0	0	0	0
			Market Share		0.0%	0.0%	0.0%	0.0%
PBI	West Palm Beach	Palm Beach International	Cargo Operations	2.6%	1,287	1,470	1,670	2,170
			Market Share		2.3%	2.3%	2.3%	2.3%
TOTAL			Cargo Operations		56,317	63,960	72,650	93,820
			Market Share		100.0%	100.0%	100.0%	100.0%

Source: US DOT BTS T-100 data, FAA Aerospace Forecast FY2016-2036, and CDM Smith

8.3 Comparison of Forecasts

Exhibit 8-14 summarizes the results of the air cargo volume and dedicated cargo aircraft operations forecast methodologies for Florida’s commercial service airports. As shown in Table 12, total air cargo tonnage at commercial service airports is projected to increase from 2.7 million tons in 2014 to a range of approximately 3.5 million tons (Population Growth Methodology) to approximately 6.1 million tons (Boeing World Air Cargo Forecast Methodology) by 2034. This represents a CAGR range of 1.2 percent to 4.1 percent, depending on the methodology. Dedicated cargo aircraft operations are forecast to increase from 56,317 operations in 2014 to a range of 69,590 operations (Historic Growth Rate Methodology) to 109,240 operations (Boeing World Air Cargo Forecast Methodology) by 2034, representing a CAGR range of 1.1 percent to 3.4 percent.

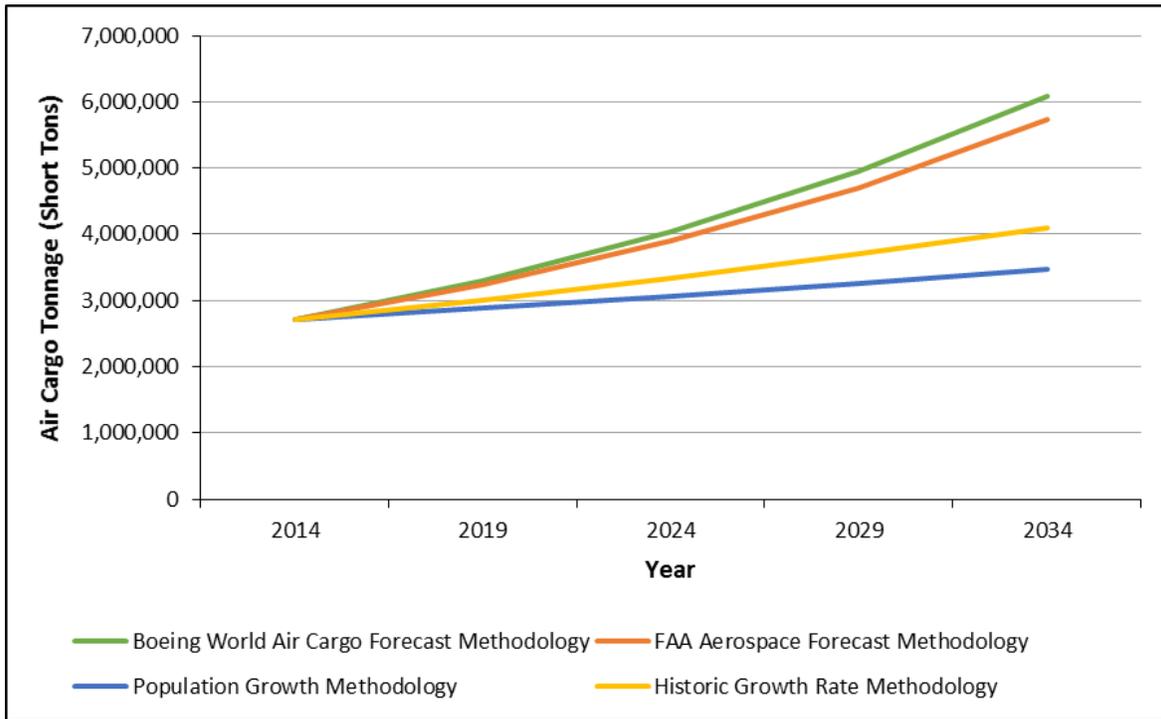
Exhibit 8-14: Commercial Service Airports Air Cargo Tonnage and Cargo Operations Forecast Summary (Tonnage in Short Tons)

	Year	Historic Growth Rate	Population Growth	Boeing World Air Cargo Forecast	FAA Aerospace Forecast
Air Cargo Tonnage					
Current	2014	2,710,994	2,710,994	2,710,994	2,710,994
Projected	2019	3,005,590	2,884,260	3,302,880	3,237,130
	2024	3,332,090	3,068,610	4,036,170	3,892,260
	2034	4,095,560	3,473,370	6,077,540	5,728,570
CAGR		2.1%	1.2%	4.1%	3.8%
Dedicated Cargo Aircraft Operations					
Current	2014	56,317	56,317	56,317	56,317
Projected	2019	59,390	59,920	66,440	63,960
	2024	62,600	63,760	78,420	72,650
	2034	69,590	72,150	109,240	93,820
CAGR		1.1%	1.2%	3.4%	2.6%

Source: CDM Smith

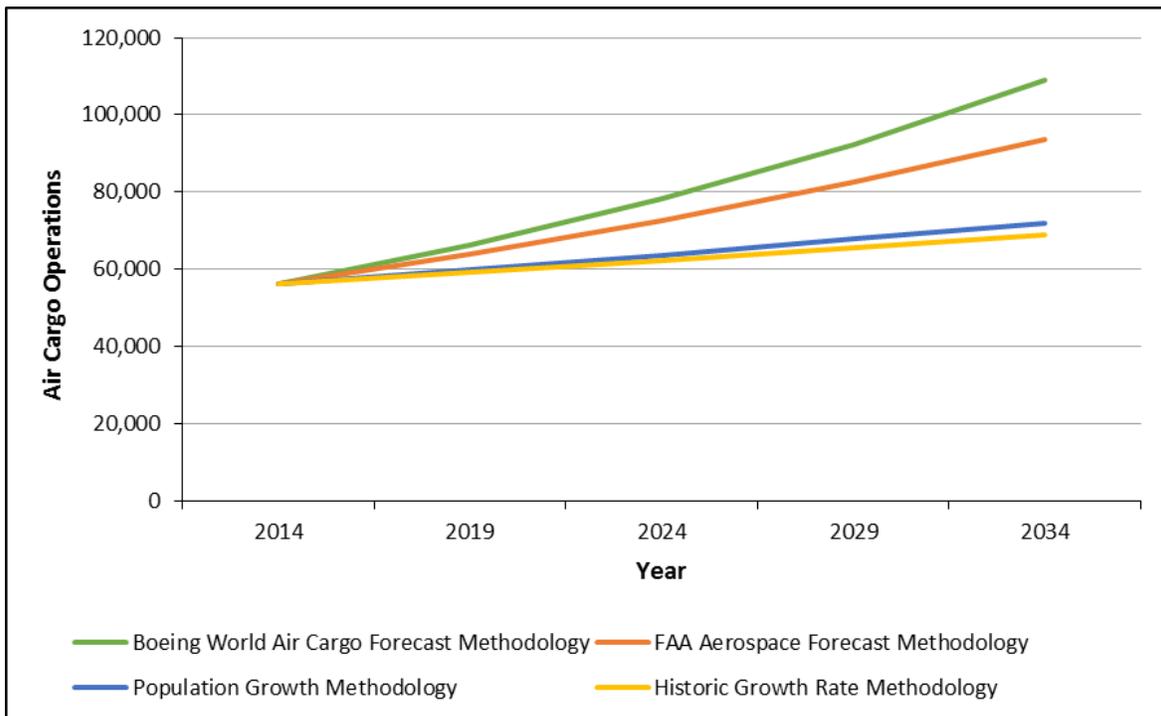
The projection scenarios for Florida’s commercial service airports are depicted in **Exhibit 8-15** and **Exhibit 8-16**. As shown in Figure 3, total air cargo volume is forecast to experience the most growth in the Boeing World Air Cargo Forecast Methodology, followed by the FAA Aerospace Forecast Methodology, Historic Growth Rate Methodology, and Population Growth Methodology. Similar to the tonnage forecasts, the largest increase in dedicated cargo operations is projected in the Boeing World Air Cargo Forecast Methodology, followed by the FAA Aerospace Forecast Methodology, the Population Growth Methodology, and Historic Growth Rate Methodology (see Figure 4).

Exhibit 8-15: Comparison of Air Cargo Tonnage Forecast Methodologies for Florida Commercial Service Airports



Source: CDM Smith

Exhibit 8-16: Comparison of Dedicated Cargo Aircraft Operations Forecast Methodologies for Florida Commercial Service Airports



Source: CDM Smith

8.4 Preferred Forecast

The Historic Growth Rate Methodology was selected as the preferred projection for both air cargo tonnage and dedicated cargo operations for Florida’s commercial service airports. This projection was selected for the following reasons:

- Reasonable and conservative CAGRs of 2.1 percent and 1.0 percent are used to project future growth in air cargo volume and cargo operations, respectively.
- The Boeing World Air Cargo Forecast and FAA Aerospace Forecast methodologies project future air cargo activity that is considered high, given the uncertainty of the global economy throughout the planning period.
- The Historic Growth Rate Methodology is based on the track record of recent (2010 to 2014) tonnage and cargo operations activity at the commercial service airports. None of the other methodologies consider the Florida commercial service airports’ historical air cargo activity.

Exhibit 8-17 presents the preferred air cargo tonnage and dedicated cargo operations forecasts.

Exhibit 8-17: Commercial Service Airports Air Cargo Tonnage and Cargo Operations Preferred Forecasts (Tonnage in Short Tons)

	Year	Air Cargo Tonnage	Dedicated Cargo Aircraft Operations
Current	2014	2,710,994	56,317
Projected	2019	3,005,590	59,390
	2024	3,332,090	62,600
	2034	4,095,560	69,590
CAGR		2.1%	1.1%

Source: CDM Smith

8.5 Summary

This chapter presented projections, using four different forecast methodologies, of air cargo tonnage and dedicated air cargo aircraft operations for Florida’s commercial service airports for the 2014-2034 planning period. These methodologies are all variations of the simple growth rate methodology, which was identified as a common technique for forecasting air cargo activity in ACI-NA’s *Air Cargo Guide* published in December 2013. The simple growth rate methodology uses an externally produced growth rate and applies it to air cargo data such as tonnage enplaned and deplaned at an airport, with the assumption that the growth rate applies to all airports in the analysis.

The four variations of the simple growth rate methodology used in this forecast include the Historic Growth Rate Methodology, Population Growth Methodology, Boeing World Air Cargo Forecast Methodology, and FAA Aerospace Forecast Methodology. Of these methodologies, the air cargo volume and dedicated operations forecasts developed using the Historic Growth Rate Methodology were selected as the preferred forecasts. Based on the Historic Growth Rate Methodology, Florida’s system of

commercial service airports is anticipated to see moderate growth during the 20-year planning period. Air cargo tonnage is expected to grow from 2.7 million tons in 2014 to more than 4.0 million tons by 2034. This growth represents a CAGR of 2.1 percent. This methodology also projects that dedicated cargo aircraft operations will increase from 56,317 annual operations in 2014 to nearly 69,600 annual operations by the end of the planning period, representing a CAGR of 1.1 percent. These growth rates (i.e., 2.1 percent CAGR for tonnage and 1.1 percent for dedicated cargo operations) are considered reasonable and conservative compared to the tonnage and operations CAGRs of 4.1 percent and 3.4 percent projected using the Boeing World Air Cargo Forecast Methodology and 3.8 percent and 2.6 percent using the FAA Aerospace Forecast Methodology, respectively. Unlike the other three methodologies, the Historic Growth Rate Methodology also takes recent (2010-2014) air cargo activity at the Florida commercial service airports into account.

Chapter 9. AIR CARGO FORECASTS – GENERAL AVIATION AIRPORTS

Within Florida’s system of 128 airports, 14 are primary commercial service (CS) airports that have scheduled air cargo activity. As demonstrated in the previous (2012) air cargo system plan, 34 general aviation (GA) airports supported some degree of air cargo activity, while nine of the 34 supported both scheduled and ad hoc air cargo operations. This analysis examines air cargo activity at Florida’s GA airports in 2016 by operations and estimated cargo throughput. Each are then forecasted through the 20-year planning period. This chapter consists of two primary sections:

- General Aviation Airport Air Cargo Analysis
- General Aviation Airport Air Cargo Forecast

9.1 General Aviation Airport Air Cargo Analysis

9.1.1 Introduction – Overview of General Aviation Air Cargo

GA airports in Florida are frequently used by regional air cargo operators, as they provide several advantages over larger CS airports. GA airports are typically less congested, both in the airspace within the airport’s vicinity and on the ground. On the ground, GA airports allow for shorter taxi-times, provide easy roadway access on the landside, and are usually close in proximity to their market area. Due to the small loads carried by regional air cargo aircraft, ground support requirements are much less labor intensive and are therefore easily accommodated by GA airports. Fixed Base Operators (FBOs) are available at most GA airports, which are capable of providing a wide array of services for the carriers, limiting the need for capital investment by the carriers themselves. Together, all of these factors enable the air cargo carriers to get closer to their customer base and shorten turnaround times at airports along multi-stop routes.

As previously established, air cargo is typically lightweight, time-sensitive, and high-value. Serving the air cargo needs of small market areas is often better accommodated by small aircraft operating at a GA airport that provides quick access to that market. This is often more economical than trucking to markets that are relatively isolated from the larger distribution network (islands in particular) or those where the cargo demand does not warrant a full-size truck (less-than-truckload shipments). Operating at GA airports is particularly economical when there are multiple small markets that can be served by one aircraft operating a multi-segment route. Florida has many such small markets, and its geography, diverse economy, and favorable flying climate make the state well suited for GA air cargo.

9.1.2 Methodology

This analysis re-evaluated each of the 34 GA airports with some degree of air cargo activity in 2012, plus the 30 additional airports that did not have air cargo activity but were considered suitable candidates based on a probability score performed for the 2012 study.⁶¹ In total, instrument flight rules (IFR) records were pulled for 64 airports for the most recent 12-month period spanning from December 2015

⁶¹ The probability score factors each airport’s runway length, county population, county manufacturing labor force, and county average annual wage.

through November 2016. The IFR records were then examined for operations by known air cargo carriers. Patterns in air cargo activity at Florida’s GA airports were identified as either scheduled or ad hoc, and available capacity was estimated based on aircraft types operated by the carriers. From available capacity, an estimate of cargo flown/carried was made. The results of this analysis are presented below.

It is important to note that in the context of this analysis, air cargo operations are identified as at least one operation by a known air cargo carrier. Carriers that have 12 or more annual operations on a single route between two airports are considered scheduled, while a carrier-route with less than 12 annual operations are considered ad hoc⁶².

9.1.3 Air Cargo Carriers Operating at Florida’s General Aviation Airports

The types of carriers operating at GA airports in Florida include those that carry medical supplies, bank materials, and specialty cargo on a scheduled and ad hoc or as needed basis. A significant number of carriers are contracted feeders for larger integrated express carriers such as FedEx Express and UPS. As shown in **Exhibit 9-1**, there were 29 air cargo carriers operating at Florida GA airports in 2016, which is an increase from the 23 observed in 2012. Quest Diagnostics, Central Air Southwest, Ameriflight, and Mountain Air Cargo are the largest carriers in terms of total annual operations. Each of these four carriers increased total operations in Florida since 2012. Quest Diagnostics, a clinical lab testing firm with its own fleet of aircraft, transports medical lab samples on eight regularly scheduled routes and a handful of ad hoc routes. Quest Diagnostics is the largest user of Florida GA airports with nearly 1,900 operations over the last 12 months (December 2015-November 2016). Ameriflight contracts for each of the big three integrated express carriers (FedEx, UPS, DHL), while Mountain Air Cargo is a dedicated feeder for FedEx.

Exhibit 9-1: Air Cargo Operations by Carrier at Florida General Aviation Airports, 2012 vs 2016

Carrier	2012 Total Operations	2016 Total Operations	Change	Percent Change
ACEF - Transportes Aereos Cargas*	-	51	51	100%
Air Cargo Africa*	-	78	78	100%
Air Cargo Belize*	-	90	90	100%
Air Cargo Carriers Inc.	1	8	7	700%
AirNet	1,765	2	(1,763)	-100%
Ameriflight Inc.	189	762	573	303%
Amerijet International Inc.	19	1	(18)	-95%
Bankair Inc.	60	104	44	73%
Berry Aviation	1	1	-	0%
Capital Cargo International Airlines	13	-	(13)	-100%
Cargo Plus Aviation	73	34	(39)	-53%
Cargojet Airways	1	-	(1)	-100%
Cargoman*	-	1	1	100%
Castle Aviation Inc.	1	3	2	200%

⁶² Twelve annual operations equate to an average of one operation per month, and can therefore be defended as a scheduled route.

Carrier	2012 Total Operations	2016 Total Operations	Change	Percent Change
Central Air Southwest*	-	904	904	100%
Contract Air Cargo	1	37	36	3600%
Empire Airlines Inc.	21	18	(3)	-14%
EVERTS AIR ALASKA / Everts Air Cargo*	-	3	3	100%
Flight Express	6,339	1	(6,338)	-100%
IBC Airways	67	12	(55)	-82%
Jet Freighters*	-	36	36	100%
Kalitta Charters*	-	116	116	100%
Key Lime Air	20	2	(18)	-90%
Martinaire Inc.	5	17	12	240%
Mountain Air Cargo Inc.	303	466	163	54%
Quest Diagnostics	1,819	1,879	60	3%
Ram Air Freight	1	-	(1)	-100%
Royal Air Freight Inc.	32	66	34	106%
Skyway Enterprises Inc.	50	313	263	526%
Suburban Air Freight Inc.	8	2	(6)	-75%
USA Jet Airlines Inc.*	-	4	4	100%
Westair Aviation LTD	6	2	(4)	-67%
Statewide Total	10,795	5,013	(5,782)	-54%

* Denotes new carrier identified in 2016

Source: GCR Airport IQ, CDM Smith

Statewide, air cargo operations by known carriers at Florida GA airports have declined by more than half, dropping from under 11,000 annual operations in 2012 to approximately 5,000 annual operations in 2016. Flight Express and AirNet Systems were the biggest contributors to this decline, which combined for a loss of over 8,000 annual operations. If both Flight Express and AirNet are excluded from the annual totals, statewide operations actually increase from 2,691 in 2012 to 5,010 in 2016, which represents an increase of 86 percent. Flight Express and AirNet were both owned by Bayside Capital in 2012, and over the past decade both carriers were forced to overcome the declining demand for check hauling services since the advent of electronic banking. Flight Express appears to have ceased operations altogether in 2013, while AirNet was acquired by Kalitta Charters in 2015 and now focuses on specialized services for transporting radiopharmaceuticals and nuclear medicine.⁶³⁶⁴

The carriers that experienced the most substantial gains were Ameriflight, Skyway Enterprises, Mountain Air Cargo, and Quest Diagnostics. Nine new carriers were identified in 2016, while only three carriers ceased operations. Some of the notable new carriers include Transportes Aereos Cargas (ACEF), Air Cargo Africa, Air Cargo Belize, Central Air Southwest, Everts Air Cargo, and Kalitta Charters. A matrix of where these carriers operate is presented in **Exhibit 9-11**.

⁶³ <http://www.bizjournals.com/columbus/news/2015/08/04/pilots-wanted-airnet-to-start-hiring-following.html>

⁶⁴ <http://airnet.com/about/>

9.1.3.1 Estimating Available Capacity and Cargo Carried

For the most part, GA airports do not track air cargo volumes. Likewise, most of the small carriers that operate at GA airports do not report data to the US DOT⁶⁵ since only those with \$20 million or more in operating revenue are required to do so. As a result, actual cargo volumes carried by these carriers is unknown and must be estimated. By identifying the specific aircraft payload⁶⁶ utilized by each carrier, available capacity can be calculated. Aircraft payload was ascertained by aircraft type from either manufacturer specifications or from carrier fleet details available online. Available capacity was then calculated for each carrier-route by multiplying annual operations by aircraft payload. Once available capacity is determined, an estimate of actual cargo flown can be made.

Cargo airlines typically consider an aircraft to be at capacity around 80 percent of total capacity, as aircraft generally “bulk out” volume-wise before reaching maximum capacity by weight. For this analysis, it is assumed that, on average, actual cargo carried comprises 60 percent of an aircraft’s useful capacity. Therefore, estimated cargo carried nets out to 48 percent of total available capacity. This percentage is applied to all carrier-routes. Since the inbound/outbound directional flow through most air cargo markets typically favors one direction over the other, this net assumption serves to balance out any disproportionate directional flows in actual cargo carried.

Perhaps unsurprisingly, the air cargo aircraft that operate at GA airports are significantly smaller and have far less capacity than the aircraft employed by major air cargo carriers at commercial service airports. These aircraft are typically single or twin-engine piston or turboprop aircraft that are capable of operating on the shorter runways of GA airports and are more economical when operating on shorter routes. While large cargo aircraft payloads can range from 18,000 to 95,000 pounds for narrow-body jets and 80,000 to 240,000 for wide-body jets, the capacities of cargo aircraft operating at GA airports have payloads that range from 800 up to around 7,000 pounds. Commonly used GA cargo aircraft include the Cessna 210, Cessna 208 Caravan, Beechcraft Baron 58, Learjet 35, Embraer EMB-500 Phenom, Piper Navajo Chieftain, Shorts 360, Swearingen/Fairchild Metroliner, and others. The smallest of these aircraft is a Beechcraft Baron 58, which is a twin-engine piston aircraft with a payload of around 800 pounds. The largest cargo aircraft found to be operating at Florida’s GA airports are Boeing 727 and McDonnell Douglas MD-82 aircraft, which are converted narrowbody passenger aircraft with available payloads of 46,000 pounds and 41,000 pounds, respectively. As shown in **Exhibit 9-2**, a wide variety of aircraft types are used by cargo carriers at Florida’s GA airports.

While **Exhibit 9-2** presents cargo aircraft types observed at Florida’s GA airports in 2016, **Exhibit 9-3** provides a sample of the various aircraft types employed by each carrier. Most carriers have fleets consisting of several different aircraft types and use multiple types on a given route.

⁶⁵ US DOT Bureau of Transportation Statistics (BTS), T-100 data

⁶⁶ Payload is defined as an aircraft’s useful load less the weight of the pilot and fuel required.

Exhibit 9-2: GA Cargo Aircraft Types at Florida General Aviation Airports, 2016

Aircraft Type	Aircraft Make & Model	Payload
B190	Beechcraft 1900	6,356
B722	Boeing 727-200	46,060
BE20	Beechcraft Super King Air	2,200
BE33	Beech Bonanza	1,025
BE58	Beechcraft Baron / 58 Baron	1,020
C182	Cessna 182 Skylane	650
C208	Cessna 208 Caravan	3,500
C340	Cessna 340	1,250
C421	Cessna 421	1,164
CVLP	Convair CV-240 & -440	9,350
E110	Embraer EMB 110 Bandeirante	3,450
E120	Embraer EMB 120 Brasilia	8,000
F2TH	Dassault Falcon 2000	5,500
F900	Dassault Falcon 900	4,600
FA20	Dassault Falcon 20	5,000
G150	Gulfstream G150	2,400
GLF4	Gulfstream IV	3,600
LJ31	Learjet 31	2,000
LJ35	Learjet 35 / 36 / C-21A	2,000
LJ45	Learjet 45	1,875
LJ55	Learjet 55	2,000
LJ60	Learjet 60	2,100
LJ70	Learjet 70	2,785
M20	Mooney M20	600
MD82	McDonnell Douglas MD-82	41,400
P46T	Piper P46T Meridian	600
PA24	Piper PA-24 Comanche	700
PA30	Piper PA-30 Twin Comanche	900
PA42	Piper PA-42 Cheyenne	2,050
PA46	Piper PA-46 Malibu	600
PC12	Pilatus PC-12	2,283
PRM1	Beechcraft Premier 1	1,400
SF34	Saab SF340A/B	8,500
SH33	Shorts SD.330	4,350
SH36	Shorts SD.360	7,010
SW4	Fairchild Swearingen Metroliner	4,900
TBM7	SOCATA TBM 700	5,150
TBM8	SOCATA TBM 850	1,673

Source: Aircraft Manufacturers, Carrier Websites, CDM Smith

Exhibit 9-3: GA Cargo Aircraft Types by Carrier at Florida General Aviation Airports, 2016

Carrier/Aircraft Type	Percent of Total Operations	Payload	Carrier/Aircraft Type	Percent of Total Operations	Payload
ACEF - Transportes Aereos Cargas			Empire Airlines INC.		
C421	10%	1,164	LJ45	25%	1,875
P46T	20%	600	M20	50%	600
PA46	10%	600	PA46	25%	600
PC12	10%	1,826	Everts Air Alaska / Everts Air Cargo		
TBM7	20%	1,673	MD82	100%	41,400
TBM8	30%	1,673	IBC Airways		
Air Cargo Africa			SF34	100%	3,440
BE33	3%	1,025	Jet Freighters		
F900	36%	4,600	C421	11%	1,164
GLF4	9%	3,600	G150	68%	2,400
LJ70	48%	2,785	PA30	16%	900
PA24	3%	700	PRM1	5%	1,400
Air Cargo Belize			Key Lime Air		
BE20	4%	2,200	SW4	100%	3,440
P46T	50%	600	Martinaire INC.		
PA42	4%	2,050	C208	100%	2,800
PA46	12%	600	Mountain Air Cargo INC.		
TBM7	31%	1,673	C208	100%	2,800
Air Cargo Carriers INC.			Northern-East Cargo Airlines		
SH33	25%	4,350	CVLP	100%	9,350
SH36	75%	6,000	Quest Diagnostics		
Airnet Systems Inc.			BE58	0%	1,020
LJ35	100%	2,552	F2TH	0%	5,500
Ameriflight INC.			PC12	51%	1,826
B190	8%	6,356	TBM7	49%	1,673
E120	4%	6,400	Royal Air Freight Inc.		
SW4	88%	3,440	BE20	3%	2,200
Amerijet International Inc.			E110	3%	3,450
B722	100%	36,848	FA20	24%	5,000
Bankair Inc.			LJ35	51%	2,552
LJ31	2%	2,000	LJ55	19%	2,000
LJ35	96%	2,552	Skyway Enterprises Inc.		
LJ60	2%	2,100	SH36	100%	6,000
Berry Aviation			Suburban Air Freight Inc.		
E120	100%	6,400	B190	100%	6,356
Cargoman			USA Jet Airlines Inc.		
C182	14%	650	B722	50%	36,848
C340	11%	1,250	FA20	50%	5,000
F2TH	3%	5,500			
GLF4	29%	3,600			
LJ45	43%	1,875			

NOTE: Not a complete list of carriers, aircraft types, and operations Source: Aircraft Manufacturers, Carrier Websites, CDM Smith

Total annual operations for carriers found to be operating at Florida GA airports in 2016 are presented in **Exhibit 9-4**, along with available capacity and estimated cargo carried.

Exhibit 9-4: Operations, Available Capacity, and Estimated Cargo by Carrier at Florida General Aviation Airports, 2016

Carrier	2016 Total Operations	Available Capacity (lbs)	Estimated Cargo Carried (lbs)
Quest Diagnostics	1,879	3,330,088	1,598,444
Kalitta Charters	116	2,927,150	1,405,032
Ameriflight Inc.	762	2,890,960	1,387,664
Skyway Enterprises Inc.	313	2,194,130	1,053,183
Mountain Air Cargo Inc.	466	1,630,300	782,544
Central Air Southwest	904	1,018,808	489,028
Contract Air Cargo	37	394,667	189,440
Air Cargo Africa	78	254,563	122,190
Bankair Inc.	104	222,896	106,997
Royal Air Freight Inc.	66	186,024	89,295
Air Cargo Belize	90	151,752	72,849
USA Jet Airlines Inc.	4	83,696	40,172
IBC Airways	12	81,760	39,244
ACEF - Transportes Aereos Cargas	51	71,155	34,167
Jet Freighters	36	66,240	31,794
Martinaire Inc.	17	59,500	28,560
Air Cargo Carriers Inc.	8	48,100	23,089
Amerijet International Inc.	1	46,060	22,109
Cargo Plus Aviation	34	34,000	16,320
Empire Airlines Inc.	18	19,088	9,162
EVERTS AIR ALASKA / Everts Air Cargo	3	124,374	59,700
Suburban Air Freight Inc.	2	12,712	6,102
Key Lime Air	2	9,800	4,704
Berry Aviation	1	8,000	3,840
Castle Aviation Inc.	3	7,650	3,672
Westair Aviation LTD	2	7,000	3,360
AirNet Systems Inc.	2	4,000	1,920
Cargoman	1	2,225	1,068
Flight Express	1	910	437
Statewide Total	5,013	15,887,608	7,626,086

Source: GCR Airport IQ, CDM Smith

As shown in **Exhibit 9-4**, the carriers with the greatest available capacity largely correspond to their number of operations. However, carriers utilizing larger aircraft, such as Kalitta Charters, will have a higher available capacity despite having fewer operations. Quest Diagnostics has the largest available capacity at over 3.3 million pounds, which is unsurprising due to its high number of operations. Kalitta Charters is second with nearly 3.0 million pounds despite only having 116 annual operations.

Ameriflight, Skyway Enterprises, Mountain Air Cargo, and Central Air Southwest follow with 2.8 million pounds, 2.2 million pounds, 1.6 million pounds, and 1.0 million pounds of available capacity, respectively.

9.1.4 General Aviation Airports with Scheduled Air Cargo Operations

Of the 64 GA airports examined, 40 were identified as having some form (either ad hoc or scheduled) of air cargo operation within the last year (December 2015 - November 2016). As previously explained, air cargo operations are identified as at least one operation by a known air cargo carrier. Carriers that have 12 or more annual operations on a single route between two airports are considered scheduled, while a carrier-route with less than 12 annual operations are considered ad hoc. **Exhibit 9-5** lists each of the airports with scheduled air cargo by total annual operations, available capacity, and estimated cargo carried/ flown.

Exhibit 9-5: Scheduled Air Cargo Operations by Florida GA Airport, 2016

Primary Airport	ID	Scheduled Operations	Available Capacity (lbs)	Estimated Cargo Carried (lbs)
Opa-Locka Executive Airport	OPF	1,509	4,243,705	2,036,978
Tampa Executive Airport	VDF	920	1,621,040	778,100
The Florida Keys Marathon International Airport	MTH	454	1,589,000	762,720
Executive Airport	ORL	402	1,523,982	731,511
Cecil Airport	VQQ	479	843,998	405,120
Ft. Lauderdale Executive Airport	FXE	468	828,104	397,489
Kissimmee Gateway Airport	ISM	26	182,260	87,485
Statewide Total		4,258	10,832,089	5,199,403

Source: GCR Airport IQ, CDM Smith

As shown in **Exhibit 9-5**, the seven GA airports with scheduled air cargo activity combine for a total of nearly 4,300 operations with an available capacity of over 10.8 million pounds. The nearly 4,300 scheduled operations constitute 85 percent of total statewide GA cargo operations identified in 2016, while the 10.8 million pounds of available capacity makes up 68 percent of statewide capacity. Opa-Locka Executive accommodates the majority of operations and has the most available capacity. Tampa Executive is second, followed by The Florida Keys Marathon International Airport, Executive Airport, Cecil Airport, Ft. Lauderdale Executive, and Kissimmee Gateway. The specific scheduled air cargo routes are presented by airport, carrier, and number of operations in **Exhibit 9-6**.

Exhibit 9-6: Scheduled Air Cargo Routes from Florida GA Airports, 2016

Primary Airport	ID	Secondary Airport	ID	Carrier	Arrivals	Departures	Total Operations
Opa-Locka Executive Airport	OPF	Tampa International Airport	TPA	Central Air Southwest	220	445	665
The Florida Keys Marathon International Airport	MTH	Ft. Lauderdale/Hollywood International Airport	FLL	Mountain Air Cargo Inc.	208	246	454
Cecil Airport	VQQ	Gainesville Regional Airport	GNV	Quest Diagnostics	-	243	243
Tampa Executive Airport	VDF	Gainesville Regional Airport	GNV	Quest Diagnostics	242	-	242
Tampa Executive Airport	VDF	Orlando International Airport	MCO	Quest Diagnostics	-	236	236
Cecil Airport	VQQ	Gwinnett County Airport	LZU	Quest Diagnostics	236	-	236
Ft. Lauderdale Executive Airport	FXE	Gwinnett County Airport	LZU	Quest Diagnostics	-	228	228
Opa-Locka Executive Airport	OPF	Palm Beach International Airport	PBI	Central Air Southwest	226	1	227
Tampa Executive Airport	VDF	Ft. Lauderdale/Hollywood International Airport	FLL	Quest Diagnostics	-	226	226
Ft. Lauderdale Executive Airport	FXE	Tampa Executive Airport	VDF	Quest Diagnostics	224	-	224
Tampa Executive Airport	VDF	Tallahassee International Airport	TLH	Quest Diagnostics	216	-	216
Opa-Locka Executive Airport	OPF	Nassau International Airport	NAS	Skyway Enterprises Inc.	96	104	200
Executive Airport	ORL	Spirit of St Louis	SUS	Ameriflight Inc.	-	175	175
Executive Airport	ORL	Charlotte Douglas International Airport	CLT	Ameriflight Inc.	139	1	140
Opa-Locka Executive Airport	OPF	Orlando International Airport	MCO	Ameriflight Inc.	128	-	128
Opa-Locka Executive Airport	OPF	Miami International Airport	MIA	Ameriflight Inc.	35	55	90
Executive Airport	ORL	De Kalb/Peachtree	PDK	Ameriflight Inc.	71	-	71
Opa-Locka Executive Airport	OPF	Cincinnati/Northern Kentucky International Airport	CVG	Ameriflight Inc.	-	62	62
Opa-Locka Executive Airport	OPF	Freeport International	FPO	Skyway Enterprises Inc.	16	9	25
Opa-Locka Executive Airport	OPF	Montreal Trudeau International Airport	YUL	Air Cargo Africa	11	13	24
Opa-Locka Executive Airport	OPF	Laurence G Hanscom Field	BED	Ameriflight Inc.	-	24	24
Opa-Locka Executive Airport	OPF	Miami International Airport	MIA	Contract Air Cargo	19	2	21
Opa-Locka Executive Airport	OPF	Louisville International Airport	SDF	Ameriflight Inc.	-	16	16
Executive Airport	ORL	Louisville International Airport	SDF	Ameriflight Inc.	-	16	16
Ft. Lauderdale Executive Airport	FXE	Toronto Pearson International Airport	YYZ	Jet Freighters	8	8	16
Kissimmee Gateway Airport	ISM	Opa-Locka Executive Airport	OPF	Skyway Enterprises Inc.	2	12	14
Opa-Locka Executive Airport	OPF	Kissimmee Gateway Airport	ISM	Skyway Enterprises Inc.	12	2	14
Opa-Locka Executive Airport	OPF	Toronto Pearson International Airport	YYZ	Air Cargo Africa	8	5	13
Kissimmee Gateway Airport	ISM	Orlando-Sanford International Airport	SFB	Skyway Enterprises Inc.	4	8	12

Source: CDM Smith, GCR Airport IQ

As shown in **Exhibit 9-6**, the single busiest scheduled route between two airports was operated by Central Air Southwest between Opa-Locka Executive and Tampa International. Most of the scheduled routes are intra-state; however, there are several inter-state routes as well. Quest Diagnostics operates nearly 500 annual operations between Florida and Gwinnett County (LZU) in Lawrenceville, Georgia. Other notable markets served from Florida include Nassau (NAS), Charlotte (CLT), Atlanta (PDK), St. Louis (SUS), Cincinnati (CVG), Freeport (FPO), Montreal (YUL), Bedford (BED), Louisville (SDF), and Toronto (YYZ).

9.1.5 General Aviation Airports with Ad Hoc Air Cargo Operations

Due to the inherent nature of ad hoc flights, GA airports that have ad hoc air cargo activity far outnumber those that experience regularly scheduled air cargo operations. All of the 40 GA airports that accommodated any air cargo over the past year have also experienced ad hoc operations, including the seven airports with regularly scheduled air cargo operations. There were several airports that experienced only one annual operation by an air cargo operator; however, it is still worth noting each instance, no matter how infrequent. As shown in **Exhibit 9-7**, there were a total of 755 ad hoc air cargo operations at Florida GA airports in 2016.

As shown in **Exhibit 9-7**, Opa-Locka Executive experiences the most ad hoc cargo flights. However, Ocala International has significantly greater available capacity due to the larger aircraft used by the carriers operating there. Ocala is considered the capital of Florida's horse breeding industry and is home to the Ocala Breeder's Sales where for one month each spring, thoroughbreds are bought and sold for an average price of \$100,000.⁶⁷ During this time, Ocala International is heavily used for horse charter flights through forwarders like Tex Sutton and airlines like Kalitta Charters that set up special "airstables" on modified Boeing 727 aircraft. According to Kalitta's website, their Boeing 727 aircraft has a 58,500-pound capacity. Horses are generally flown internationally but are also flown domestically over long distances. Larger airports such as New York (JFK), Miami (MIA), and Los Angeles (LAX), which have U.S. Customs quarantine facilities, must be used when a horse is first imported into the U.S. The aforementioned airports plus Houston (IAH), Chicago (ORD), and Dallas (DFW) are most commonly used for exporting horses after departing Ocala.⁶⁸

9.1.6 Scheduled & Ad Hoc Air Cargo Operations Combined

The GA airports in Florida that accommodate any type of air cargo operation are presented in **Exhibit 9-8**, which also identifies the change in total operations experienced from 2012 to 2016.

⁶⁷ <http://www.wcjb.com/local-news/2012/03/horses-make-landing>

⁶⁸ <http://www.equinechronicle.com>

Exhibit 9-7: Florida GA Airports with Ad Hoc Air Cargo, 2016

Primary Airport	ID	Ad Hoc Operations	Available Capacity (lbs)	Estimated Cargo Carried (lbs)
Ocala International-Jim Taylor Field	OCF	53	2,728,416	1,309,640
Opa-Locka Executive Airport	OPF	132	608,863	292,265
Executive Airport	ORL	66	202,779	97,338
Ft. Lauderdale Executive Airport	FXE	78	175,224	84,108
Kissimmee Gateway Airport	ISM	34	165,098	79,248
Naples Municipal Airport	APF	49	164,913	79,160
Treasure Coast International Airport	FPR	31	153,719	73,787
Lakeland Linder Regional Airport	LAL	17	134,738	64,674
Boca Raton Airport	BCT	50	88,018	42,252
Page Field	FMY	33	82,100	39,408
Witham Field	SUA	15	68,300	32,784
Punta Gorda Airport	PGD	14	62,677	30,085
The Florida Keys Marathon International Airport	MTH	16	50,295	24,141
Northeast Florida Regional Airport	SGJ	20	47,152	22,634
Destin Executive Airport	DTS	13	34,650	16,632
Miami Executive Airport	TMB	17	30,880	14,824
DeLand Municipal - Sidney H. Taylor Field	DED	4	28,040	13,460
Venice Municipal Airport	VNC	7	27,913	13,400
Leesburg International Airport	LEE	9	27,150	13,032
Vero Beach Municipal Airport	VRB	14	19,423	9,326
Palatka Municipal-Lt. Kay Larkin Field	28J	4	16,712	8,022
Space Coast Regional Airport	TIX	8	16,000	7,680
Tampa Executive Airport	VDF	10	15,937	7,649
Pompano Beach Airpark	PMP	9	14,923	7,163
Brooksville - Tampa Bay Regional Airport	BKV	3	13,450	6,456
Bartow Municipal Airport	BOW	11	13,044	6,263
Bob Sikes Airport	CEW	4	9,132	4,384
Cecil Airport	VQQ	6	8,724	4,188
Immokalee Regional Airport	IMM	2	7,000	3,360
Jacksonville Executive At Craig Airport	CRG	5	6,740	3,235
Marco Island Airport	MKY	3	5,940	2,851
Lake City Gateway Airport	LCQ	6	5,200	2,496
Airglades Airport	2IS	1	5,150	2,472
Perry-Foley Airport	40J	2	4,000	1,920
Fernandina Beach Municipal Airport	FHB	2	4,000	1,920
Ormond Beach Municipal Airport	OMN	2	2,632	1,264
Marion County Airport	X35	1	2,225	1,068
Cross City Airport	CTY	2	2,000	960
Herlong Recreational Airport	HEG	1	1,762	846
Okeechobee County Airport	OBE	1	600	288
Statewide		755	5,055,519	2,426,683

Source: CDM Smith, GCR Airport IQ

Exhibit 9-8: Air Cargo Operations by Florida GA Airport, 2012 vs 2016

Primary Airport	ID	2012 Total Operations	2016 Total Operations	Change	Percent Change
Airglades Airport	2IS	-	1	1	100%
Bartow Municipal Airport	BOW	-	11	11	100%
Bob Sikes Airport	CEW	8	4	(4)	-50%
Boca Raton Airport	BCT	31	50	19	61%
Brooksville - Tampa Bay Regional Airport	BKV	2	3	1	50%
Cecil Airport	VQQ	164	485	321	196%
Cross City Airport	CTY	-	2	2	100%
DeFuniak Springs Airport	54J	1	-	(1)	-100%
DeLand Municipal - Sidney H. Taylor Field	DED	-	4	4	100%
Destin Executive Airport	DTS	22	13	(9)	-41%
Executive Airport	ORL	2,920	468	(2,452)	-84%
Fernandina Beach Municipal Airport	FHB	2	2	-	0%
Flagler Executive Airport	FIN	2	-	(2)	-100%
Ft. Lauderdale Executive Airport	FXE	1,809	546	(1,263)	-70%
Herlong Recreational Airport	HEG	391	1	(390)	-100%
Immokalee Regional Airport	IMM	-	2	2	100%
Jacksonville Executive At Craig Airport	CRG	1,350	5	(1,345)	-100%
Kissimmee Gateway Airport	ISM	60	60	-	0%
Lake City Gateway Airport	LCQ	3	6	3	100%
Lakeland Linder Regional Airport	LAL	12	17	5	42%
Leesburg International Airport	LEE	1	9	8	800%
Marco Island Airport	MKY	1	3	2	200%
Marion County Airport	X35	-	1	1	100%
Miami Executive Airport	TMB	24	17	(7)	-29%
Naples Municipal Airport	APF	37	49	12	32%
New Smyrna Beach Municipal Airport	EVB	4	-	(4)	-100%
Northeast Florida Regional Airport	SGJ	7	20	13	186%
Ocala International-Jim Taylor Field	OCF	11	53	42	382%
Okeechobee County Airport	OBE	2	1	(1)	-50%
Opa-Locka Executive Airport	OPF	2,627	1,641	(986)	-38%
Ormond Beach Municipal Airport	OMN	4	2	(2)	-50%
Page Field	FMY	24	33	9	38%
Palatka Municipal-Lt. Kay Larkin Field	28J	-	4	4	100%
Perry-Foley Airport	40J	-	2	2	100%
Pompano Beach Airpark	PMP	-	9	9	100%
Punta Gorda Airport	PGD	12	14	2	17%
Space Coast Regional Airport	TIX	21	8	(13)	-62%
Tampa Executive Airport	VDF	899	930	31	3%
The Florida Keys Marathon International Airport	MTH	306	470	164	54%
Treasure Coast International Airport	FPR	7	31	24	343%
Venice Municipal Airport	VNC	2	7	5	250%
Vero Beach Municipal Airport	VRB	5	14	9	180%
Winter Haven's Gilbert Airport	GIF	3	-	(3)	-100%
Witham Field	SUA	12	15	3	25%
Zephyrhills Municipal Airport	ZPH	9	-	(9)	-100%
Statewide Total		10,795	5,013	(5,782)	-54%

Source: GCR Airport IQ, CDM Smith

As shown in **Exhibit 9-8**, with over 1,600 annual operations, Opa-Locka Executive still accommodates the most GA air cargo operations despite having declined by 38 percent since 2012. Tampa Executive is second with 930 annual operations, followed by Ft. Lauderdale Executive, Cecil Airport, The Florida Keys Marathon International Airport, and Executive Airport with 546, 485, 470, and 468 annual operations, respectively. The most significant gains in annual operations from 2012 to 2016 were experienced by Cecil Airport and The Florida Keys Marathon International Airport, which grew by 321 and 164 operations, respectively. The most significant decline in annual operations from 2012 to 2016 occurred at Executive Airport, Jacksonville Executive at Craig, Ft. Lauderdale Executive, Opa-Locka Executive, and Herlong Recreational Airport with losses of 2,452, 1,345, 1,263, 986, and 320 operations, respectively. Much of these drops can be attributed to the decline of Flight Express and AirNet Systems, as identified in **Exhibit 9-1**.

The total annual operations, available capacity, and estimated cargo carried are presented by airport in **Exhibit 9-9**.

9.1.7 [Summary](#)

Despite the fact that commercial service airports accommodate the large majority of Florida’s air cargo tonnage, it is undeniable that GA airports play a significant role in facilitating the transport of air freight within the state and region. GA airports provide several unique advantages over commercial service airports that enable air cargo carriers to optimize the markets they serve. These advantages include less congestion (in the air and on the ground), shorter taxi times, ease of ground access, proximity to market area, and less demanding ground support needs. This analysis found that of the 64 GA airports identified as suitable for air cargo, 40 accommodated air cargo between December 2015 and November 2016. All 40 airports experienced ad hoc air cargo operations, while seven of the 40 airports experienced both scheduled and ad hoc air cargo operations. Thirty-two air cargo carriers combined for a total of more than 5,000 operations at these 40 airports with an available capacity of nearly 16 million pounds, of which 7.6 million pounds of actual cargo was estimated to have been flown. The busiest routes among these airports were between the primary GA airport of a major metropolitan area and a commercial service airport. **Exhibit 9-10** lists each airport and the type of air cargo activity experienced. **Exhibit 9-11** is a matrix that identifies which carriers have operated at each of the 40 airports.

Exhibit 9-9: Operations, Available Capacity, and Estimated Cargo by Florida GA Airport, 2016

Primary Airport	ID	2016 Total Operations	Available Capacity (lbs)	Estimated Cargo Carried (lbs)
Opa-Locka Executive Airport	OPF	1,641	4,852,568	2,329,243
Ocala International-Jim Taylor Field	OCF	53	2,728,416	1,309,640
Executive Airport	ORL	468	1,726,761	828,849
The Florida Keys Marathon International Airport	MTH	470	1,639,295	786,861
Tampa Executive Airport	VDF	930	1,636,977	785,749
Ft. Lauderdale Executive Airport	FXE	546	1,003,328	481,597
Cecil Airport	VQQ	485	852,722	409,308
Kissimmee Gateway Airport	ISM	60	347,358	166,733
Naples Municipal Airport	APF	49	164,913	79,160
Treasure Coast International Airport	FPR	31	153,719	73,787
Lakeland Linder Regional Airport	LAL	17	134,738	64,674
Boca Raton Airport	BCT	50	88,018	42,252
Page Field	FMY	33	82,100	39,408
Witham Field	SUA	15	68,300	32,784
Punta Gorda Airport	PGD	14	62,677	30,085
Northeast Florida Regional Airport	SGJ	20	47,152	22,634
Destin Executive Airport	DTS	13	34,650	16,632
Miami Executive Airport	TMB	17	30,880	14,824
DeLand Municipal - Sidney H. Taylor Field	DED	4	28,040	13,460
Venice Municipal Airport	VNC	7	27,913	13,400
Leesburg International Airport	LEE	9	27,150	13,032
Vero Beach Municipal Airport	VRB	14	19,423	9,326
Palatka Municipal-Lt. Kay Larkin Field	28J	4	16,712	8,022
Space Coast Regional Airport	TIX	8	16,000	7,680
Pompano Beach Airpark	PMP	9	14,923	7,163
Brooksville - Tampa Bay Regional Airport	BKV	3	13,450	6,456
Bartow Municipal Airport	BOW	11	13,044	6,263
Bob Sikes Airport	CEW	4	9,132	4,384
Immokalee Regional Airport	IMM	2	7,000	3,360
Jacksonville Executive At Craig Airport	CRG	5	6,740	3,235
Marco Island Airport	MKY	3	5,940	2,851
Lake City Gateway Airport	LCQ	6	5,200	2,496
Airglades Airport	2IS	1	5,150	2,472
Perry-Foley Airport	40J	2	4,000	1,920
Fernandina Beach Municipal Airport	FHB	2	4,000	1,920
Ormond Beach Municipal Airport	OMN	2	2,632	1,264
Marion County Airport	X35	1	2,225	1,068
Cross City Airport	CTY	2	2,000	960
Herlong Recreational Airport	HEG	1	1,762	846
Okeechobee County Airport	OBE	1	600	288
Statewide Total		5,013	15,887,608	7,626,086

Source: GCR Airport IQ, CDM Smith

Exhibit 9-10: Florida GA Airports with Air Cargo by Type, 2016

Airport Name	ID	Ad Hoc Ops	Scheduled Ops	Total Ops	Available Capacity (lbs)	Estimated Cargo Carried (lbs)	Air Cargo Type
Airglades Airport	2IS	1		1	5,150	2,472	Ad Hoc
Bartow Municipal Airport	BOW	11		11	13,044	6,263	Ad Hoc
Bob Sikes Airport	CEW	4		4	9,132	4,384	Ad Hoc
Boca Raton Airport	BCT	50		50	88,018	42,252	Ad Hoc
Brooksville - Tampa Bay Regional Airport	BKV	3		3	13,450	6,456	Ad Hoc
Cecil Airport	VQQ	6	479	485	852,722	409,308	Scheduled & Ad Hoc
Cross City Airport	CTY	2		2	2,000	960	Ad Hoc
DeLand Municipal - Sidney H. Taylor Field	DED	4		4	28,040	13,460	Ad Hoc
Destin Executive Airport	DTS	13		13	34,650	16,632	Ad Hoc
Executive Airport	ORL	66	402	468	1,726,761	828,849	Scheduled & Ad Hoc
Fernandina Beach Municipal Airport	FHB	2		2	4,000	1,920	Ad Hoc
Ft. Lauderdale Executive Airport	FXE	78	468	546	1,003,328	481,597	Scheduled & Ad Hoc
Herlong Recreational Airport	HEG	1		1	1,762	846	Ad Hoc
Immokalee Regional Airport	IMM	2		2	7,000	3,360	Ad Hoc
Jacksonville Executive At Craig Airport	CRG	5		5	6,740	3,235	Ad Hoc
Kissimmee Gateway Airport	ISM	34	26	60	347,358	166,733	Scheduled & Ad Hoc
Lake City Gateway Airport	LCQ	6		6	5,200	2,496	Ad Hoc
Lakeland Linder Regional Airport	LAL	17		17	134,738	64,674	Ad Hoc
Leesburg International Airport	LEE	9		9	27,150	13,032	Ad Hoc
Marco Island Airport	MKY	3		3	5,940	2,851	Ad Hoc
Marion County Airport	X35	1		1	2,225	1,068	Ad Hoc
Miami Executive Airport	TMB	17		17	30,880	14,824	Ad Hoc
Naples Municipal Airport	APF	49		49	164,913	79,160	Ad Hoc
Northeast Florida Regional Airport	SGJ	20		20	47,152	22,634	Ad Hoc
Ocala International-Jim Taylor Field	OCF	53		53	2,728,416	1,309,640	Ad Hoc
Okeechobee County Airport	OBE	1		1	600	288	Ad Hoc
Opa-Locka Executive Airport	OPF	132	1,509	1,641	4,852,568	2,329,243	Scheduled & Ad Hoc
Ormond Beach Municipal Airport	OMN	2		2	2,632	1,264	Ad Hoc
Page Field	FMY	33		33	82,100	39,408	Ad Hoc
Palatka Municipal-Lt. Kay Larkin Field	28J	4		4	16,712	8,022	Ad Hoc
Perry-Foley Airport	40J	2		2	4,000	1,920	Ad Hoc
Pompano Beach Airpark	PMP	9		9	14,923	7,163	Ad Hoc
Punta Gorda Airport	PGD	14		14	62,677	30,085	Ad Hoc
Space Coast Regional Airport	TIX	8		8	16,000	7,680	Ad Hoc
Tampa Executive Airport	VDF	10	920	930	1,636,977	785,749	Scheduled & Ad Hoc
The Florida Keys Marathon International Airport	MTH	16	454	470	1,639,295	786,861	Scheduled & Ad Hoc
Treasure Coast International Airport	FPR	31		31	153,719	73,787	Ad Hoc
Venice Municipal Airport	VNC	7		7	27,913	13,400	Ad Hoc
Vero Beach Municipal Airport	VRB	14		14	19,423	9,326	Ad Hoc
Witham Field	SUA	15		15	68,300	32,784	Ad Hoc
Statewide		755	4,258	5,013	15,887,608	7,626,086	

Source: CDM Smith, GCR Airport IQ

Exhibit 9-11: Florida GA Airport and Air Cargo Carrier Matrix, 2016

ID	ACEF - Transportes Aereos Cargas	Air Cargo Africa	Air Cargo Belize	Air Cargo Carriers Inc.	AirNet Systems Inc.	Ameriflight Inc.	Amerijet International Inc.	Bankair Inc.	Berry Aviation	Cargo Plus Aviation	Cargoman	Castle Aviation Inc.	Central Air Southwest	Contract Air Cargo	Empire Airlines Inc.	EVERTS AIR ALASKA / Everts Air Cargo	Flight Express	IBC Airways	Jet Freighters	Kalitta Charters	Key Lime Air	Martinaire Inc.	Mountain Air Cargo Inc.	Quest Diagnostics	Royal Air Freight Inc.	Skyway Enterprises Inc.	Suburban Air Freight Inc.	USA Jet Airlines Inc.	Westair Aviation LTD	Air Cargo Africa
28J																								X		X				
2IS			X																											
40J																									X					
APF	X	X	X				X		X			X	X			X				X				X	X					X
BCT	X	X	X				X		X			X								X				X						X
BKV	X																			X										
BOW	X		X																											
CEW																								X						
CRG															X								X	X						
CTY										X																				
DED				X																										
DTS		X								X										X	X	X								X
FHB							X																							
FMY			X				X													X		X			X					
FPR			X				X							X											X	X				
FXE	X	X	X				X	X				X							X	X		X		X	X					X
HEG																								X						
IMM																							X							
ISM			X	X						X		X			X										X	X				
LAL						X	X									X		X		X					X					

ID	ACEF - Transportes Aereos Cargas	Air Cargo Africa	Air Cargo Belize	Air Cargo Carriers Inc.	AirNet Systems Inc.	Ameriflight Inc.	Amerijet International Inc.	Bankair Inc.	Berry Aviation	Cargo Plus Aviation	Cargoman	Castle Aviation Inc.	Central Air Southwest	Contract Air Cargo	Empire Airlines Inc.	EVERTS AIR ALASKA / Everts Air Cargo	Flight Express	IBC Airways	Jet Freighters	Kalitta Charters	Key Lime Air	Martinaire Inc.	Mountain Air Cargo Inc.	Quest Diagnostics	Royal Air Freight Inc.	Skyway Enterprises Inc.	Suburban Air Freight Inc.	USA Jet Airlines Inc.	Westair Aviation LTD	Air Cargo Africa	
LCQ			X							X																					
LEE								X				X								X											
MKY																			X												
MTH			X					X						X				X					X								
OBE			X																												
OCF										X						X				X					X					X	
OMN	X																														
OPF	X	X	X		X	X		X		X			X	X	X			X	X	X		X	X		X	X			X		X
ORL	X					X		X		X					X				X	X					X	X					
PGD			X	X									X							X											
PMP	X	X	X					X											X												X
SGJ	X	X	X			X		X											X												X
SUA			X					X																	X	X					
TIX								X																		X					
TMB	X							X		X										X					X						
VDF								X		X			X												X						
VNC	X													X																	
VQQ			X																						X	X					
VRB			X					X																							

Source: CDM Smith, GCR Airport IQ

9.2 General Aviation Airport Air Cargo Forecast

This section presents air cargo activity forecasts for Florida’s GA airports. The forecasts include estimates of annual air cargo operations (inbound and outbound) and estimates of annual air cargo carried in pounds. Similar to the commercial service air cargo forecast, the activity projections developed for GA airports can be useful in assessing future facility needs. To align with the commercial service forecast, projections were developed for planning years of 2019, 2024, and 2034. Since GA air cargo activity was identified for the most recently available 12-month period, 2016 will serve as the base year of the forecast.

9.2.1 Baseline Data

As established in the preceding analysis, the baseline data used in this forecast consists of annual operations and estimated cargo carried identified at Florida GA airports in 2016. Operations data was determined by analyzing 12 months of instrument flight rules (IFR) data, from which actual cargo carried was estimated by applying a utilization rate to available aircraft capacity. The base data used in this forecast is presented by airport in **Exhibit 9-12**. Note that 2012 operations are included for reference only, and 2016 operations are used as base data.

As shown in **Exhibit 9-12**, dedicated air cargo operations identified across Florida GA airports declined from 10,795 operations in 2012 to 5,013 in 2016, representing a 54 percent reduction, or a compound annual growth rate (CAGR) of -17 percent. Actual cargo carried in 2016 was estimated at over 7.6 million pounds, or 3,800 tons, statewide.

9.2.2 General Aviation Forecasts

Prior to forecasting air cargo activity at GA airports, several assumptions were made:

- Regional/feeder cargo carriers operating at GA airports will generally operate using the same mode of transport throughout the planning period.
- Average aircraft payload will remain constant throughout the planning period.

This forecast analysis considered numerous variables to associate with the future activity projections. The following growth factors were evaluated for this air cargo forecast (only a few were used):

- Historic Population Growth (Statewide and by County)
- Future Population Growth Projection (Statewide and by County)
- Historic Per Capita Income Growth (Statewide and by County)
- Historic Employment Growth (Statewide and by County)
- Historic Manufacturing Employment Growth (Statewide and by County)
- *FAA Aerospace Forecast FY 2016-2036 – All Cargo Carrier: Domestic RTMs*
- *FAA Aerospace Forecast FY 2016-2036 – GA Hours Flown (Fixed Wing)*
- *FAA Aerospace Forecast FY 2016-2036 – GA Hours Flown (Propeller)*
- *Boeing World Air Cargo Forecast 2016-2017 – Total RTMs Intra-North America*

Exhibit 9-12: Forecast Baseline Data

ID	Airport Name	2012 Operations	2016 Operations	2012-2016 Operations CAGR	2016 Estimated Cargo Carried (Pounds)
2IS	Airglades Airport	-	1	100%	2,472
BOW	Bartow Municipal Airport	-	11	100%	6,263
CEW	Bob Sikes Airport	8	4	-16%	4,384
BCT	Boca Raton Airport	31	50	13%	42,252
BKV	Brooksville - Tampa Bay Regional Airport	2	3	11%	6,456
VQQ	Cecil Airport	164	485	31%	409,308
CTY	Cross City Airport	-	2	100%	960
54J	DeFuniak Springs Airport	1	-	-100%	-
DED	DeLand Municipal - Sidney H. Taylor Field	-	4	100%	13,460
DTS	Destin Executive Airport	22	13	-12%	16,632
ORL	Executive Airport	2,920	468	-37%	828,849
FHB	Fernandina Beach Municipal Airport	2	2	0%	1,920
FIN	Flagler Executive Airport	2	-	-100%	-
FXE	Ft. Lauderdale Executive Airport	1,809	546	-26%	481,597
HEG	Herlong Recreational Airport	391	1	-78%	846
IMM	Immokalee Regional Airport	-	2	100%	3,360
CRG	Jacksonville Executive At Craig Airport	1,350	5	-75%	3,235
ISM	Kissimmee Gateway Airport	60	60	0%	166,733
LCQ	Lake City Gateway Airport	3	6	19%	2,496
LAL	Lakeland Linder Regional Airport	12	17	9%	64,674
LEE	Leesburg International Airport	1	9	73%	13,032
MKY	Marco Island Airport	1	3	32%	2,851
X35	Marion County Airport	-	1	100%	1,068
TMB	Miami Executive Airport	24	17	-8%	14,824
APF	Naples Municipal Airport	37	49	7%	79,160
EVB	New Smyrna Beach Municipal Airport	4	-	-100%	-
SGJ	Northeast Florida Regional Airport	7	20	30%	22,634
OCF	Ocala International-Jim Taylor Field	11	53	48%	1,309,640
OBE	Okeechobee County Airport	2	1	-16%	288
OPF	Opa-Locka Executive Airport	2,627	1,641	-11%	2,329,243
OMN	Ormond Beach Municipal Airport	4	2	-16%	1,264
FMY	Page Field	24	33	8%	39,408
28J	Palatka Municipal-Lt. Kay Larkin Field	-	4	100%	8,022
40J	Perry-Foley Airport	-	2	100%	1,920
PMP	Pompano Beach Airpark	-	9	100%	7,163
PGD	Punta Gorda Airport	12	14	4%	30,085
TIX	Space Coast Regional Airport	21	8	-21%	7,680
VDF	Tampa Executive Airport	899	930	1%	785,749
MTH	The Florida Keys Marathon International Airport	306	470	11%	786,861
FPR	Treasure Coast International Airport	7	31	45%	73,787
VNC	Venice Municipal Airport	2	7	37%	13,400
VRB	Vero Beach Municipal Airport	5	14	29%	9,326
GIF	Winter Haven's Gilbert Airport	3	-	-100%	-
SUA	Witham Field	12	15	6%	32,784
ZPH	Zephyrhills Municipal Airport	9	-	-100%	-
Statewide Total		10,795	5,013	-17%	7,626,086

Source: CDM Smith, GCR Airport IQ

Similar to the commercial service forecast in Chapter 8, the simple growth rate methodology was used to forecast air cargo activity for Florida’s GA airports. After considering all relevant variables, it was determined that the ideal forecast scenarios would be performed using four variations of the simple growth rate methodology, each based on a different data source. The four variations of the simple growth rate methodology are as follows:

5. Projected Population Growth Methodology

ACI-NA’s *Air Cargo Guide* explains that links between the level of aviation activity and economic growth within a catchment area, which is the area and population from which a facility or region attracts business, is well documented. Air cargo traffic increases in a catchment area as population, income, employment, and business activity grow. Projected population data readily available from Florida’s Office of Economic and Demographic Research for the 2014-2034 period was used to derive a growth rate to forecast air cargo tonnage and dedicated cargo operations at the commercial service airports throughout the planning period.

6. Boeing World Air Cargo Forecast – Intra-North America Revenue-Ton-Miles (RTMs) Methodology

According to ACI-NA’s *Air Cargo Guide*, cargo forecasts prepared by Boeing and Airbus can be useful in forecasting cargo demand. Boeing’s *World Air Cargo Forecast* is released on a biennial basis and provides a comprehensive overview of the air cargo industry, including identification of major trends, summaries of the world’s major air trade markets, and forecasts of future activity and demand for freighter aircraft. For this study, growth rates from Boeing’s *World Air Cargo Forecast 2016-2017* (most recent published version) were readily available and used to project future air cargo activity.

7. FAA Aerospace Forecast Methodologies (2)

- All-Cargo Carrier Domestic RTMs
- GA Hours Flown (Fixed Wing Piston & Turboprop)

ACI-NA’s *Air Cargo Guide* and the FAA’s *Forecasting Aviation Activity by Airport* report identify the *FAA Aerospace Forecast* as a useful data source for forecasting aviation activity. This forecast provides the FAA’s official 20-year outlook of the air cargo industry and projected domestic and international growth in activity. Similar to the Boeing World Air Cargo Forecast Methodology, growth rates from the *FAA Aerospace Forecast FY2016-2036* (the FAA’s most recent forecast) were readily available and applied to this study’s base year data from 2016 to project future air cargo activity.

Since the weight figures estimated for actual air cargo carried are closely tied to and/or based upon the number of dedicated air cargo operations, only aircraft operations will be forecast using the different methodologies. From the preferred operations forecast, actual tonnage carried will be calculated for each of the planning years.

9.2.2.1 Projected Population Growth Methodology

From 2014 to 2034, Florida’s population is forecast to grow from 19.5 million to 25.0 million at a CAGR of 1.21 percent, according to projections from Florida’s Office of Economic and Demographic Research (EDR).⁶⁹ The projected population growth rates for each airport’s associated county were taken from EDR data and used to project growth in air cargo operations. As identified in **Exhibit 9-13**, statewide dedicated air cargo operations are projected to increase from 5,013 operations in 2016 to 5,116 operations in 2019, and 6,172 operations by 2034. This represents a statewide CAGR of 1.21 percent.

9.2.2.2 Boeing Intra-North America RTMs Methodology

According to Boeing’s *World Air Cargo Forecast 2016-2017*, domestic U.S. (intra-North America) air cargo revenue-ton-miles (RTMs) are anticipated to grow at a CAGR of 2.2 percent from 2015 to 2035. This growth rate was applied to base year operations (2016) for each airport through the end of the planning period. As shown in **Exhibit 9-14**, this methodology results in statewide air cargo operations increasing from 5,013 operations in 2016 to 5,351 operations in 2019, and 9,423 operations by 2034.

9.2.2.3 FAA All-Cargo Carrier Domestic RTMs Methodology

The FAA anticipates total revenue-ton-miles (RTMs) for domestic air cargo to grow at a CAGR of 0.52 percent from 2016 to 2036. As shown in **Exhibit 9-15**, applying this growth rate to the base-year operations for each airport results in statewide operations increasing from 5,013 operations in 2016 to 5,091 operations in 2019, and 5,819 operations by 2034.

9.2.2.4 FAA GA Hours Flown Methodology

According to the latest forecast (*FAA Aerospace Forecast FY 2016-2036*), the FAA projects hours flown by active GA aircraft to increase by a CAGR of 0.98 percent from 2016 to 2036. This is a combined growth rate for all fixed-wing aircraft types, including piston single-engine, piston multi-engine, turboprop, and turbojet. Since the vast majority of air cargo operations at GA airports are operated using propeller-driven aircraft, this forecast methodology will use an adjusted CAGR of 0.27 percent, which considers the forecast of hours flown for piston single-engine, piston multi-engine, and turboprop aircraft types. As shown in **Exhibit 9-16**, using this methodology statewide air cargo operations at GA airports are forecast to grow from 5,013 operations in 2016 to 5,053 operations in 2019, and 5,415 operations by 2034.

⁶⁹ http://edr.state.fl.us/Content/population-demographics/data/CountyPopulation_2015.pdf

**Exhibit 9-13: Forecast of Florida GA Air Cargo Operations
Projected Population Growth Methodology**

ID	Airport Name	Associated County	Projected Population Growth CAGR	2016	2019	2024	2034
ZIS	Airglades Airport	Hendry	0.37%	1	1	1	1
BOW	Bartow Municipal Airport	Polk	1.49%	11	11	12	14
CEW	Bob Sikes Airport	Okaloosa	0.67%	4	4	4	5
BCT	Boca Raton Airport	Palm Beach	1.01%	50	50	54	60
BKV	Brooksville - Tampa Bay Regional Airport	Hernando	1.47%	3	3	3	4
VQQ	Cecil Airport	Duval	0.95%	485	485	523	575
CTY	Cross City Airport	Dixie	0.72%	2	2	2	2
54J	DeFuniak Springs Airport	Walton	2.05%	-	-	-	-
DED	DeLand Municipal - Sidney H. Taylor Field	Volusia	0.69%	4	4	4	5
DTS	Destin Executive Airport	Okaloosa	0.67%	13	13	14	15
ORL	Executive Airport	Orange	1.83%	468	468	541	648
FHB	Fernandina Beach Municipal Airport	Nassau	1.61%	2	2	2	3
FIN	Flagler Executive Airport	Flagler	2.69%	-	-	-	-
FXE	Ft. Lauderdale Executive Airport	Broward	0.73%	546	546	579	622
HEG	Herlong Recreational Airport	Duval	0.95%	1	1	1	1
IMM	Immokalee Regional Airport	Collier	1.48%	2	2	2	3
CRG	Jacksonville Executive At Craig Airport	Duval	0.95%	5	5	5	6
ISM	Kissimmee Gateway Airport	Osceola	2.70%	60	60	74	97
LCQ	Lake City Gateway Airport	Columbia	0.78%	6	6	6	7
LAL	Lakeland Linder Regional Airport	Polk	1.49%	17	17	19	22
LEE	Leesburg International Airport	Lake	1.91%	9	9	10	13
MKY	Marco Island Airport	Collier	1.48%	3	3	3	4
X35	Marion County Airport	Marion	1.41%	1	1	1	1
TMB	Miami Executive Airport	Miami-Dade	1.09%	17	17	19	21
APF	Naples Municipal Airport	Collier	1.48%	49	49	55	64
EVB	New Smyrna Beach Municipal Airport	Volusia	0.69%	-	-	-	-
SGJ	Northeast Florida Regional Airport	St. Johns	2.58%	20	20	25	32
OCF	Ocala International-Jim Taylor Field	Marion	1.41%	53	53	59	68
OBE	Okeechobee County Airport	Okeechobee	0.43%	1	1	1	1
OPF	Opa-Locka Executive Airport	Miami-Dade	1.09%	1,641	1,641	1,789	1,994
OMN	Ormond Beach Municipal Airport	Volusia	0.69%	2	2	2	2
FMY	Page Field	Lee	2.01%	33	33	39	47
28J	Palatka Municipal-Lt. Kay Larkin Field	Putnam	0.13%	4	4	4	4
40J	Perry-Foley Airport	Taylor	0.42%	2	2	2	2
PMP	Pompano Beach Airpark	Broward	0.73%	9	9	10	10
PGD	Punta Gorda Airport	Charlotte	0.97%	14	14	15	17
TIX	Space Coast Regional Airport	Brevard	0.79%	8	8	9	9
VDF	Tampa Executive Airport	Hillsborough	1.59%	930	930	1,055	1,234
MTH	The Florida Keys Marathon International Airport	Monroe	0.03%	470	470	471	472
FPR	Treasure Coast International Airport	St. Lucie	1.94%	31	31	36	44
VNC	Venice Municipal Airport	Sarasota	0.88%	7	7	8	8
VRB	Vero Beach Municipal Airport	Indian River	1.30%	14	14	16	18
GIF	Winter Haven's Gilbert Airport	Polk	1.49%	-	-	-	-
SUA	Witham Field	Martin	0.82%	15	15	16	17
ZPH	Zephyrhills Municipal Airport	Pasco	1.66%	-	-	-	-
Statewide Total			1.21%	5,013	5,116	5,491	6,172

Source: CDM Smith, GCR Airport IQ, Florida EDR

**Exhibit 9-14: Forecast of Florida GA Air Cargo Operations
Boeing Intra-North America RTMs Methodology**

ID	Airport Name	Boeing Intra-North America RTMs CAGR	2016	2019	2024	2034
2IS	Airglades Airport	2.20%	1	1	1	1
BOW	Bartow Municipal Airport	2.20%	11	11	12	13
CEW	Bob Sikes Airport	2.20%	4	4	4	5
BCT	Boca Raton Airport	2.20%	50	51	53	58
BKV	Brooksville - Tampa Bay Regional Airport	2.20%	3	3	3	3
VQQ	Cecil Airport	2.20%	485	493	513	563
CTY	Cross City Airport	2.20%	2	2	2	2
54J	DeFuniak Springs Airport	2.20%	-	-	-	-
DED	DeLand Municipal - Sidney H. Taylor Field	2.20%	4	4	4	5
DTS	Destin Executive Airport	2.20%	13	13	14	15
ORL	Executive Airport	2.20%	468	475	495	543
FHB	Fernandina Beach Municipal Airport	2.20%	2	2	2	2
FIN	Flagler Executive Airport	2.20%	-	-	-	-
FXE	Ft. Lauderdale Executive Airport	2.20%	546	554	578	634
HEG	Herlong Recreational Airport	2.20%	1	1	1	1
IMM	Immokalee Regional Airport	2.20%	2	2	2	2
CRG	Jacksonville Executive At Craig Airport	2.20%	5	5	5	6
ISM	Kissimmee Gateway Airport	2.20%	60	61	63	70
LCQ	Lake City Gateway Airport	2.20%	6	6	6	7
LAL	Lakeland Linder Regional Airport	2.20%	17	17	18	20
LEE	Leesburg International Airport	2.20%	9	9	10	10
MKY	Marco Island Airport	2.20%	3	3	3	3
X35	Marion County Airport	2.20%	1	1	1	1
TMB	Miami Executive Airport	2.20%	17	17	18	20
APF	Naples Municipal Airport	2.20%	49	50	52	57
EVB	New Smyrna Beach Municipal Airport	2.20%	-	-	-	-
SGJ	Northeast Florida Regional Airport	2.20%	20	20	21	23
OCF	Ocala International-Jim Taylor Field	2.20%	53	54	56	62
OBE	Okeechobee County Airport	2.20%	1	1	1	1
OPF	Opa-Locka Executive Airport	2.20%	1,641	1,667	1,737	1,905
OMN	Ormond Beach Municipal Airport	2.20%	2	2	2	2
FMY	Page Field	2.20%	33	34	35	38
28J	Palatka Municipal-Lt. Kay Larkin Field	2.20%	4	4	4	5
40J	Perry-Foley Airport	2.20%	2	2	2	2
PMP	Pompano Beach Airpark	2.20%	9	9	10	10
PGD	Punta Gorda Airport	2.20%	14	14	15	16
TIX	Space Coast Regional Airport	2.20%	8	8	8	9
VDF	Tampa Executive Airport	2.20%	930	944	984	1,080
MTH	The Florida Keys Marathon International Airport	2.20%	470	477	497	546
FPR	Treasure Coast International Airport	2.20%	31	31	33	36
VNC	Venice Municipal Airport	2.20%	7	7	7	8
VRB	Vero Beach Municipal Airport	2.20%	14	14	15	16
GIF	Winter Haven's Gilbert Airport	2.20%	-	-	-	-
SUA	Witham Field	2.20%	15	15	16	17
ZPH	Zephyrhills Municipal Airport	2.20%	-	-	-	-
Statewide Total		2.20%	5,013	5,351	6,369	9,423

Source: CDM Smith, GCR Airport IQ, Boeing

**Exhibit 9-15: Forecast of Florida GA Air Cargo Operations
FAA All-Cargo Carrier Domestic RTMs Methodology**

ID	Airport Name	FAA All-Cargo Carrier Domestic RTMs CAGR	2016	2019	2024	2034
2IS	Airglades Airport	0.52%	1	1	1	1
BOW	Bartow Municipal Airport	0.52%	11	11	12	13
CEW	Bob Sikes Airport	0.52%	4	4	4	5
BCT	Boca Raton Airport	0.52%	50	51	53	58
BKV	Brooksville - Tampa Bay Regional Airport	0.52%	3	3	3	3
VQQ	Cecil Airport	0.52%	485	493	513	563
CTY	Cross City Airport	0.52%	2	2	2	2
54J	DeFuniak Springs Airport	0.52%	-	-	-	-
DED	DeLand Municipal - Sidney H. Taylor Field	0.52%	4	4	4	5
DTS	Destin Executive Airport	0.52%	13	13	14	15
ORL	Executive Airport	0.52%	468	475	495	543
FHB	Fernandina Beach Municipal Airport	0.52%	2	2	2	2
FIN	Flagler Executive Airport	0.52%	-	-	-	-
FXE	Ft. Lauderdale Executive Airport	0.52%	546	554	578	634
HEG	Herlong Recreational Airport	0.52%	1	1	1	1
IMM	Immokalee Regional Airport	0.52%	2	2	2	2
CRG	Jacksonville Executive At Craig Airport	0.52%	5	5	5	6
ISM	Kissimmee Gateway Airport	0.52%	60	61	63	70
LCQ	Lake City Gateway Airport	0.52%	6	6	6	7
LAL	Lakeland Linder Regional Airport	0.52%	17	17	18	20
LEE	Leesburg International Airport	0.52%	9	9	10	10
MKY	Marco Island Airport	0.52%	3	3	3	3
X35	Marion County Airport	0.52%	1	1	1	1
TMB	Miami Executive Airport	0.52%	17	17	18	20
APF	Naples Municipal Airport	0.52%	49	50	52	57
EVB	New Smyrna Beach Municipal Airport	0.52%	-	-	-	-
SGJ	Northeast Florida Regional Airport	0.52%	20	20	21	23
OCF	Ocala International-Jim Taylor Field	0.52%	53	54	56	62
OBE	Okeechobee County Airport	0.52%	1	1	1	1
OPF	Opa-Locka Executive Airport	0.52%	1,641	1,667	1,737	1,905
OMN	Ormond Beach Municipal Airport	0.52%	2	2	2	2
FMY	Page Field	0.52%	33	34	35	38
28J	Palatka Municipal-Lt. Kay Larkin Field	0.52%	4	4	4	5
40J	Perry-Foley Airport	0.52%	2	2	2	2
PMP	Pompano Beach Airpark	0.52%	9	9	10	10
PGD	Punta Gorda Airport	0.52%	14	14	15	16
TIX	Space Coast Regional Airport	0.52%	8	8	8	9
VDF	Tampa Executive Airport	0.52%	930	944	984	1,080
MTH	The Florida Keys Marathon International Airport	0.52%	470	477	497	546
FPR	Treasure Coast International Airport	0.52%	31	31	33	36
VNC	Venice Municipal Airport	0.52%	7	7	7	8
VRB	Vero Beach Municipal Airport	0.52%	14	14	15	16
GIF	Winter Haven's Gilbert Airport	0.52%	-	-	-	-
SUA	Witham Field	0.52%	15	15	16	17
ZPH	Zephyrhills Municipal Airport	0.52%	-	-	-	-
Statewide Total		0.52%	5,013	5,091	5,305	5,819

Source: CDM Smith, GCR Airport IQ, FAA

**Exhibit 9-16: Forecast of Florida GA Air Cargo Operations
FAA GA Hours Flown (Fixed-Wing Piston & Turboprop) Methodology**

ID	Airport Name	FAA Domestic GA Hours Flown CAGR	2016	2019	2024	2034
2IS	Airglades Airport	0.27%	1	1	1	1
BOW	Bartow Municipal Airport	0.27%	11	11	12	13
CEW	Bob Sikes Airport	0.27%	4	4	4	5
BCT	Boca Raton Airport	0.27%	50	51	53	58
BKV	Brooksville - Tampa Bay Regional Airport	0.27%	3	3	3	3
VQQ	Cecil Airport	0.27%	485	493	513	563
CTY	Cross City Airport	0.27%	2	2	2	2
54J	DeFuniak Springs Airport	0.27%	-	-	-	-
DED	DeLand Municipal - Sidney H. Taylor Field	0.27%	4	4	4	5
DTS	Destin Executive Airport	0.27%	13	13	14	15
ORL	Executive Airport	0.27%	468	475	495	543
FHB	Fernandina Beach Municipal Airport	0.27%	2	2	2	2
FIN	Flagler Executive Airport	0.27%	-	-	-	-
FXE	Ft. Lauderdale Executive Airport	0.27%	546	554	578	634
HEG	Herlong Recreational Airport	0.27%	1	1	1	1
IMM	Immokalee Regional Airport	0.27%	2	2	2	2
CRG	Jacksonville Executive At Craig Airport	0.27%	5	5	5	6
ISM	Kissimmee Gateway Airport	0.27%	60	61	63	70
LCQ	Lake City Gateway Airport	0.27%	6	6	6	7
LAL	Lakeland Linder Regional Airport	0.27%	17	17	18	20
LEE	Leesburg International Airport	0.27%	9	9	10	10
MKY	Marco Island Airport	0.27%	3	3	3	3
X35	Marion County Airport	0.27%	1	1	1	1
TMB	Miami Executive Airport	0.27%	17	17	18	20
APF	Naples Municipal Airport	0.27%	49	50	52	57
EVB	New Smyrna Beach Municipal Airport	0.27%	-	-	-	-
SGJ	Northeast Florida Regional Airport	0.27%	20	20	21	23
OCF	Ocala International-Jim Taylor Field	0.27%	53	54	56	62
OBE	Okeechobee County Airport	0.27%	1	1	1	1
OPF	Opa-Locka Executive Airport	0.27%	1,641	1,667	1,737	1,905
OMN	Ormond Beach Municipal Airport	0.27%	2	2	2	2
FMY	Page Field	0.27%	33	34	35	38
28J	Palatka Municipal-Lt. Kay Larkin Field	0.27%	4	4	4	5
40J	Perry-Foley Airport	0.27%	2	2	2	2
PMP	Pompano Beach Airpark	0.27%	9	9	10	10
PGD	Punta Gorda Airport	0.27%	14	14	15	16
TIX	Space Coast Regional Airport	0.27%	8	8	8	9
VDF	Tampa Executive Airport	0.27%	930	944	984	1,080
MTH	The Florida Keys Marathon International Airport	0.27%	470	477	497	546
FPR	Treasure Coast International Airport	0.27%	31	31	33	36
VNC	Venice Municipal Airport	0.27%	7	7	7	8
VRB	Vero Beach Municipal Airport	0.27%	14	14	15	16
GIF	Winter Haven's Gilbert Airport	0.27%	-	-	-	-
SUA	Witham Field	0.27%	15	15	16	17
ZPH	Zephyrhills Municipal Airport	0.27%	-	-	-	-
Statewide Total		0.27%	5,013	5,053	5,162	5,415

Source: CDM Smith, GCR Airport IQ, FAA

9.2.2.5 Comparison of Forecasts

Exhibit 9-17 summarizes the results of the air cargo operations forecast methodologies for Florida’s GA airports. As shown, the four forecast methodologies result in GA air cargo operations forecasts ranging from 5,415 operations in the FAA GA Hours Flown scenario to 9,423 operations in the Boeing Intra-North America RTMs scenario for the out-year of the planning period, 2034. The annual growth rates range from 0.27 percent to 2.2 percent.

Exhibit 9-17: Summary of Forecast Methodologies

Year	Low Growth Scenario	Medium-Low Growth Scenario	Medium-High Growth Scenario	High Growth Scenario
	FAA GA Hours Flown	FAA All-Cargo Carrier Domestic RTMs	Population Projection	Boeing Intra-North America RTMs
2016	5,013	5,013	5,013	5,013
2019	5,053	5,091	5,013	5,351
2024	5,162	5,305	5,491	6,369
2034	5,415	5,819	6,172	9,423
CAGR	0.27%	0.52%	1.21%	2.20%

Source: CDM Smith, GCR Airport IQ, FAA, Boeing, Florida EDR

9.2.2.6 Preferred Forecast Methodology: FAA All-Cargo Carrier Domestic RTMs

The FAA All-Cargo Carrier Domestic RTMs methodology was selected as the preferred projection for dedicated air cargo operations at Florida GA airports. In this scenario, operations increase at a CAGR of 0.52 percent from 5,013 operations in 2013 to 5,819 operations in 2016. This projection was selected as it is reasonable, conservative, and is tied to the FAA’s forecast for the most relevant geography. This forecast scenario also takes into consideration the historical decline in dedicated air cargo operations observed at Florida GA airports, which dropped by over 50 percent since 2012. Since air cargo demand is relatively volatile and subject to various economic factors and industry trends, the GA Aircraft Hours Flown methodology was not considered as relevant. The Boeing World Air Cargo Forecast methodology was considered high given both the historic decline in GA cargo operations and Florida’s projected population growth. Several other scenarios projecting future air cargo tonnage figures could have been presented in this exercise. However, the range of growth rates presented represent the most realistic growth patterns considering the nature of this niche industry.

With the preferred operations forecast selected, the estimated cargo carried can be calculated. As shown in **Exhibit 9-18**, the estimated baseline cargo is forecast to grow at a CAGR of 0.52 percent from 2016 to 2034. Statewide, this results in estimated cargo carried increasing from over 7.6 million pounds in 2016 to over 7.7 million pounds in 2019, and over 8.8 million pounds by 2034.

**Exhibit 9-18: Preferred Forecast of GA Air Cargo Pounds Carried
FAA All-Cargo Carrier Domestic RTMs Methodology**

ID	Airport Name	FAA All-Cargo Carrier Domestic RTMs CAGR	2016	2019	2024	2034
2IS	Airglades Airport	0.52%	2,472	2,510	2,616	2,869
BOW	Bartow Municipal Airport	0.52%	6,263	6,360	6,627	7,269
CEW	Bob Sikes Airport	0.52%	4,384	4,452	4,639	5,089
BCT	Boca Raton Airport	0.52%	42,252	42,908	44,709	49,042
BKV	Brooksville - Tampa Bay Regional Airport	0.52%	6,456	6,556	6,831	7,493
VQQ	Cecil Airport	0.52%	409,308	415,667	433,111	475,083
CTY	Cross City Airport	0.52%	960	975	1,016	1,114
54J	DeFuniak Springs Airport	0.52%	-	-	-	-
DED	DeLand Municipal - Sidney H. Taylor Field	0.52%	13,460	13,669	14,243	15,623
DTS	Destin Executive Airport	0.52%	16,632	16,890	17,599	19,305
ORL	Executive Airport	0.52%	828,849	841,726	877,050	962,044
FHB	Fernandina Beach Municipal Airport	0.52%	1,920	1,950	2,032	2,229
FIN	Flagler Executive Airport	0.52%	-	-	-	-
FXE	Ft. Lauderdale Executive Airport	0.52%	481,597	489,079	509,604	558,989
HEG	Herlong Recreational Airport	0.52%	846	859	895	982
IMM	Immokalee Regional Airport	0.52%	3,360	3,412	3,555	3,900
CRG	Jacksonville Executive At Craig Airport	0.52%	3,235	3,285	3,423	3,755
ISM	Kissimmee Gateway Airport	0.52%	166,733	169,323	176,429	193,527
LCQ	Lake City Gateway Airport	0.52%	2,496	2,535	2,641	2,897
LAL	Lakeland Linder Regional Airport	0.52%	64,674	65,679	68,435	75,067
LEE	Leesburg International Airport	0.52%	13,032	13,234	13,790	15,126
MKY	Marco Island Airport	0.52%	2,851	2,895	3,017	3,309
X35	Marion County Airport	0.52%	1,068	1,085	1,130	1,240
TMB	Miami Executive Airport	0.52%	14,824	15,054	15,686	17,206
APF	Naples Municipal Airport	0.52%	79,160	80,390	83,763	91,881
EVB	New Smyrna Beach Municipal Airport	0.52%	-	-	-	-
SGJ	Northeast Florida Regional Airport	0.52%	22,634	22,986	23,950	26,271
OCF	Ocala International-Jim Taylor Field	0.52%	1,309,640	1,329,986	1,385,801	1,520,098
OBE	Okeechobee County Airport	0.52%	288	292	305	334
OPF	Opa-Locka Executive Airport	0.52%	2,329,243	2,365,429	2,464,698	2,703,551
OMN	Ormond Beach Municipal Airport	0.52%	1,264	1,284	1,338	1,467
FMY	Page Field	0.52%	39,408	40,020	41,700	45,741
28J	Palatka Municipal-Lt. Kay Larkin Field	0.52%	8,022	8,147	8,489	9,311
40J	Perry-Foley Airport	0.52%	1,920	1,950	2,032	2,229
PMP	Pompano Beach Airpark	0.52%	7,163	7,274	7,580	8,314
PGD	Punta Gorda Airport	0.52%	30,085	30,552	31,835	34,920
TIX	Space Coast Regional Airport	0.52%	7,680	7,799	8,127	8,914
VDF	Tampa Executive Airport	0.52%	785,749	797,956	831,443	912,018
MTH	The Florida Keys Marathon International Airport	0.52%	786,861	799,085	832,620	913,309
FPR	Treasure Coast International Airport	0.52%	73,787	74,933	78,078	85,645
VNC	Venice Municipal Airport	0.52%	13,400	13,608	14,179	15,553
VRB	Vero Beach Municipal Airport	0.52%	9,326	9,471	9,868	10,825
GIF	Winter Haven's Gilbert Airport	0.52%	-	-	-	-
SUA	Witham Field	0.52%	32,784	33,293	34,691	38,052
ZPH	Zephyrhills Municipal Airport	0.52%	-	-	-	-
Statewide Total		0.52%	7,626,086	7,744,562	8,069,573	8,851,592

Source: CDM Smith, GCR Airport IQ, FAA

9.2.3 Summary

Using four different forecast methodologies, this section presented projections of dedicated air cargo operations and associated cargo carried for Florida’s GA airports through the 2034 planning period. These methodologies are all variations of the simple growth rate methodology, which uses an externally produced growth rate and applies it to air cargo data at an airport, with the assumption that the growth rate applies to all airports in the analysis.

The four variations of the simple growth rate methodology used in this forecast include the FAA GA Hours Flown Methodology, FAA All-Cargo Carrier Domestic RTMs Methodology, Projected Population Growth Methodology, and Boeing World Air Cargo Forecast Methodology (Intra-North America RTMs). Of these methodologies, the FAA All-Cargo Carrier Domestic RTMs was selected as the preferred forecast. As shown in **Exhibit 9-19**, GA air cargo operations are forecast to grow from 2,013 operations in 2016 to 5,819 operations by 2034, representing a CAGR of 0.52 percent. Estimated cargo carried is also expected to grow at a CAGR of 0.52 percent, increasing from 7.6 million pounds in 2016 to over 8.8 million pounds in 2034.

**Exhibit 9-19: Preferred Forecast of GA Air Cargo Operations & Estimated Cargo Flown
FAA All-Cargo Carrier Domestic RTMs Methodology**

Year	Operations	Estimated Cargo Carried (lbs)
2016	5,013	7,626,086
2019	5,091	7,744,562
2024	5,305	8,069,573
2034	5,819	8,851,592
CAGR	0.52%	0.52%

Source: CDM Smith, GCR Airport IQ, FAA

Chapter 10. AIR FREIGHT MOVEMENTS

As discussed in previous sections of this study, air cargo includes freight and mail; however, this section focuses on air freight. Significant freight volumes traverse Florida’s airports annually. Air freight includes various commodities such as finished goods, materials, and supplies, which originate and terminate Florida, other states, and abroad. Air freight data is collected and tabulated by various vendors/organizations, and presented in a variety of formats. By comparing and contrasting the various sources available, the best source for the economic impact analysis has been identified.

10.1 Approach

Air freight comprises tangible merchandise that is produced, used, or sold, which can be quantified by commodity type, tonnage, and value. Conversely, the value associated with personal correspondence, marketing materials, cancelled checks, etc. that comprise air mail is subjective and not quantified herein. Additionally, no commodity-specific detail or shipment value is readily available for mail. Further, air mail currently comprises only 1.2% (by weight) of total air cargo movements and continues to decline annually. For such reasons, tonnage and value information tabulated and processed in this report focus on air freight and excludes air mail.

Air freight data sources are tabulated, compared, and contrasted between five sources to identify the best source for estimating the associated economic impacts. Discussion of the various data dimensions (terms measured, analysis details, and other information) define what each source includes or excludes, and helps explain the complexity and differences in tonnage and dollar values. Summarization of tonnage and value between sources by trade geography and direction illustrate the reporting disparity, and provide the rationale for which source provides the best data for the economic impact analysis.

Detailed support tables for all five sources analyzed are provided in the appendices.

10.2 Data Sources

Air freight data collected from several sources is used for different purposes – planning, forecasts, freight flow, and economic impacts. Sources compared and contrasted include:

- *Airport Records* – Datasets compiled from monthly operations reports used to settle landing fees and satisfy other carrier reporting requirements. No single standard exists for how airports generate public or internal reports. Freight data may be organized into domestic and international increments, and reporting ranges widely. For example, Miami International Airport (MIA) reports detailed tonnage and value by direction by commodity by month versus various smaller airports reporting only an annual summary tonnage volume.
- *USDOT Data T100* – Combines domestic and international market data reported by U.S. air carriers. Provides data by carrier, origin/destination, and service class for enplaned passengers, freight (including express), and mail. Excludes freight values, commodity breakdown, and flights with both origin and destination in a foreign country.

- *US Census, USA Trade Online* – Foreign trade (US Customs data) in metric tonnage and current value terms by direction, by country (except Canada), and by commodity type. Data is tabulated by point of entry and/or exit, which includes seaports and airports (both commercial and GA). Entry/exit points are referred to as “ports” grouped into two “districts” (Miami or Tampa). Data reported herein pertains only to the air-bound cargo shipments through such customs “ports.” While the airport associated with some of these “ports” are obvious (e.g., “Miami International Airport”), others are less so (e.g., “Boca Raton”, assumed to be “Coral Creek Airport”). The online tool presents data from two perspectives:
 - *Florida freight through all airports* – Air freight produced/manufactured in, or destined to Florida – some of which flies through a Florida airport, and some of which is trucked to/from an out-of-state airport. For example, includes electronics manufactured in Jacksonville, trucked to ATL, and flown to NYC, as well as those flown from JAX to NYC.
 - *All freight through Florida airports* – Air freight flown through Florida airports regardless of US origin/destination. For example, includes equipment manufactured in South Carolina, trucked to MIA and flown to BOG, as well as Florida manufactured equipment flown through MIA.

Note, neither separates Florida volumes from through Florida volumes.

- *Freight Analysis Framework v4.1* – An integrated database of all primary freight shipments by mode (truck, rail, water, air, and pipeline), produced by the Federal Highway Administration (FHWA) in collaboration with the Bureau of Transportation Statistics (BTS), based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the Census. It provides commodity data by direction, origin/destination geography, mode, year, terms, etc. The most recent version 4.1 queried (for both year 2014 and 2015) reflects FAF-estimates based on the most recent year 2012 update and year 2040 forecasts.
- *TRANSEARCH* – Provides a base year estimate of freight flows at the county level using a comprehensive database of North American freight flows, compiled by IHS Global Insight from more than a hundred industry, commodity, and proprietary data sources. Oriented to surface transportation modes, the applicability to airborne data is limited since it only includes NAFTA-related (i.e., Canada and Mexico) international trade partners, thereby limiting comparability of airborne trade data to other comprehensive sources. Purchased for the previous Florida Freight Plan, the source is dated (year 2011 flows).

10.3 Economic Impact Freight Data Requirements

Conduct of the economic impact requires freight tonnage and value for each commodity by direction. This information is used to estimate impacts associated with firms using air freight to trade goods (i.e., shippers/receivers). Each commodity shipment is only considered once, and avoids double-counting of transit movements through Florida airports. (For example, an inbound shipment from Latin America transferred at MIA bound to another airport is only counted once, versus airport operational records which typically count the shipment twice – as both an international inbound deplanement and as a domestic enplanement). Further, the economic analysis focuses on freight that originates and/or

terminates in Florida, and excludes through-State movements (e.g., originating in Latin America transferred at MIA bound to NYC).

Lastly, Florida-specific freight shipment data (tons and value) is compared to other freight movement data (inclusive of Florida-specific and transit shipments) to facilitate a quantitative understanding of how the perspectives contrast.

10.4 Data Dimensions and Comparability

Data source comparability is curtailed by the dimensions provided. Each source compiles and presents air freight data differently, depending on the original source data, database objectives, and the intended audiences. Of the sources identified, each partially covers at least one *Measurement Term* (i.e., weight or dollar value), and provide some multidimensional coverage with respect to *Analysis Detail* (i.e., trade geography, shipment direction, commodity breakdown, locational focus, and timeframe/year). A tabular summarization of such available data dimensionality by source is provided in **Exhibit 10-1**, with a summary of source strengths and weaknesses in **Exhibit 10-2**.

Exhibit 10-1: Air Freight Flow Data Sources and Dimensions

Data Dimension	Airport Records ¹	T100 ²	Census ³	FAF v4.1 ⁴	TRANSEARCH ⁵
Terms Measured					
Air Cargo Tons ⁶	Varies (Freight, Express, Mail)	Freight, Express, Mail (S)	Freight (M)	Freight (S)	Freight (S)
Air Freight Value	MIA ⁷	--	Current \$	Current \$	Current \$
Air Freight Detail					
Trade Geography	Various	Dom./Foreign	Foreign	Dom/Foreign.	Dom./ NAFTA
Direction	Enplaned/ Deplaned	Origin/Destination	Import/Export	In, Out, Intra-region	In, Out, Intrastate
Analysis Location	Airport	Airport	Port/District	BEA Region/ State	County/State
Tabulation	Movements	Movements	Shipments	Shipments	Shipments
Commodity Code	na	na	HS/SITC	SCTG	STCC
Years Available	Various	1990-2015	2003-2015	2012-'15 +5yr incr.	2011, 2040
Comparative Year	2015	2015	2014, 2015	2014, 2015	2011
Other Information					
Update Frequency	Annual/Monthly	Annual/Qtr/Mo.	Annual/Qtr/Mo.	5 years	Annual
Cost	Free	Free	Free	Free	\$\$\$
Study Purpose/Use	Planning, Forecasts, Freight Flow	Planning, Forecasts	Planning, Economic	Forecasts, Freight Flow, Economic	Forecasts, Freight Flow, Economic

¹Individual Florida airport data

²USDOT Bureau of Transportation Statistics (BTS), Data T100; <https://www.transtats.bts.gov/tables.asp>

³USA Trade Online customs data; <https://usatrade.census.gov/>

⁴Freight Analysis Framework, USDOT; <http://faf.ornl.gov/fafweb/Extraction1.aspx>

⁵IHS Global Insight

⁶(M) = Metric Tonnes; (S) = Short Tons

⁷Information for international freight through Miami only, which comes from Census

Exhibit 10-2: Primary Source Strengths and Weaknesses

Data Source	Advantages	Limitations
<i>Airport Records and Statistics</i>	<ul style="list-style-type: none"> Kept by airport on a carrier-level basis. Tonnage can be organized into market share by carrier, type (all-cargo aircraft versus passenger belly), trade geography (i.e., domestic and international) as applicable. Reports provide monthly frequencies (take offs and landings) and aircraft types. 	<ul style="list-style-type: none"> Tonnage is reported in a variety of ways with no single standard for how, or if, airports generate public or internal reports. For example; several airports include "express", others may not; some provide only monthly data detail on-line; some do not provide inbound vs. outbound detail; some provide international breakdown, some do not. May be posted online, but often have to request reports and statistics from airport management.
<i>USDOT Data T100</i>	<ul style="list-style-type: none"> Combines domestic and international tonnage data by U.S. air carrier, origin, destination, and cargo type (freight and mail). 	<ul style="list-style-type: none"> Excludes flights with both origin and destination in a foreign country. Excludes commodity type and value.
<i>US Census – USA Trade Online Customs data</i>	<ul style="list-style-type: none"> Foreign trade tonnage and value by airport, by direction, country (except Canada), and commodity. Two perspectives: <ul style="list-style-type: none"> <i>Through-airport</i> – Includes Florida and other state freight flown through Florida airport. <i>Statewide</i> – Florida freight flown through Florida and other state airports. 	<ul style="list-style-type: none"> Does not provide Florida volumes through Florida airports. Excludes domestic freight
<i>FAFv4.1</i>	<ul style="list-style-type: none"> Incorporates extensive domestic (Commodity Flow Survey) and international (Census) movement data. Identifies air cargo tonnage and value that originates in Florida and moves through Florida airports. 	<ul style="list-style-type: none"> Last update done in 2012 is updated to years 2014 based on year 2040 forecasts. Commodity detail is limited to aggregate industry level. Airport detail is not available.
<i>TRANSEARCH</i>	<ul style="list-style-type: none"> Provides detailed commodity data that coordinates with IMPLAN economic model. 	<ul style="list-style-type: none"> International air freight only includes NAFTA (Canada and Mexico). Other countries are excluded. Domestic data misleadingly includes connecting international freight. Airport detail is not available. Most recent year data are 2011.

Measured Terms – Data collected are presented in two terms:

- *Weight* – Air freight volumes are reported in three weight conventions, either as metric tons, short tons, or pounds.⁷⁰ Note that despite the original convention per source, all tonnage terms herein are converted to, and presented in, short tons for direct comparability.⁷¹
- *Dollar Value* – The dollar values of air freight shipments are presented in current year terms – that is, the dollars are presented in nominal terms corresponding to the year of the freight shipments.

Analysis Detail – Each freight measurement term is detailed accordingly, as available:

- *Trade Geography* – Pertains to domestic versus foreign freight. Airport Records, T100, and FAF data typically includes both domestic and foreign freight. While TRANSEARCH includes NAFTA trading partner (i.e., Canada and Mexico) freight, it excludes other foreign freight (i.e., South America, Europe, Asia, etc.) Conversely, Census data includes all foreign freight (except Canada), but excludes domestic freight.
- *Direction* – Air freight volumes move directionally, regardless of trade geography, as either in (inbound for domestic, imports for foreign), out (outbound for domestic, exports for foreign), intra (FAF and TRANSEARCH intrastate freight between Florida airports), or through (inbound international transfer to outbound domestic, and vice-versa).
- *Analysis Location* – Most air freight data sources provide airport-level; however, the FAF and TRANSEARCH are the general exceptions, each conveying data at a geographic level (i.e., BEA and/or state region for FAF and county for TRANSEARCH). An absence of airport-specific resolution makes those geographically-focused sources difficult to directly compare with other airport-specific sources, other than at top-level state summaries. Additionally, the Census provides data by airport, but corresponds each airport to a Customs District and “port”, which, in effect, is a geographic clustering of proximate airports within a defined geography.
- *Movement vs. Shipment Tabulation* – Concerned with total “movements”, Airport Records and T100 data typically tabulate total tonnage enplanements and deplanements, which often double-counts freight that transits through an airport (i.e., incurs both an enplanement and a deplanement). Conversely, the other three “shipment”-based sources (Census, FAF, and TRANSEARCH) provide commodity detail with each shipment tabulated only once regardless of the number of movements (i.e., transfers) incurred.
- *Commodity Code* – Airport Records and T100 data provide no categorical detail for commodities. For those sources that do provide commodity detail, each compile and report commodity data differently:

⁷⁰ 1 metric ton (or tonne) = 1,000 kilograms = 2,205 pounds = 1.1023 short tons

⁷¹ Tonnages in Appendix D are converted to short tons only for summary data (i.e., all airports or all commodities). Tonnages for individual airports and individual commodities are displayed in original-source metric tonnage.

- Census – Standard International Trade Classification (SITC);
- FHWA FAF – Standard Classification of Transported Goods (SCTG); and,
- TRANSEARCH – Standard Transportation Commodity Code (STCC).

Concordances are available and there is some comparability between the different coding structures; however, the differences are sufficiently substantial to preclude simple side-by-side parallels.

- *Years* – Air freight data always pertain to a temporal dimension, and most of the sources provide annual summaries. All sources presented provide data on an aggregated calendar basis.⁷² Additionally, all sources provide at least one year, with the Census providing historical data too. To compare data as closely as possible between the various sources, the most-recent/consistent year available pertains to years 2014 and 2015. However, FAF is based on year 2012 that is updated to year 2014 volumes (using year 2040 forecasts); and, the latest available TRANSEARCH is for 2011. Ultimately, year 2014 is used as the comparative year because freight value data provides input into the economic impact modeling, and the most recent year impact modeling data available is 2014.

Other Information – Additional noteworthy factors also affect source usefulness:

- *Update Frequency* – Most of the sources provide annual data, updated annually or more frequently (i.e., Airport Records and Census). FAF is the noted exception, comprehensively updating the database only once every five years. TRANSEARCH updates regularly, but as access is limited to specific (and expensive) subscriptions for a given year, annually-updated access is limited.
- *Acquisition Cost* – Not all data is available to the public and free. TRANSEARCH, as developed by IHS Global Insight, is a proprietary database and is costly to obtain. All other sources are free and accessed via the internet.
- *Unused Sources* – Four other sources identified and contrasted in a previous working paper include: Airport Council International - North America (ACI-NA), Air Carrier Activity Information System (ACAIS), Official Airline Guide – Air Cargo Guide, and CASS-USA Market Monitor. Air freight detail limitations outlined that preclude use in this analysis include, direction, trade geography, and/or air mail separation.

⁷² Airports and the Census typically compile information on a monthly basis.

10.5 Air Freight Data Comparison

Despite data complexity and source divergences, air freight data can be compared at a Florida-summary level. The following summary visually compares and contrasts the two freight measures (tons, and value) for the five sources. Note that Airport Records and T100 provide no commodity detail or value information, while the Census provides no domestic data. Also, the two manners in which Census data is provided is shown to illustrate the numerical variance:

10.6 Short Tons

Exhibit 10-3 presents source tonnage by trade geography from two perspectives. The first summarizes foreign and domestic flows while the second provides additional directional detail resolution. Reported short tonnage range from 0.2 million (TRANSEARCH) to 4.6 billion (T100) tons (see **Exhibit 10-4** for tabular data). Several issues affect the huge disparity. First and foremost, concerns *movement* versus *shipment* tabulation. Airport Records and T100 tabulate multiple flight *movements* of a shipment (when connecting flights are required). Conversely, the Census, FAF, and TRANSEARCH that tabulate each *shipment* only once regardless of the number of required flight movements. Secondly, Airport Records and T100 data often include express mail, which is not included in the other sources. Thirdly, trade Geography (e.g., Foreign versus Domestic) also significantly affects source disparity, as discussed below.

Foreign – Total foreign trade-related short tonnage (imports and exports) is similar between the two movement-based sources (Airport Records and T100 Data), ranging between 1.82 million (T100) to 1.96 million (Airport Records). Comparatively, the three shipment-based sources are much less. The very low tonnage of 0.2 million (TRANSEARCH) reflects the exclusion of non-NAFTA freight. One of the Census-foreign data sets (FL freight through all airports) reflects nearly the same amount as FAF (879,436 tons vs. 869,669 tons, respectively). The other Census-foreign data set (all freight through FL airports) indicates considerably more freight from other states moves through Florida airports (1.12 million tons). The important take-away from the comparison is that that the foreign FAF estimate is substantiated by the detailed Census-Florida data.

Note that FAF foreign data is based on Census data, but year 2014 estimates (reflect an estimate based on year 2012 data and year 2040 estimates).

Domestic – Domestic statewide tonnage volume varies considerably by all sources. Again, the two *movement*-based sources are much higher than the three shipment-based sources. At 2.76 million tons, the T100 estimates are over three-times greater than the Airport Records, due to several factors. While some airport records include express tonnage with freight tonnage, many do not, such as MIA. Further, some airport records tabulate transit tonnage as both deplanements (inbound) and enplanements (outbound), and some do not.

Regarding the two *shipment*-based sources, domestic TRANSEARCH air freight tonnage (220,536) is significantly (63%) greater than domestic FAF (135,305). This reflects the nature of how TRANSEARCH data is tabulated. Apparently, international air freight that transfers to/from domestic flights is tabulated as originating/terminating in Florida instead of abroad.

Exhibit 10-3: Source Tonnage by Trade Geography

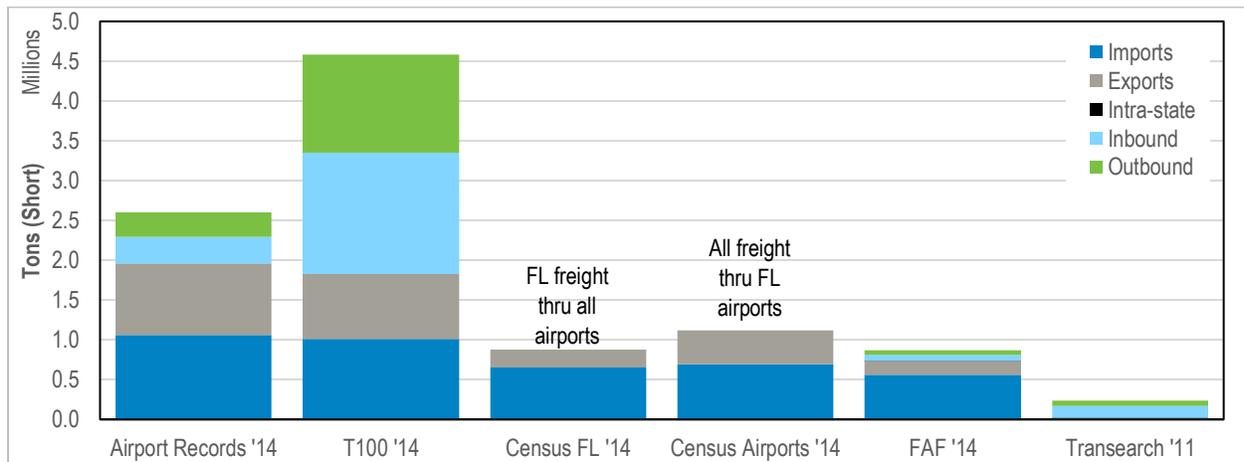
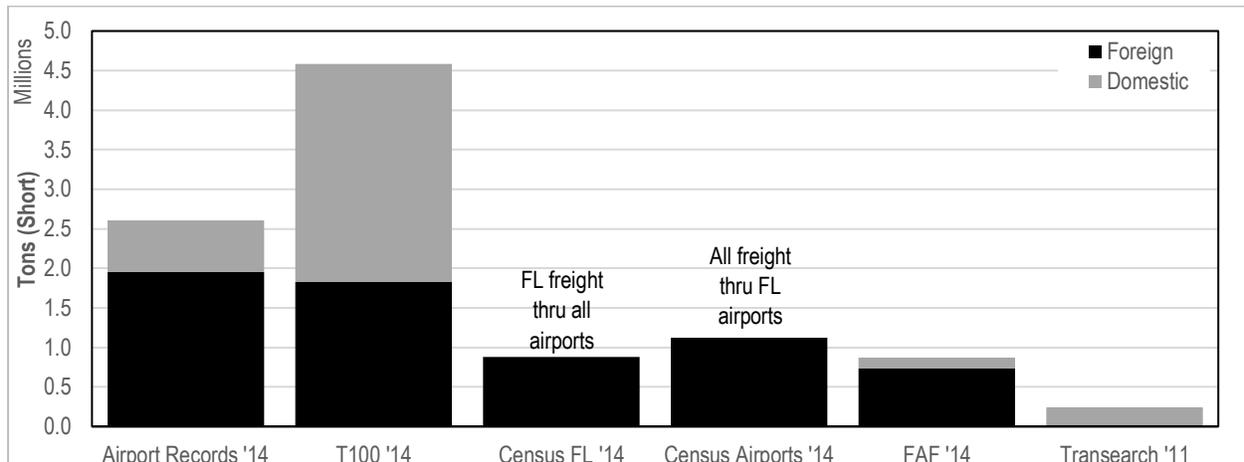


Exhibit 10-4: Source Comparison by Trade Geography and Direction, Short Tons

Source	Airport Records	T100	Census FL Freight Thru All Airports	Census All Freight Thru FL Airports	FAF4.1	TRANSEARCH
Year	2014	2014	2014	2014	2014	2011
Domestic						
Intra-state	N/A	N/A	N/A	N/A	2,856	3,532
Inbound	338,427	1,525,552	N/A	N/A	69,291	145,247
Outbound	308,175	1,236,391	N/A	N/A	63,159	71,758
Subtotal	646,602	2,761,942	N/A	N/A	135,305	220,536
Foreign						
Intra-state	N/A	N/A	N/A	N/A	N/A	N/A
Imports	1,062,880	1,009,086	653,087	691,553	560,001	11,177
Exports	892,524	813,545	226,348	428,740	174,363	7,253
Subtotal	1,955,404	1,822,632	879,436	1,120,293	734,364	18,430
Total						
Intra-state	N/A	N/A	N/A	N/A	2,856	3,532
In	1,401,306	2,534,638	653,087	691,553	629,291	156,423
Out	1,200,699	2,049,936	226,348	428,740	237,522	79,010
Total	2,602,005	4,584,574	879,436	1,120,293	869,669	238,965

Total – While the T100 appears to be the most consistent source of total air freight *movements*, FAF appears to be the most comprehensive source of air freight commodity *shipments*. Regarding such shipments, FAF data suggests that 84% (734,364 tons) are foreign versus 16% (135,305) domestic. This reflects the large share of international trade going through MIA.

10.6.1 Dollar Value

Airport Records and T100 data do not collect air freight value data, hence only the shipment-based sources can be compared. Interestingly, the relative disparities in reported freight values between sources is much less than the tonnage; see **Exhibit 10-5** and **Exhibit 10-6**.

Foreign – Census data indicates Florida’s international trade moving through airports (both in Florida and other states) totaled \$50.1 billion. Census data also indicates that all US trade moving through Florida airports totaled \$65.7 billion. FAF data indicates that Florida’s international trade moving through Florida airports totaled \$44.8 billion, which appears plausible compared to the Census data.

Domestic – Only the FAF and TRANSEARCH provide domestic freight values. Again, the FAF domestic air freight value (\$11.7 billion) is notably less than those reported by TRANSEARCH (\$44.4 billion) because of the data tabulation limitations of international freight by TRANSEARCH.⁷³

Total – Of the three shipment-based sources, only FAF provides both foreign and domestic data. Further, the foreign data provides information on Florida shipments through Florida airports and excludes data that would lead to over estimating Florida’s statewide economic impacts associated with Florida airports. Additionally, FAF international/domestic values appears reasonable when compared with the other sources (Census/ TRANSEARCH).

10.7 FAF Air Freight Shipments

FAF provides the most comprehensive and detailed source for estimating the economic impacts associated with Florida air freight commodity shipments. FAF summarizes air freight shipments inclusive of both geography (e.g., foreign and domestic) by aggregate commodity (40 types) in both tonnage and value terms. Each shipment is accounted for only once (i.e., no double-counting of transshipments). This section summarizes FAF air freight shipments and economic relevance to Florida, with support tables found in **Appendix K**.

FAF data indicates a total of 1.24 million tons, valued at \$132.5 billion moved across Florida airports (e.g., to, from, and through) in 2014, yielding an average value/ton of \$107,124. Air freight tonnage and value by direction is summarized in **Exhibit 10-7**.

⁷³ International airfreight that transfers to/from domestic flights is tabulated by Transearch as originating/ terminating in Florida instead of abroad.

Exhibit 10-5: Source Value by Trade Geography

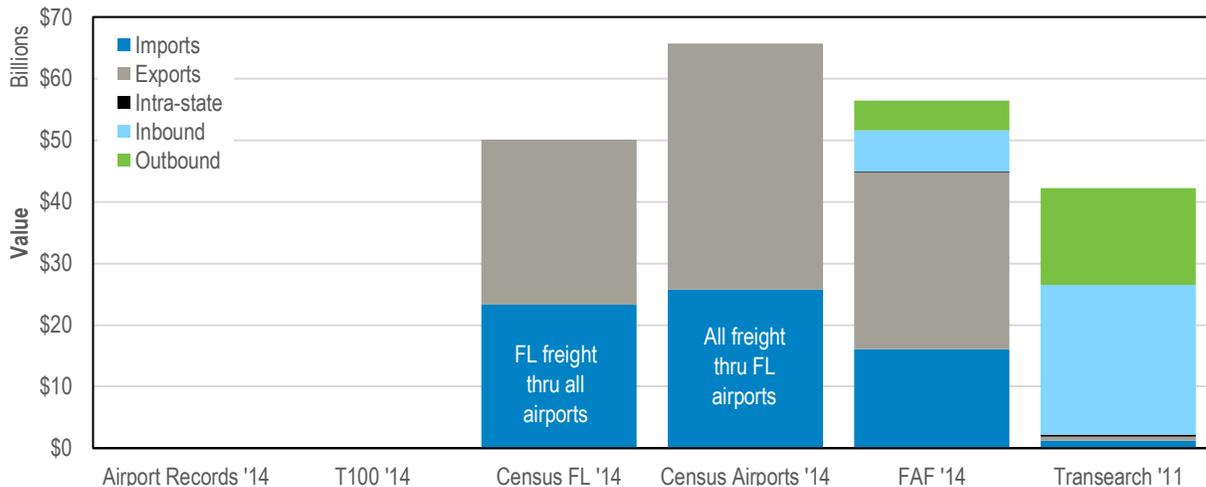
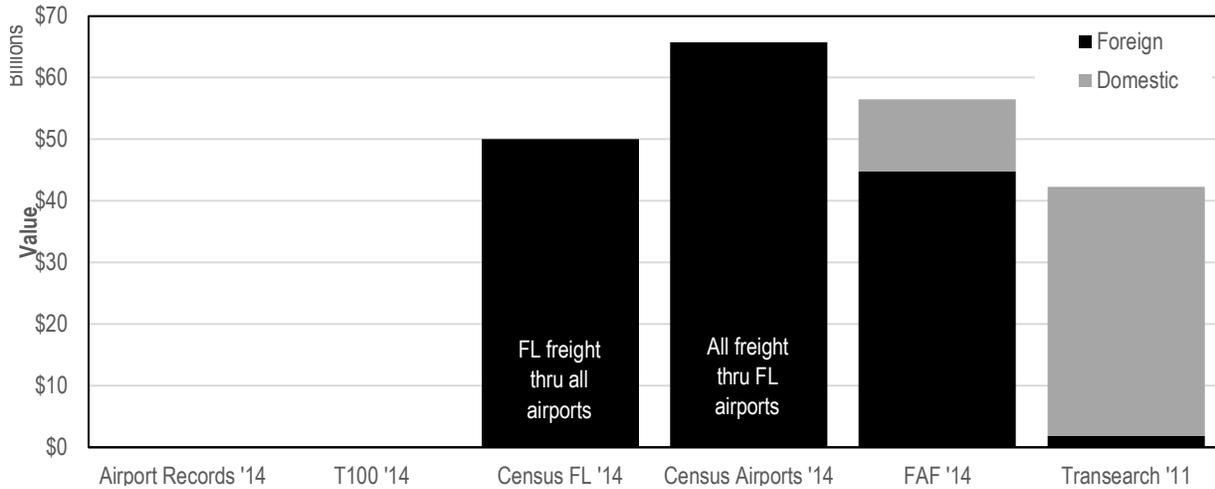


Exhibit 10-6: Source Comparison by Trade Geography and Direction, Dollar Values (in millions)

Source Year	Airport Records 2014	T100 2014	Census FL Freight Thru All Airports 2014	Census All Freight Thru FL Airports 2014	FAF4.1 2014	TRANSEARCH 2011
Domestic						
Intra-state	N/A	N/A	N/A	N/A	\$139	\$382
Inbound	N/A	N/A	N/A	N/A	\$6,680	\$24,234
Outbound	N/A	N/A	N/A	N/A	\$4,866	\$15,761
Subtotal	N/A	N/A	N/A	N/A	\$11,685	\$40,377
Foreign						
Intra-state	N/A	N/A	N/A	N/A	N/A	N/A
Imports	N/A	N/A	\$23,283	\$25,741	\$16,129	\$1,178
Exports	N/A	N/A	\$26,784	\$39,967	\$28,652	\$679
Subtotal	N/A	N/A	\$50,066	\$65,708	\$44,782	\$1,857
Total						
Intra-state	N/A	N/A	N/A	N/A	\$139	\$382
In	N/A	N/A	\$23,283	\$25,741	\$22,809	\$25,412
Out	N/A	N/A	\$26,784	\$39,967	\$33,518	\$16,440
Total	N/A	N/A	\$50,066	\$65,708	\$56,466	\$42,234

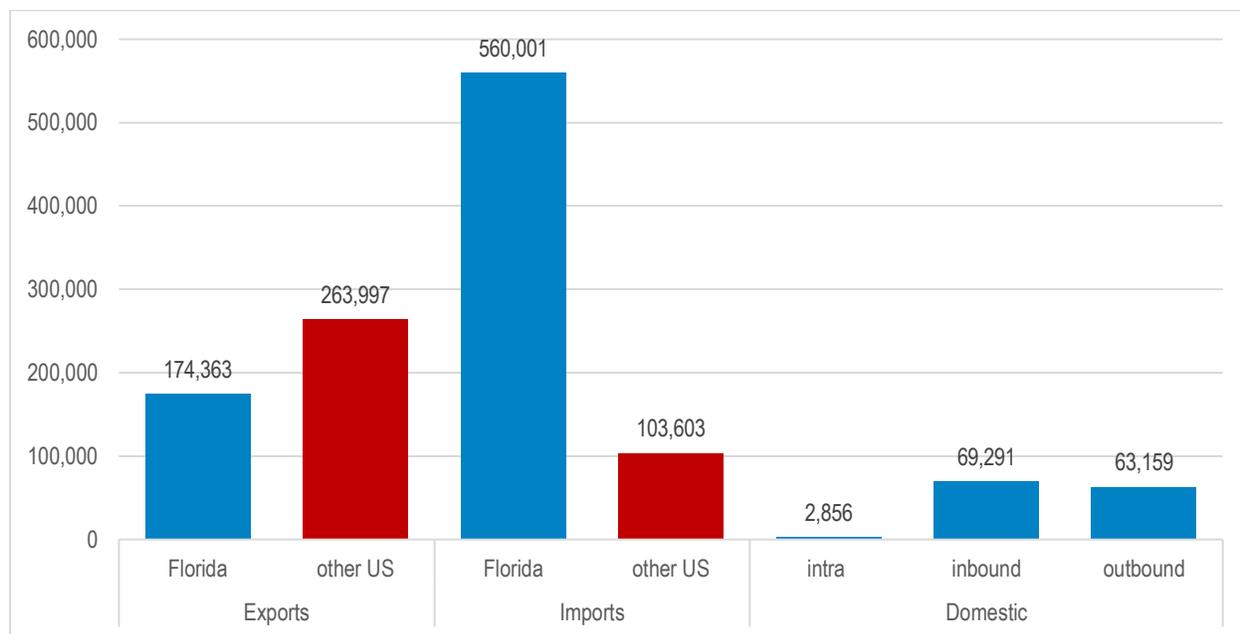
Exhibit 10-7: Air Freight Tonnage and Value by Direction (FAF)

2014	Tons	Value(m\$)	Value/Ton	% Tons	% Value
Exports					
from Florida	174,363	\$28,652	\$164,326	14%	22%
from Other USA	263,997	\$26,603	\$100,771	21%	20%
Exports Total	438,360	\$55,256	\$126,051	35%	42%
Imports					
to Florida	560,001	\$16,129	\$28,802	45%	12%
to Other USA	103,603	\$49,471	\$477,509	8%	37%
Imports Total	663,604	\$65,601	\$98,855	54%	49%
Domestic (Intra-nat'l)					
Intrastate	2,856	\$139	\$48,786	0%	0%
Inbound	69,291	\$6,680	\$96,399	6%	5%
Outbound	63,159	\$4,866	\$77,045	5%	4%
Domestic Total	135,305	\$11,685	\$86,360	11%	9%
Total					
Florida-relevant	869,669	\$56,466	\$64,929	70%	43%
Other USA	367,600	\$76,075	\$206,949	30%	57%
Total	1,237,269	\$132,541	\$107,124	100%	100%

Source: CDM Smith and FHWA FAF v4.1

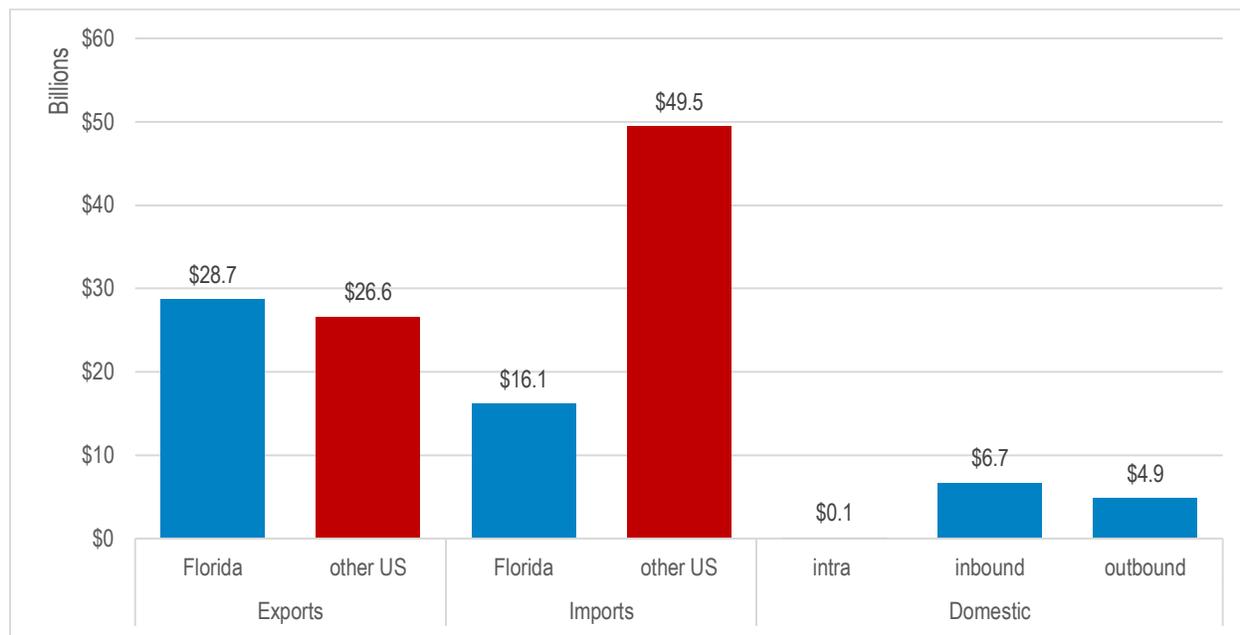
Tonnage – Of the 1.24 million tons of air freight moving through Florida’s airports, 0.87 million (70%) was either enplaned or deplaned at Florida airports, the other 0.37 million tons (30%) transited through Florida airports (i.e., destined-to, or originated-from, other states). **Exhibit 10-8** illustrates the large share of air freight imports (560,001 tons, 45%) bound for Florida, versus the various geographic-directional shipments.

Exhibit 10-8: FAF - Florida Air Freight Tons via Florida Airports (2014)



Value – Of the \$132.5 billion of air freight moving through Florida airports, \$56.5 billion (43%) was either enplaned or deplaned in Florida, and the other \$76.1 million (57%) transited through Florida. **Exhibit 10-9** illustrates the large share of air freight imports (\$49.5 billion, 37%) transiting through Florida, versus the other geographic-directional shipments.

Exhibit 10-9: FAF - Florida Air Freight Value via Florida Airports



Value per Ton – Average value per ton by directional-geography ranges from a low of \$28,802 (*Imports-to-Florida*) to a high of \$477,509 (*Imports-to-other-USA*, i.e., through Florida), as also summarized in **Exhibit 10-7**. This wide variance reflects an extremely high value outlier commodity shipment through Florida, which is addressed below. Excluding Other USA shipments, the highest average value per ton of Florida shipments are exports at \$164,326.

Commodity Flows – Major commodity tonnage by directional geography is shown in **Exhibit K-1** to **Exhibit K-3**, and graphically summarized in **Exhibit 10-10**. Detailed commodity movements by directional geography is provided in **Appendix K**. Analysis indicates that the two largest shipments comprise *Other Agriculture Products Imports to Florida* (340,900 tons) and *Meat/seafood Imports to Florida* (132,099 tons).⁷⁴ Comparatively, commodity value by directional geography is shown in **Exhibit K-5** to **Exhibit K-7**, and summarized in **Exhibit 10-11**, which indicates that *Basic Chemicals to Other USA* (\$39.1 billion) dominate value flows.⁷⁵

⁷⁴ See Exhibit K-2

⁷⁵ See Exhibit K-6

Exhibit 10-10: FAF - Florida Air Freight Tonnage by Commodity, (2014)

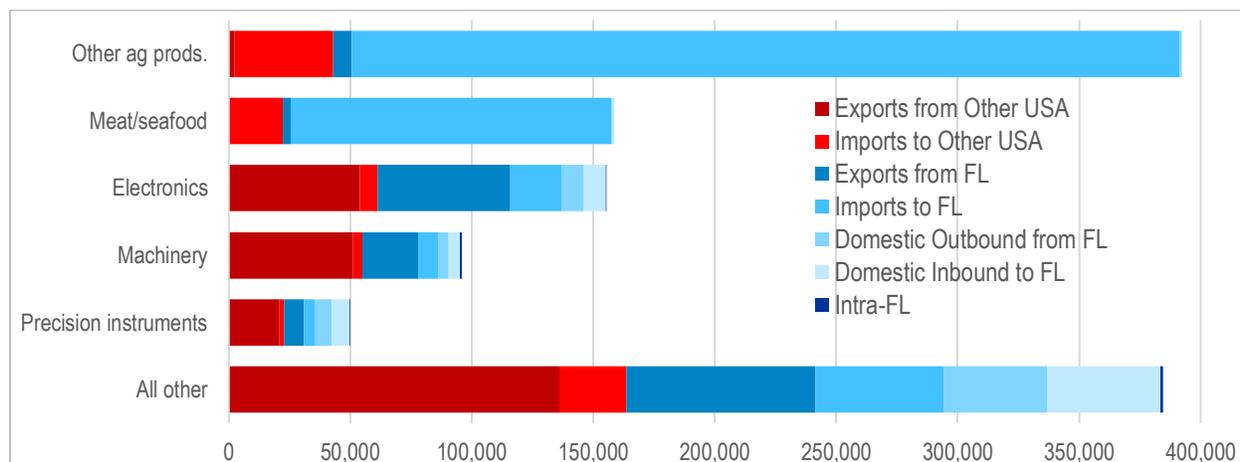
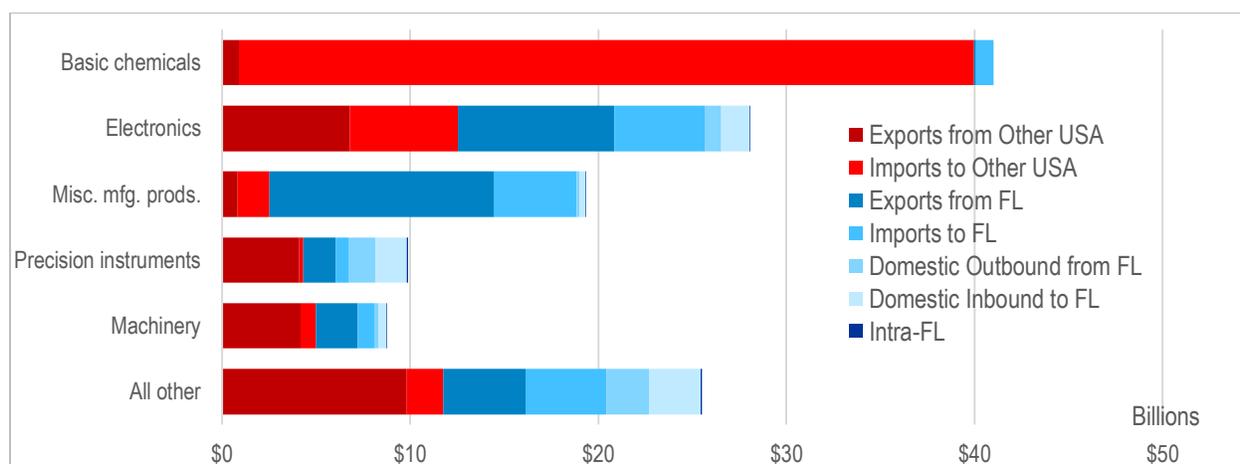


Exhibit 10-11: FAF - Florida Air Freight Value by Commodity, (2014)



Commodity value breakdown (see **Exhibit K-6**) indicates that 79% of *Imports-to-Other-USA* (\$39.1 billion) comprises Basic Chemicals (STCG 20). Corresponding commodity tonnage of 595 (see **Exhibit K-2**) indicates an average value per ton of \$65.7 million; clearly, some extremely valuable material transits through Florida airports. While this specific example concerns air freight through Florida with little economic relevance (see below), it does highlight the wide variance in commodity value. Such Florida-relevant values will be compared with other economic metrics in the economic impact analysis to ensure accuracy and comparability to statewide totals.

10.8 Economic Relevance – Next Steps

While air freight transport generates employment and other impacts, the effect is relatively small compared to the impact associated with the firms that produce or consume the air freight shipped. Air freight that originates and/or terminates in Florida is of economic-relevance, since it is produced and/or used by Florida firms. Conversely, out-of-state air freight that only moves through Florida airports (i.e., originates and terminates out-of-state) is of little economic relevance to Florida firms. The economically

relevant share of FAF-reported air freight in Florida is summarized in **Exhibit 10-12**.⁷⁶ In effect, the data is a subset of the above data – less the imports/exports to/from other domestic geographies thru Florida.

Exhibit 10-12: FAF – Florida-Relevant Air Freight Tonnage and Value by Direction (2014)

Directional Geography	Volume		Value		Value/Ton
	Tons	Percent	Millions	Percent	
Exports from Florida	174,363	20%	\$28,652	51%	\$164,326
Imports to Florida	560,001	64%	\$16,129	29%	\$28,802
Intrastate	2,856	0%	\$139	0%	\$48,786
Domestic Inbound	69,291	8%	\$6,680	12%	\$96,399
Domestic Outbound	63,159	7%	\$4,866	9%	\$77,045
Total	869,669	100%	\$56,466	100%	\$64,929

Source: CDM Smith and FHWA FAF v4.1

Exhibit 10-13 breaks-out the top ten economically-relevant commodity flows by direction and value. Both directional shipments include domestic and foreign trade geographies. These values are used to estimate the economic impacts associated with producing outbound commodities and consuming inbound commodities (production inputs, sales, etc.).

Exhibit 10-13: FAF – Florida-Relevant Air Freight Tonnage and Value by Direction and Commodity (2014)

SCTG2	Commodity	Tons		Value (in millions)		Value/Ton
		Amount	Percent	Amount	Percent	
Outbound/Intra						
40	Misc. Mfg. Prods.	10,285	4.3%	\$12,062	35.8%	\$1,172,744
35	Electronics	63,621	26.5%	\$9,205	27.3%	\$144,684
38	Precision Instruments	15,643	6.5%	\$3,179	9.4%	\$203,252
37	Transport Equip.	23,844	9.9%	\$2,979	8.9%	\$124,946
34	Machinery	28,162	11.7%	\$2,445	7.3%	\$86,811
21	Pharmaceuticals	2,738	1.1%	\$804	2.4%	\$293,815
36	Motorized Vehicles	12,138	5.0%	\$581	1.7%	\$47,828
23	Chemical Prods.	13,046	5.4%	\$462	1.4%	\$35,443
24	Plastics/Rubber	10,010	4.2%	\$315	0.9%	\$31,441
43	Mixed Freight	156	0.1%	\$293	0.9%	\$1,874,116
	Remaining Commodities	60,735	25.3%	\$1,332	4.0%	\$21,936
	Total	240,378	100.0%	\$33,658	100.0%	\$140,020
Inbound						
35	Electronics	30,443	4.8%	\$6,357	27.9%	\$208,818
40	Misc. Mfg. Prods.	8,169	1.3%	\$4,737	20.8%	\$579,893
38	Precision Instruments	11,896	1.9%	\$2,387	10.5%	\$200,664
37	Transport Equip.	5,640	0.9%	\$1,367	6.0%	\$242,356
34	Machinery	12,927	2.1%	\$1,317	5.8%	\$101,906
3	Other Ag Prods.	341,297	54.2%	\$1,290	5.7%	\$3,779
20	Basic Chemicals	1,938	0.3%	\$963	4.2%	\$496,812
5	Meat/Seafood	133,211	21.2%	\$897	3.9%	\$6,735
21	Pharmaceuticals	5,247	0.8%	\$753	3.3%	\$143,423
36	Motorized Vehicles	19,720	3.1%	\$625	2.7%	\$31,717
	Remaining Commodities	58,805	9.3%	\$2,116	9.3%	\$35,975
	Total	629,291	100.0%	\$22,809	100.0%	\$36,245

Source: CDM Smith and FHWA FAF v4.1

⁷⁶ Note, tonnage also shown in Exhibit 10-8 and Exhibit 10-10, and value also shown in Exhibit 10-9 and Exhibit 10-11, inclusive of Other USA movements through Florida airports.

Chapter 11. ECONOMIC IMPACTS

Air freight transport facilitates economic activity associated with the physical movement of goods, as well as the production and use of the goods moved (i.e., traded). Trade-oriented impacts reflect the production of goods, reallocation of intermediate goods, and consumption of final goods. Air freight-supported movements are captured by tracing the directional movement of air freight values by commodity type through commodity-industry economic interrelationships.

Translation of air freight values into economic impacts demonstrates the vital role airports provide in Florida’s economy. Such economic impact analysis provides a complementary perspective for traditional freight-related analysis that emphasizes movement volume (tons and/or aircraft) and the route/facility capacity.

11.1 Overview

Florida air freight economic impacts comprise two broad activities: transport services activities and trade-related activities. Transport services include firms providing transport services, and trade-related activities include the industries using such services to trade goods (shippers/receivers). *Trade-related* activities generate the most significant impacts whereas *transport services* impacts are comparatively smaller given their facilitating role of connecting shippers and consignees. For each activity, however, three impact types are quantified: direct, indirect, and induced. And for each type, five measures are derived: jobs (employment), income, value-added, output, and taxes. Impacts are calculated via the IMPLAN® economic model.

11.2 Data Sources and Models

Trade-related impacts incorporate the value of freight directional movements derived from the Federal Highway Administration’s (FHWA) Freight Analysis Framework (FAF). FAF-derived commodity values by direction (inbound, outbound, and intrastate) provide tonnage and value estimates of air freight produced or consumed in Florida.⁷⁷ These values, applied together with the IMPLAN® economic model, are used to determine how commodity movements generate direct economic impacts to Florida shippers/receivers. Additionally, IMPLAN® model data, in conjunction with Census County Business Patterns, were used to estimate the direct impacts associated with the provision of air freight transport services.

11.3 Report Outline

The methodology, data sources/models, and trade assumptions are outlined in the following Approach section. Impact findings are presented in the Summary Findings section, with support detail by activity, measure, and type in **Appendix M**.

⁷⁷ FAF freight flow details by direction and commodity type were detailed in the Air Freight Movements chapter which also compared/contrasted freight volumes and values to other sources.

11.4 Approach

The analysis addresses the economic impacts directly and tangentially related to air freight transportation in Florida. The following subsection outlines the methodology, data sources, economic model, and the applied assumptions for freight movements.

11.4.1 Methodology

Economic impacts of air freight are categorized into two broad activities: transport service providers, and trade-related transport users. For each activity, three types are quantified: direct, indirect, and induced. And for each type, five measures are derived: jobs (employment), income, value-added, output, and taxes. Activities, types, and measures are defined below.

Activities – Florida air freight-related economic impacts comprise transport service providers and trade-related user impacts.

- *Transport Service Providers* – Impacts associated with the provision of air freight transport services (e.g., the air freight transport industry) include a wide range of air transport activity, but also may include other support administrative operations. Transport services impacts are based on existing transportation industry information in the IMPLAN® model (e.g., “air transportation”) and relative proportions of freight versus passenger composition of the air transport industry from Census County Business Patterns (CBP) data.
- *Trade-Related Transport Users* – Impacts associated with shippers/receivers using air freight transport for goods movement (e.g., intermediate and final goods, etc.). Air freight users have several options available to transport freight and could possibly substitute other modal transport (truck and/or possibly rail or water in certain instances) if air freight services became unavailable. However, the choice to use air travel to ship/receive freight indicates cost and/or logistical advantages, and as such, removal of such advantages would negatively affect such users.

Types – Transport services and trade users each consist of three types (and a combined total):

- *Direct* – Impacts from the provision of air freight transport (i.e., “transport services”), as well from the firms/industries that use such air transport services to ship and receive goods (i.e., “trade-related transport users”).
- *Indirect* – Impacts associated with the suppliers that provide intermediate goods and services to the directly impacted industries.
- *Induced* – Impacts associated with the re-spending of earned income from both the direct and indirect industries in the study area (State of Florida).
- *Total* – Aggregated direct, indirect, and induced types.

Measures – Each type is measured in terms of five economic metrics:

- *Jobs/Employment* – Full-time-equivalent (FTE) annual jobs

- *Income* – Wage/salary earnings paid to the associated jobs.
- *Value-Added* – Net additional economic activity (i.e., total output less gross intermediate inputs), synonymous with GRP (gross regional product); includes employee and proprietor income, other income types, taxes, etc., required to produce final goods and services.
- *Output* – Total sales value associated with all levels of economic activity (combines gross intermediate inputs and value added).
- *Tax Revenues* – Various taxes on production and imports (sales, property, excise, etc.), fines, fees, licenses, permits, etc. resulting from business economic activity; and, include all federal, state, and local tax revenues.

11.4.2 Data Sources and Models

For the two impact activities, various data and modeling processes are utilized. Reflective of assorted production sectors, trade-related impacts are typically much greater than those related to transport services. Generating comprehensive freight user-related estimates requires converting commodity movement data into direct industry output estimates. This is done by bridging the FHWA FAF commodity movement data and the IMPLAN® economic model. Identifying the transport services-related impacts is a more-straightforward analysis process.

11.4.2.1 FHWA FAF

Freight Analysis Framework is an integrated database of freight movements for all primary transportation modes (truck, rail, water, air, and pipeline), produced by the Federal Highway Administration (FHWA) in collaboration with the Bureau of Transportation Statistics (BTS), based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the United States Census Trade Division. It is a searchable freight database by movement direction, origin/destination geography, mode, year, terms, etc. Air freight data is extracted from the most recent version (v4.1) for year 2014, which is an estimate based on the most recent year 2012 update and year 2040 forecasts. Air freight data was extracted for all available directional options (international imports and exports, and domestic inbound, outbound, and intrastate), focusing on Florida. Unlike the extensive commodity type detail (500+) provided by the Census and IHS TRANSEARCH®, FAF only offers a consolidated commodity summary of 43 Standard Classification of Transported Goods (SCTG) codes.⁷⁸ SCTG data were used to ascertain the economic impact associated with Florida firms that ship locally produced goods, and/or receive out-of-state materials used in the production process (intermediate goods) or sold as finished products (final consumption).⁷⁹

11.4.2.2 IMPLAN®

The IMPLAN® v3 model, produced by the IMPLAN® Group, LLC, is an economic modeling, input-output based, social account matrix software. It is used to estimate the economic impacts to a defined geography (i.e., Florida) ensuing from expenditures in an industry or commodity. A social account matrix

⁷⁸ Such other freight data sources were considered for the trade-related air freight users' economic impacts, but excluded because of partial coverage and limitations to economic relevancy: TRANSEARCH® is geographically limited to NAFTA countries, and misses all air freight movements to/from the Eastern and Southern Hemispheres. US Census only provides international movements and excludes all domestic.

⁷⁹ http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm

reflects the economic interrelationships between the various industries (and commodities), households, and governments in an economy and measures the economic interdependency of each industry on others through impact multipliers. Multipliers are developed within IMPLAN® from regional purchase coefficients, production functions, and socioeconomic data for each of the economic impact variables and are geographically-specific. IMPLAN® data and industry-accounts closely follow the conventions used in the “Input-Output Study of the U.S. Economy” by the U.S. Bureau of Economic Analysis. IMPLAN® is one of the most commonly accepted models used for economic impact analysis and estimation throughout the country.

Additionally, IMPLAN® provides commodity-to-industry production and absorption matrices that enable the quantification, for example, of how inbound commodities are used (absorbed) across Florida industries in the respective production processes to create final goods and services, or by institutions for final consumption. Further, algorithms developed for this analysis translate commodity (SCTG) data into IMPLAN® industry categories. Such data and translation processes are used to estimate the impacts associated with directional commodity movements.

11.4.2.3 Combined

The FHWA FAF directional-commodity data is bridged with the IMPLAN® economic model to assess the economic interrelationships underpinning the Florida economy, and to derive the economic impacts of air freight. FHWA FAF data provides the requisite commodity value detail for translation into detailed economic interrelationships between commodities, industries, and institutions in the economy, made transparent via the IMPLAN® model.

IMPLAN® does not identify commodity tonnage movements (only the underlying commodity to industry value structure), and the FHWA FAF does not provide the economic interrelationships necessary to determine how the commodity movements interact within the economy. As such, the two sources are combined to derive the freight-related economic impacts to Florida. Lastly, both the commodity detail and the IMPLAN® model reflect year 2014 activity.

In bridging the directional air freight SCTG data (from FHWA FAF) with IMPLAN® production and absorption functions, the IMPLAN® model was aggregated from the traditional 536 industry/commodity scale to a two-digit North American Industry Classification System (NAICS)-equivalent scale (86 industries/commodities). The economic model aggregation was required to more-closely concord with the relatively-limited 43 SCTG commodity code structure from the FHWA FAF.⁸⁰

11.4.3 Air Freight Data and Assumptions

Freight tonnage volumes and values used in the economic analysis are based on the data and findings presented in *Chapter 10: Air Freight Movements*. Economically-relevant directional movements include outbound (originating within Florida, terminating beyond), inbound (originating beyond Florida, terminating within), and intra (originating and terminating within Florida). Such directional movements are considered economically relevant to the Florida economy because the origin/destination of such air

⁸⁰ SCTG was developed by the USDOT, US Census Bureau, Statistics Canada, and Transport Canada to replace the STCC for the Commodity Flow Surveys (CFS). It comprises four levels (i.e., 2- to 5-digits). At the most aggregated level (i.e., 2-digit), the SCTG provides an overview of commodity groupings. The 4-digit level SCTG categories reflect industry patterns and transportation. However, because of data confidentiality, insignificant sample size, or data-reliability issues, statistics at the 4-digit SCTG are generally unpublished in the U.S.

freight corresponds to relative production/consumption of goods in the State. For economic analysis, the intrastate movements are combined with outbound movements, since both reflect industry production within Florida.

In contrast, goods transferred through Florida (i.e., originating/terminating beyond Florida, but moved via a Florida airport) are not economically-relevant from a trade-related air freight users' perspective to Florida. Such through traffic is not directly applicable to freight users based in Florida, and are thus excluded in this Florida-specific analysis; albeit, such movements bear on the magnitude of air freight transport service providers in Florida who transfer such air freight between aircraft.

Consolidated tons and value movements (i.e., two-digit SCTG) are summarized in **Exhibit 11-1** sorted by highest relative commodity value by direction. Data is presented by highest relative value and not tons, given that the economic relevancy of the freight movements is determined by the value of such movements, not the physical weight.

Exhibit 11-1: Economically-Relevant Freight Movements (2014)

SCTG2	Commodity	Tons		Value (in millions)		Value/Ton
		Amount	Percent	Amount	Percent	
Outbound/Intra						
40	Misc. Mfg. Prods.	10,285	4.3%	\$12,062	35.8%	\$1,172,744
35	Electronics	63,621	26.5%	\$9,205	27.3%	\$144,684
38	Precision Instruments	15,643	6.5%	\$3,179	9.4%	\$203,252
37	Transport Equip.	23,844	9.9%	\$2,979	8.9%	\$124,946
34	Machinery	28,162	11.7%	\$2,445	7.3%	\$86,811
21	Pharmaceuticals	2,738	1.1%	\$804	2.4%	\$293,815
36	Motorized Vehicles	12,138	5.0%	\$581	1.7%	\$47,828
23	Chemical Prods.	13,046	5.4%	\$462	1.4%	\$35,443
24	Plastics/Rubber	10,010	4.2%	\$315	0.9%	\$31,441
43	Mixed Freight	156	0.1%	\$293	0.9%	\$1,874,116
	Remaining Commodities	60,735	25.3%	\$1,332	4.0%	\$21,936
	<i>Total</i>	<i>240,378</i>	<i>100.0%</i>	<i>\$33,658</i>	<i>100.0%</i>	<i>\$140,020</i>
Inbound						
35	Electronics	30,443	4.8%	\$6,357	27.9%	\$208,818
40	Misc. Mfg. Prods.	8,169	1.3%	\$4,737	20.8%	\$579,893
38	Precision Instruments	11,896	1.9%	\$2,387	10.5%	\$200,664
37	Transport Equip.	5,640	0.9%	\$1,367	6.0%	\$242,356
34	Machinery	12,927	2.1%	\$1,317	5.8%	\$101,906
3	Other Ag Prods.	341,297	54.2%	\$1,290	5.7%	\$3,779
20	Basic Chemicals	1,938	0.3%	\$963	4.2%	\$496,812
5	Meat/Seafood	133,211	21.2%	\$897	3.9%	\$6,735
21	Pharmaceuticals	5,247	0.8%	\$753	3.3%	\$143,423
36	Motorized Vehicles	19,720	3.1%	\$625	2.7%	\$31,717
	Remaining Commodities	58,805	9.3%	\$2,116	9.3%	\$35,975
	<i>Total</i>	<i>629,291</i>	<i>100.0%</i>	<i>\$22,809</i>	<i>100.0%</i>	<i>\$36,245</i>

Source: CDM Smith and FHWA FAF v4.1

11.4.3.1 Outbound/Intrastate

Combining outbound and intrastate air freight movements, 240,378 tons of freight, valued at \$33.7 billion, originates in Florida. *Miscellaneous Manufacturing Products* and *Electronics* comprise the majority of originating freight value (63.2%), but just 30.7% of tonnage. The relatively high concentration of value, but not tonnage, for these two commodity groups reflects the higher relative value per ton metrics. Impacts associated with outbound/intrastate movements are derived by mapping the freight values with the respective industrial production in Florida from the IMPLAN® model. *Miscellaneous Manufacturing Products* and *Mixed Freight* commodities, with relatively high values per ton for such undefined commodities are mapped into the economic model by allocating the associated value across those industries that produce physical goods.

11.4.3.2 Inbound

In 2014, 629,291 economically-relevant tons were moved into Florida via air freight, valued at \$22.8 billion. As with outbound/intrastate movements, the top two commodity categories by value are *Electronics* and *Miscellaneous Manufacturing Products*, combined amounting to almost half (48.6%) of inbound total. Despite the high commodity values, the tonnages for such commodity groupings represents 6.1% of inbound tonnage, due to relatively higher values per tonnage than the average. *Other Agricultural Products* (e.g., flowers) and *Meat/Seafood* together represent a majority of the inbound air freight tonnage, at 54.2% and 21.2%, respectively. However, due to the comparatively low values per ton for such commodity groups, the commodity values represent just 5.7% and 3.9%, respectively. As such, the inbound air freight is dominated, in volume, by perishables; but, in value terms, dominated by relatively expensive manufacturing and electronics (e.g., computers, tablets, etc.).

Inbound commodities are translated into economic impacts by mapping the value of the inbound goods via the absorption of such respective goods into the industry production in Florida. Non-defined miscellaneous commodities are reallocated to the various existing Florida industries that absorb physical products into the production process.

11.4.3.3 Transport Services

IMPLAN® industry data provides various economic measures associated with the direct provision of air transport in Florida (e.g., employment, output, etc.). Unfortunately, such data are not subcategorized by passenger versus air freight transport. As such, to estimate the air freight share of direct air transport service impacts required proportioning the IMPLAN® industry employment data⁸¹ into the respective components and apply only the air freight portion through the model. United States Census County Business Patterns (CBP) provide NAICS-level data on industry employment, number of establishments, etc. Culling that detailed data by sub-industry, the relative proportion of air freight to total air transportation industry services is 13.7%. Applying that proportion to the IMPLAN® industry data yields 5,266 employees in air freight. However, as air freight transport also travels in the belly of commercial passenger airlines, an assumed 8% of the proportioned passenger employees from the IMPLAN® data (2,659) were attributed to air freight due to that type of transport handling. In total, 7,924 direct air freight transport service provider employees are estimated in Florida.

⁸¹ In 2014, IMPLAN® includes 38,497 employees in the entire air transport industry.

11.5 Summary Findings

Impacts are summarized by activity (transport services and trade related), type (direct and total), and measure (employment, income, value added, output, and tax revenue) for year 2014 to provide a comprehensive perspective on how air freight in Florida impacts the economy. (see **Exhibit 11-2**) Direct impacts reflect the provision and use of air freight transport. Total impacts include the indirect impacts (associated with suppliers) and induced impacts (associated with the re-spending of income). Direct and total impacts are summarized by measure:

- *Employment* – Economic impacts of air freight extend beyond the 7,920 employees directly employed in the provision of air freight transport services. When trade-related users are included, along with the economic multiplier impacts, air freight-related employment in Florida totals 625,410 jobs, which represent 5.8% of the 10.8 million jobs statewide.
- *Income* – \$31.2 billion earned by 625,410 total employees represent 6.2% of Florida’s total labor income.
- *Value-Added* – The combined value-added impact, \$48.2 billion, associated with the air freight services and users represents 5.8% of the state’s Gross State Product (GSP).
- *Output* – Total sales (value-added and intermediates inputs) associated with all air freight-related activity totals \$98.8 billion, representing 6.7% of Florida’s economy.
- *Tax Revenues* – The associated federal, state, and local tax revenues associated with air freight-related economic activity totals \$4.1 billion (5.9% of State).

Exhibit 11-2: Summary Impacts (2014)

Measure and Type	Transport Services	Trade Related	Total
Employment *			
Direct	7,920	295,180	303,110
Total	26,990	598,420	625,410
Income **			
Direct	\$669	\$15,196	\$15,865
Total	\$1,600	\$29,591	\$31,192
Value Added **			
Direct	\$1,262	\$21,059	\$22,321
Total	\$2,727	\$45,481	\$48,208
Output **			
Direct	\$2,875	\$49,998	\$52,872
Total	\$5,372	\$93,447	\$98,819
Tax Revenue **			
Direct	\$292	\$1,369	\$1,662
Total	\$399	\$3,664	\$4,063

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN*

* employment rounded to the nearest ten; totals may not sum due to rounding

** in millions of 2014 dollars

Additional impact detail by measure (indirect and induced) and by trade direction (inbound vs. outbound/intrastate) is provided in **Appendix M**.

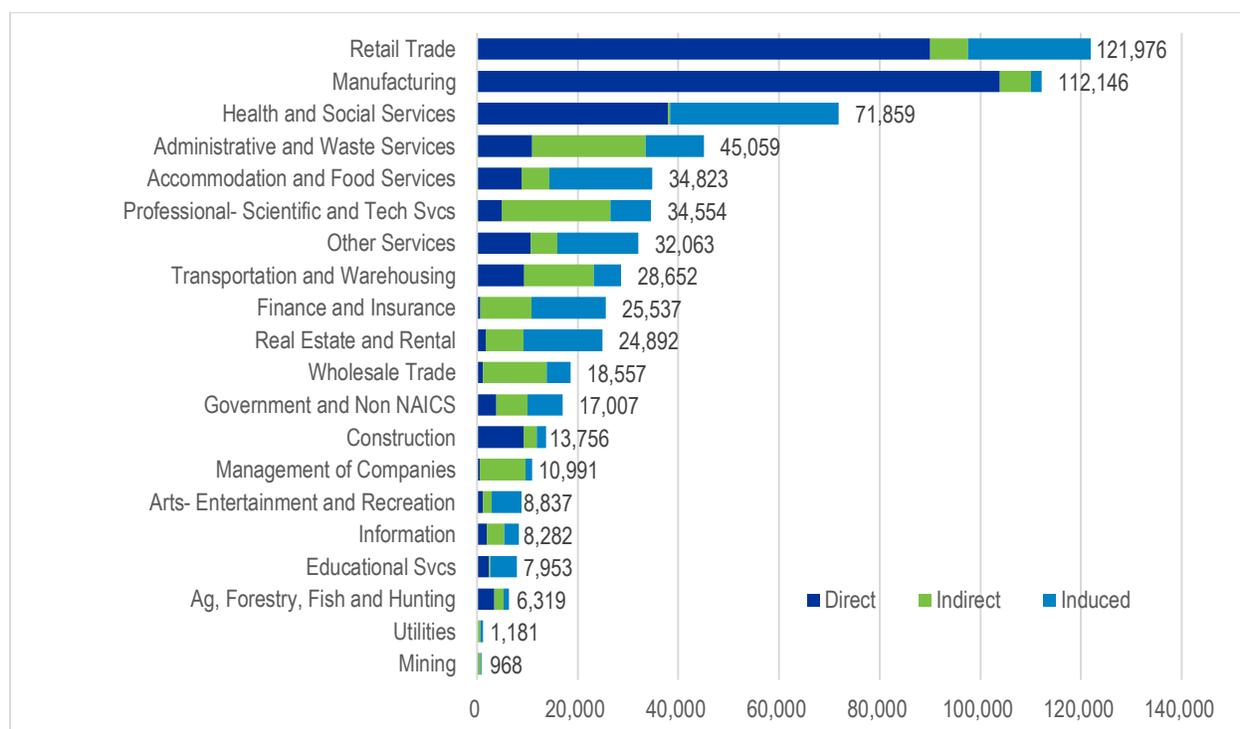
11.5.1 Industry Impacts

Almost half (48.9%) of the total 625,410 employment impacts from air freight activities are concentrated within three aggregate industry sectors: *Retail Trade* (121,976), *Manufacturing* (112,146), and *Health and Social Services* (71,859).

Direct *Manufacturing* employment (103,827) and *Retail Trade* employment (90,023) comprise two-thirds (66%) of direct impacts. (see **Exhibit 11-3**) Direct manufacturing impacts primarily reflect the high aggregate value of outbound miscellaneous products, electronics, and precision instruments manufactured in Florida and flown through the U.S. and abroad. Similarly, direct retail impacts primarily reflect the high aggregate value of inbound electronics, miscellaneous products, and precision instruments manufactured elsewhere, flown into Florida, and sold throughout the State.

Comparatively, many of the other air freight-related industry impacts are predominately via indirect and induced impacts; that is, those industries supplying materials to the various service industries (e.g., administrative, professional, transportation, etc.), and via the re-spending of income earned by the directly and indirectly affected employee base (e.g. food, retail, health, etc.). Notably, *Health and Social Services* also generate both a high direct (37,970) and induced (33,521) impact, but low indirect (368).⁸²

Exhibit 11-3: Employment Impacts by Industry and Type (2014)



Source: CDM Smith, FHWA FAF v4.1, and IMPLAN®

⁸² Tabular data presented in Appendix M - Air Freight Transport Impacts

11.5.2 Airport Impacts

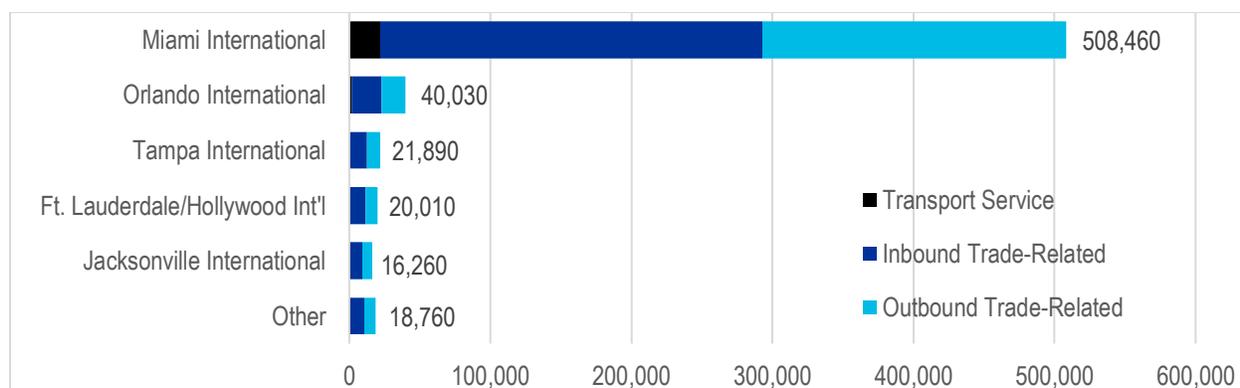
Data constraints inhibit air freight impact estimates by airport. The vast majority (95.7%) of impacts arise from trade-related users based on FAF shipment values. However, FAF does not provide airport-specific commodity shipment detail by ton, value, and direction. For this reason, the best impact-allocation option is based on each airport's relative share of total ton movements, as presented in Chapter 7 – Air Cargo Lift Capacity Analysis,⁸³ which provide a compilation of individual airport records and ACI-NA movement data (includes multiple movements of a single shipment). Similarly, impact disaggregation between impact activities (transport service, trade-related) at each airport is based on statewide totals, as are the directional shares of trade-related impacts.

MIA tonnage comprise 81.3%, another 15.7% moves through the four other airports, each with over 2.5% of total tonnage movements (Orlando, Tampa, Ft. Lauderdale, and Jacksonville). The remaining 3% moves through the other 15 airports moving air freight. Given the lack of airport-specific detail and the relatively minor air freight tonnage movements, airport-specific impact estimates for the remaining 15 airports are aggregated.

Using a tonnage-proxy distribution approach provides a fair, albeit crude, representation of the relative air freight impact associated with large air freight airports.⁸⁴ However, the approach is limited at smaller tonnage airports, because of movement volatility (temporal, commodity mix, direction) that identifies only sporadic movements that do not always translate into economic impacts.⁸⁵

The resultant employment impacts by the five largest air freight Florida airports indicates MIA dominance with 508,460, a magnitude of ten-times greater than the second airport, Orlando (40,030). (see **Exhibit 11-4**) This reflects the huge volume of international air freight moving through Miami. Support data is provided in the **Appendix M**.

Exhibit 11-4: Employment Impacts by Airport, Activity, and Direction (2014)



Source: CDM Smith, FHWA FAF v4.1, and IMPLAN®

⁸³ Includes movement geography (international vs. domestic) and direction (inbound vs. outbound)

⁸⁴ Value data would be a better proxy, but is unavailable for all relevant dimensions.

⁸⁵ Such sporadic movements are often one-off occurrences or statistical outliers and do not relate to sustained, airport-dedicated impacts

11.6 Conclusions

Economic impact analysis provides an alternative perspective of air freight importance. Air freight tonnage volume is typically considered as the relevant metric in traditional freight analyses. However, that same high-volume movement may be a low-value (per weight) commodity with comparatively small economic relevance compared to other higher value per weight commodity groups (e.g., *Other Agricultural Products* relative to *Miscellaneous Manufacturing Products*).⁸⁶ Consequently, traditional volume-assessed commodity movements may not yield similar observations from an economic perspective. In effect, volumes do not always translate into relevant values, and into direct economic impacts (and thus, into total impacts, inclusive of multiplier effects).

It would be erroneous to conclude that all impacts are entirely and solely dependent on air freight, and would disappear if airports ceased operating (i.e., no modal substitutability). Rather, the findings show that air freight transport services facilitate business throughout the State as quantified under trade-related activities. Specifically, these impacts highlight the magnitude of air freight use by *Retail Trade*, *Manufacturing*, and *Health and Social Services* across the state, as well as dealers, wholesalers, and others who transport materials, component parts, and products.

In summary, while the air freight industry provides some economic activity, it facilitates far more via the services rendered to people and industries by enabling the movement of goods necessary to conduct economic pursuits.

⁸⁶ *Electronics* and *Miscellaneous Manufacturing Products*, combined account for 48.6% of inbound value, but only represent 6.1% of inbound tonnage, See Table 1.

SUPPLEMENTAL DATA TABLES

The Supplemental Data Tables presented in this section are intended to consolidate all relevant air cargo statistics and figures presented throughout the 2016 Florida Air Cargo Study into a single location, allowing for simple side-by-side comparison. The Supplemental Data Tables are presented as follows:

- Supplement A – Data Tables: State Level
- Supplement B – Data Tables: FDOT District Level
- Supplement C – Data Tables: CFASPP Region Level
- Supplement D – Data Tables: Airport Level

The table below provides descriptions and detail (definition, years, methodology, sources, notes) of each air cargo measure presented in the Supplemental Data Tables. The full data set used to generate these tables can be accessed by [clicking here](#).

Data Source Details		
Air Cargo Measure Category	Air Cargo Measure Year	Source Detail
Historic Annual Air Cargo Tonnage (short tons)	2006 - 2015	Air Cargo Tonnage = (enplaned freight + deplaned freight + enplaned mail + deplaned mail). Actual air cargo tonnage throughput indicates the volume of air cargo activity occurring at a particular airport, and is closely related to airport infrastructure capacity. Historic air cargo trends act an indicator for industry demand. Sources: <ul style="list-style-type: none"> ◦ Airport Records ◦ Airports Council International - North America (ACI-NA) NOTE: Tonnage from US DOT Bureau of Transportation Statistics T100 Data is available but was not included since statistics sourced directly from airport records are considered more reliable. <ul style="list-style-type: none"> ◦ 2006-2013 tonnage sourced from ACI-NA ◦ 2014 & 2015 tonnage source identified in columns R and S as either Airport Records or ACI-NA
Forecast Annual Air Cargo Tonnage (short tons)	2019, 2024, 2034	Base year (2014) air cargo tonnage forecast in 5, 10, and 20 year increments using historic growth rate methodology. Airports may have varying forecast figures.
Historic Annual Dedicated Air Cargo Aircraft Operations	2006 - 2015	Dedicated air cargo aircraft operations = one takeoff or landing by a known air cargo carrier. Sources: <ul style="list-style-type: none"> ◦ US DOT Bureau of Transportation Statistics T100 Data ◦ Includes only carriers with \$20 million or more in operating revenue (therefore does not include all regional air cargo carriers and feeder airlines)
Forecast Annual Dedicated Air Cargo Aircraft Operations	2019, 2024, 2034	Base year (2014) dedicated air cargo operations forecast in 5, 10, and 20 year increments using historic growth rate methodology. Airports may have varying forecast figures.

Data Source Details		
Air Cargo Measure Category	Air Cargo Measure Year	Source Detail
Average Daily Air Cargo Lift Capacity (short tons)	2006, 2007, 2008, 2012, 2016	Air cargo lift capacity is the available space on an aircraft for carrying freight and mail. One-week samples of airline schedules (future) and IFR data records (past) were analyzed to determine average daily air cargo lift capacity provided by integrated express carriers, all-cargo carriers, and widebody passenger aircraft. Sources: <ul style="list-style-type: none"> ◦ OAG Cargo Flights ◦ GCR Airport IQ
Average Weekly RFS Capacity (short tons)	2006, 2007, 2008, 2012, 2016	Road Feeder Service (RFS) = trucking services offered by a cargo operator, such as an air freight forwarder, to move carried goods to and from the aircraft and/or terminal by truck. RFS allows a carrier, such as a passenger airline, to offer cargo service to a city to which it does not fly. Many RFS services are allocated an airline flight number for a truck route connecting two airports. Source: <ul style="list-style-type: none"> ◦ OAG Cargo Flights
Dedicated Annual Air Cargo Operations (GA)	2012, 2016	Dedicated air cargo aircraft operations = one takeoff or landing by a known air cargo carrier. Source: <ul style="list-style-type: none"> ◦ GCR Airport IQ
Forecast Dedicated Air Cargo Operations (GA)	2019, 2024, 2034	Base year (2016) dedicated air cargo operations forecast (aligning with planning years of commercial service forecast) using FAA Domestic All-Cargo Carrier RTMs growth rate methodology. Airports may have varying forecast figures
GA Air Cargo Capacity and Estimated Tonnage (short tons)	2016	Estimated capacity associated with dedicated air cargo operations by known air cargo carriers at GA airports. Assumes aircraft bulk-out at 80% of weight capacity and 60% of available capacity utilized (48% net utilization). Sources: <ul style="list-style-type: none"> ◦ Aircraft manufacturer specifications ◦ Carrier fleet specifications
Forecast GA Air Cargo Estimated Tonnage (short tons)	2019, 2024, 2034	Base year (2016) estimated air cargo tonnage forecast (aligning with planning years of commercial service forecast) using FAA Domestic All-Cargo Carrier RTMs growth rate methodology. Airports may have varying forecast figures

Data Source Details		
Air Cargo Measure Category	Air Cargo Measure Year	Source Detail
Economic Impacts (Employment, Income, Value-Added, Output, Tax Revenues)	2014	Economic impacts associated with the physical movement of goods by air cargo. Sources: <ul style="list-style-type: none"> ◦ FHWA FAF ◦ IMPLAN NOTE: Refer to Chapters 10 and 11 of the full technical report (2016 Florida Air Cargo Study) for context and detailed explanation of the methodologies employed to determine economic impacts associated with air cargo in Florida.

Source: CDM Smith

Supplement A-DATA TABLES: STATE LEVEL

Supplement A summarizes all relevant air cargo data at the statewide level in the table below. The full data set used to generate this table can be accessed by [clicking here](#).

Supplement A-Data Table: State Level		
Air Cargo Measure Category	Air Cargo Measure Year	Statewide
Historic Annual Air Cargo Tonnage (short tons)	2006 Tons	2,689,123
	2007 Tons	2,758,200
	2008 Tons	2,570,171
	2009 Tons	2,191,259
	2010 Tons	2,496,260
	2011 Tons	2,525,108
	2012 Tons	2,662,382
	2013 Tons	2,659,303
	2014 Tons	2,710,828
Forecast Annual Air Cargo Tonnage (short tons)	2019 Tons	3,006,351
	2024 Tons	3,333,971
	2034 Tons	4,100,252
Historic Annual Dedicated Air Cargo Aircraft Operations	2006 Operations	67,754
	2007 Operations	67,337
	2008 Operations	64,826
	2009 Operations	54,772
	2010 Operations	54,655
	2011 Operations	55,499
	2012 Operations	57,070
	2013 Operations	56,043
	2014 Operations	56,952
Forecast Annual Dedicated Air Cargo Aircraft Operations	2019 Operations	59,181
	2024 Operations	62,272
	2034 Operations	68,963
Average Daily Air Cargo Lift Capacity (short tons)	2006 Average Daily Lift Capacity	5,321
	2007 Average Daily Lift Capacity	4,646
	2008 Average Daily Lift Capacity	6,115
	2012 Average Daily Lift Capacity	6,794

Supplement A-Data Table: State Level		
Air Cargo Measure Category	Air Cargo Measure Year	Statewide
	2016 Average Daily Lift Capacity	6,838
Average Weekly RFS Capacity (short tons)	2006 Average Weekly RFS Capacity	2,625
	2007 Average Weekly RFS Capacity	2,910
	2008 Average Weekly RFS Capacity	6,139
	2012 Average Weekly RFS Capacity	8,948
	2016 Average Weekly RFS Capacity	12,180
Dedicated Annual Air Cargo Operations (GA)	2012 GA Air Cargo Operations	10,795
	2016 GA Air Cargo Operations	5,013
Forecast Dedicated Air Cargo Operations (GA)	2019 GA Air Cargo Operations	5,088
	2024 GA Air Cargo Operations	5,303
	2034 GA Air Cargo Operations	5,817
GA Air Cargo Capacity and Estimated Tonnage (short tons)	2016 GA Air Cargo Available Capacity (Inbound + Outbound)	6,355
	2016 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	3,813
Forecast GA Air Cargo Estimated Tonnage (short tons)	2019 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	3,872
	2024 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	4,035
	2034 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	4,426
2014 Economic Impacts	Employment	625,410
	Income	\$31,192,000,000
	Value-Added	\$48,208,000,000
	Output	\$98,818,000,000
	Tax Revenues	\$4,063,000,000

Source: CDM Smith

Supplement B-DATA TABLES: DISTRICT LEVEL

Supplement B summarizes all relevant air cargo data by FDOT District. Airports included in the data are presented in the table below, while the data is presented by FDOT District in the ensuing table. The full data set used to generate these tables can be accessed by [clicking here](#).

Airports Included in Supplement B Data by FDOT District				
ID	Associated City	Airport Name	FDOT District	CS-GA
BOW	Bartow	Bartow Municipal Airport	1	General Aviation
2IS	Clewiston	Airglades Airport	1	General Aviation
FMY	Fort Myers	Page Field	1	General Aviation
RSW	Fort Myers	Southwest Florida International Airport	1	Commercial Service
IMM	Immokalee	Immokalee Regional Airport	1	General Aviation
LAL	Lakeland	Lakeland Linder Regional Airport	1	General Aviation
MKY	Marco Island	Marco Island Airport	1	General Aviation
APF	Naples	Naples Municipal Airport	1	General Aviation
OBE	Okeechobee	Okeechobee County Airport	1	General Aviation
PGD	Punta Gorda	Punta Gorda Airport	1	Commercial Service
SRQ	Sarasota	Sarasota/Bradenton International Airport	1	Commercial Service
VNC	Venice	Venice Municipal Airport	1	General Aviation
GIF	Winter Haven	Winter Haven's Gilbert Airport	1	General Aviation
CTY	Cross City	Cross City Airport	2	General Aviation
FHB	Fernandina Beach	Fernandina Beach Municipal Airport	2	General Aviation
GNV	Gainesville	Gainesville Regional Airport	2	Commercial Service
VQQ	Jacksonville	Cecil Airport	2	General Aviation
HEG	Jacksonville	Herlong Recreational Airport	2	General Aviation
CRG	Jacksonville	Jacksonville Executive At Craig Airport	2	General Aviation
JAX	Jacksonville	Jacksonville International Airport	2	Commercial Service
LCQ	Lake City	Lake City Gateway Airport	2	General Aviation
28J	Palatka	Palatka Municipal-Lt. Kay Larkin Field	2	General Aviation
40J	Perry	Perry-Foley Airport	2	General Aviation
SGJ	St. Augustine	Northeast Florida Regional Airport	2	Commercial Service
CEW	Crestview	Bob Sikes Airport	3	General Aviation
54J	DeFuniak Springs	DeFuniak Springs Airport	3	General Aviation
DTS	Destin	Destin Executive Airport	3	General Aviation
ECP	Panama City	Northwest Florida Beaches International Airport	3	Commercial Service
PNS	Pensacola	Pensacola International Airport	3	Commercial Service
TLH	Tallahassee	Tallahassee International Airport	3	Commercial Service
VPS	Valparaiso	Destin-Fort Walton Beach Airport	3	Commercial Service
BCT	Boca Raton	Boca Raton Airport	4	General Aviation
FXE	Fort Lauderdale	Ft. Lauderdale Executive Airport	4	General Aviation
FLL	Fort Lauderdale	Ft. Lauderdale/Hollywood International Airport	4	Commercial Service
FPR	Fort Pierce	Treasure Coast International Airport	4	General Aviation
PMP	Pompano Beach	Pompano Beach Airpark	4	General Aviation
SUA	Stuart	Witham Field	4	General Aviation
VRB	Vero Beach	Vero Beach Municipal Airport	4	General Aviation

Airports Included in Supplement B Data by FDOT District				
ID	Associated City	Airport Name	FDOT District	CS-GA
PBI	West Palm Beach	Palm Beach International Airport	4	Commercial Service
DAB	Daytona Beach	Daytona Beach International Airport	5	Commercial Service
DED	DeLand	DeLand Municipal - Sidney H. Taylor Field	5	General Aviation
X35	Dunnellon	Marion County Airport	5	General Aviation
LEE	Leesburg	Leesburg International Airport	5	General Aviation
MLB	Melbourne	Melbourne International Airport	5	Commercial Service
EVB	New Smyrna Beach	New Smyrna Beach Municipal Airport	5	General Aviation
OCF	Ocala	Ocala International-Jim Taylor Field	5	General Aviation
ORL	Orlando	Executive Airport	5	General Aviation
ISM	Orlando	Kissimmee Gateway Airport	5	General Aviation
MCO	Orlando	Orlando International Airport	5	Commercial Service
SFB	Orlando	Orlando Sanford International Airport	5	Commercial Service
OMN	Ormond Beach	Ormond Beach Municipal Airport	5	General Aviation
FIN	Palm Coast	Flagler Executive Airport	5	General Aviation
TIX	Titusville	Space Coast Regional Airport	5	General Aviation
EYW	Key West	Key West International Airport	6	Commercial Service
MTH	Marathon	The Florida Keys Marathon International Airport	6	General Aviation
TNT	Miami	Dade-Collier Training and Transition Airport	6	General Aviation
TMB	Miami	Miami Executive Airport	6	General Aviation
MIA	Miami	Miami International Airport	6	Commercial Service
OPF	Miami	Opa-Locka Executive Airport	6	General Aviation
BKV	Brooksville	Brooksville - Tampa Bay Regional Airport	7	General Aviation
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International Airport	7	Commercial Service
VDF	Tampa	Tampa Executive Airport	7	General Aviation
TPA	Tampa	Tampa International Airport	7	Commercial Service
ZPH	Zephyrhills	Zephyrhills Municipal Airport	7	General Aviation

Source: CDM Smith

Supplement B-Data Table: District Level								
Air Cargo Measure Category	Air Cargo Measure Year	FDOT District						
		District 1 - Southwest Florida	District 2 - Northeast Florida	District 3 - Northwest Florida	District 4 - Southeast Florida	District 5 - Central Florida	District 6 - South Florida	District 7 - West Central Florida
Historic Annual Air Cargo Tonnage (short tons)	2006 Tons	21,849	87,335	20,688	163,319	227,807	2,018,859	149,266
	2007 Tons	20,608	83,646	18,160	167,461	209,717	2,120,720	137,888
	2008 Tons	17,443	81,954	16,840	145,506	182,064	1,992,545	133,819
	2009 Tons	17,235	72,407	10,948	108,729	153,774	1,717,570	110,596
	2010 Tons	17,493	60,079	10,722	117,081	153,889	2,024,532	112,464
	2011 Tons	16,602	72,689	12,144	116,049	165,455	2,031,233	110,936
	2012 Tons	17,224	74,899	16,373	117,548	195,073	2,128,228	113,037
	2013 Tons	16,346	73,064	14,945	106,004	190,601	2,144,942	113,401
	2014 Tons	17,061	71,309	14,612	113,587	174,776	2,204,229	115,254
2015 Tons	16,813	72,555	14,323	108,744	189,442	2,211,260	125,661	
Forecast Annual Air Cargo Tonnage (short tons)	2019 Tons	18,800	79,081	16,220	125,980	194,000	2,444,450	127,820
	2024 Tons	20,860	87,701	17,970	139,680	215,160	2,710,850	141,750
	2034 Tons	25,650	107,852	22,100	171,810	264,600	3,333,920	174,320
Historic Annual Dedicated Air Cargo Aircraft Operations	2006 Operations	1,819	4,961	2,541	7,533	7,260	38,672	4,968
	2007 Operations	1,818	4,861	2,557	8,091	7,586	37,509	4,915
	2008 Operations	1,427	4,619	2,584	7,679	6,521	37,282	4,714
	2009 Operations	1,488	3,552	1,381	5,854	5,237	34,213	3,047
	2010 Operations	1,071	2,766	1,591	5,519	4,939	36,328	2,441
	2011 Operations	1,087	2,388	1,912	5,474	4,812	37,432	2,394
	2012 Operations	1,092	2,238	2,146	5,282	4,665	39,286	2,361
	2013 Operations	1,077	2,259	1,945	5,097	4,611	38,427	2,627
	2014 Operations	1,116	2,304	1,951	5,194	4,869	38,736	2,782
2015 Operations	1,130	2,338	2,029	5,731	5,772	38,812	3,220	

Supplement B-Data Table: District Level								
Air Cargo Measure Category	Air Cargo Measure Year	FDOT District						
		District 1 - Southwest Florida	District 2 - Northeast Florida	District 3 - Northwest Florida	District 4 - Southeast Florida	District 5 - Central Florida	District 6 - South Florida	District 7 - West Central Florida
Forecast Annual Dedicated Air Cargo Aircraft Operations	2019 Operations	1,170	2,424	1,960	5,460	5,067	40,170	2,930
	2024 Operations	1,230	2,554	2,060	5,750	5,328	42,270	3,080
	2034 Operations	1,360	2,825	2,290	6,370	5,898	46,810	3,410
Average Daily Air Cargo Lift Capacity (short tons)	2006 Average Daily Lift Capacity	118	88	64	305	503	3,970	273
	2007 Average Daily Lift Capacity	105	168	62	326	546	3,198	239
	2008 Average Daily Lift Capacity	95	240	61	419	615	4,376	309
	2012 Average Daily Lift Capacity	53	164	75	630	781	4,694	397
	2016 Average Daily Lift Capacity	45	162	67	369	869	4,815	510
Average Weekly RFS Capacity (short tons)	2006 Average Weekly RFS Capacity	-	225	113	173	773	870	473
	2007 Average Weekly RFS Capacity	-	225	165	240	795	1,013	473
	2008 Average Weekly RFS Capacity	-	540	90	146	1,748	2,753	863
	2012 Average Weekly RFS Capacity	-	870	240	105	2,625	3,713	1,395
	2016 Average Weekly RFS Capacity	53	1,118	623	75	3,053	5,513	1,748
Dedicated Annual Air Cargo Operations (GA)	2012 GA Air Cargo Operations	93	1,917	31	1,864	3,023	2,957	910
	2016 GA Air Cargo Operations	138	527	17	665	605	2,128	933
Forecast Dedicated Air Cargo Operations (GA)	2019 GA Air Cargo Operations	140	535	17	674	614	2,161	947
	2024 GA Air Cargo Operations	146	556	18	705	639	2,252	987
	2034 GA Air Cargo Operations	159	611	20	771	702	2,471	1,083

Supplement B-Data Table: District Level								
Air Cargo Measure Category	Air Cargo Measure Year	FDOT District						
		District 1 - Southwest Florida	District 2 - Northeast Florida	District 3 - Northwest Florida	District 4 - Southeast Florida	District 5 - Central Florida	District 6 - South Florida	District 7 - West Central Florida
GA Air Cargo Capacity and Estimated Tonnage (short tons)	2016 GA Air Cargo Available Capacity (Inbound + Outbound)	202	376	18	539	1,951	2,609	660
	2016 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	121	226	11	323	1,171	1,565	396
Forecast GA Air Cargo Estimated Tonnage (short tons)	2019 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	123	229	11	328	1,189	1,590	402
	2024 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	128	239	11	342	1,239	1,657	419
	2034 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	140	262	12	375	1,359	1,817	460

Source: CDM Smith

Supplement C-DATA TABLES: CFASPP LEVEL

The Continuing Florida Aviation System Planning Process (CFASPP) is a method used within Florida to continually monitor the aviation environment and determine the development requirements to best meet projected aviation demands. This process is a component of the Federal Aviation Administration Continuous Airport Systems Planning Process. Supplement C summarizes all relevant air cargo data by CFASPP region. Airports included in the data are presented in the table below, while the data is presented by CFASPP Region in the ensuing table. The full data set used to generate these tables can be accessed by clicking [here](http://www.cfaspp.com). For additional information on CFASPP, visit the website <http://www.cfaspp.com>.

Airports Included in Supplement C Data by CFASPP Region					
ID	Associated City	Airport Name	CFASPP Region Number	CFASPP Region Name	Airport Type
CEW	Crestview	Bob Sikes Airport	1	Northwest	General Aviation
54J	DeFuniak Springs	DeFuniak Springs Airport	1	Northwest	General Aviation
DTS	Destin	Destin Executive Airport	1	Northwest	General Aviation
ECP	Panama City	Northwest Florida Beaches International Airport	1	Northwest	Commercial Service
PNS	Pensacola	Pensacola International Airport	1	Northwest	Commercial Service
TLH	Tallahassee	Tallahassee International Airport	1	Northwest	Commercial Service
VPS	Valparaiso	Destin-Fort Walton Beach Airport	1	Northwest	Commercial Service
CTY	Cross City	Cross City Airport	2	North Central	General Aviation
X35	Dunnellon	Marion County Airport	2	North Central	General Aviation
GNV	Gainesville	Gainesville Regional Airport	2	North Central	Commercial Service
LCQ	Lake City	Lake City Gateway Airport	2	North Central	General Aviation
OCF	Ocala	Ocala International-Jim Taylor Field	2	North Central	General Aviation
40J	Perry	Perry-Foley Airport	2	North Central	General Aviation
FHB	Fernandina Beach	Fernandina Beach Municipal Airport	3	Northeast	General Aviation
VQQ	Jacksonville	Cecil Airport	3	Northeast	General Aviation
HEG	Jacksonville	Herlong Recreational Airport	3	Northeast	General Aviation
CRG	Jacksonville	Jacksonville Executive At Craig Airport	3	Northeast	General Aviation
JAX	Jacksonville	Jacksonville International Airport	3	Northeast	Commercial Service
28J	Palatka	Palatka Municipal-Lt. Kay Larkin Field	3	Northeast	General Aviation

Airports Included in Supplement C Data by CFASPP Region					
ID	Associated City	Airport Name	CFASPP Region Number	CFASPP Region Name	Airport Type
SGJ	St. Augustine	Northeast Florida Regional Airport	3	Northeast	Commercial Service
DAB	Daytona Beach	Daytona Beach International Airport	4	East Central	Commercial Service
DED	DeLand	DeLand Municipal - Sidney H. Taylor Field	4	East Central	General Aviation
LEE	Leesburg	Leesburg International Airport	4	East Central	General Aviation
MLB	Melbourne	Melbourne International Airport	4	East Central	Commercial Service
EVB	New Smyrna Beach	New Smyrna Beach Municipal Airport	4	East Central	General Aviation
ORL	Orlando	Executive Airport	4	East Central	General Aviation
ISM	Orlando	Kissimmee Gateway Airport	4	East Central	General Aviation
MCO	Orlando	Orlando International Airport	4	East Central	Commercial Service
SFB	Orlando	Orlando Sanford International Airport	4	East Central	Commercial Service
OMN	Ormond Beach	Ormond Beach Municipal Airport	4	East Central	General Aviation
FIN	Palm Coast	Flagler Executive Airport	4	East Central	General Aviation
TIX	Titusville	Space Coast Regional Airport	4	East Central	General Aviation
BKV	Brooksville	Brooksville - Tampa Bay Regional Airport	5	West Central	General Aviation
PIE	St. Petersburg/Clearwater	St. Pete-Clearwater International Airport	5	West Central	Commercial Service
VDF	Tampa	Tampa Executive Airport	5	West Central	General Aviation
TPA	Tampa	Tampa International Airport	5	West Central	Commercial Service
ZPH	Zephyrhills	Zephyrhills Municipal Airport	5	West Central	General Aviation
BOW	Bartow	Bartow Municipal Airport	6	Central	General Aviation
LAL	Lakeland	Lakeland Linder Regional Airport	6	Central	General Aviation
GIF	Winter Haven	Winter Haven's Gilbert Airport	6	Central	General Aviation
2IS	Clewiston	Airglades Airport	7	Southwest	General Aviation
FMY	Fort Myers	Page Field	7	Southwest	General Aviation
RSW	Fort Myers	Southwest Florida International Airport	7	Southwest	Commercial Service
IMM	Immokalee	Immokalee Regional Airport	7	Southwest	General Aviation
MKY	Marco Island	Marco Island Airport	7	Southwest	General Aviation
APF	Naples	Naples Municipal Airport	7	Southwest	General Aviation

Airports Included in Supplement C Data by CFASPP Region					
ID	Associated City	Airport Name	CFASPP Region Number	CFASPP Region Name	Airport Type
PGD	Punta Gorda	Punta Gorda Airport	7	Southwest	Commercial Service
SRQ	Sarasota	Sarasota/Bradenton International Airport	7	Southwest	Commercial Service
VNC	Venice	Venice Municipal Airport	7	Southwest	General Aviation
FPR	Fort Pierce	Treasure Coast International Airport	8	Treasure Coast	General Aviation
OBE	Okeechobee	Okeechobee County Airport	8	Treasure Coast	General Aviation
SUA	Stuart	Witham Field	8	Treasure Coast	General Aviation
VRB	Vero Beach	Vero Beach Municipal Airport	8	Treasure Coast	General Aviation
BCT	Boca Raton	Boca Raton Airport	9	Southeast	General Aviation
FXE	Fort Lauderdale	Ft. Lauderdale Executive Airport	9	Southeast	General Aviation
FLL	Fort Lauderdale	Ft. Lauderdale/Hollywood International Airport	9	Southeast	Commercial Service
EYW	Key West	Key West International Airport	9	Southeast	Commercial Service
MTH	Marathon	The Florida Keys Marathon International Airport	9	Southeast	General Aviation
TNT	Miami	Dade-Collier Training and Transition Airport	9	Southeast	General Aviation
TMB	Miami	Miami Executive Airport	9	Southeast	General Aviation
MIA	Miami	Miami International Airport	9	Southeast	Commercial Service
OPF	Miami	Opa-Locka Executive Airport	9	Southeast	General Aviation
PMP	Pompano Beach	Pompano Beach Airpark	9	Southeast	General Aviation
PBI	West Palm Beach	Palm Beach International Airport	9	Southeast	Commercial Service

Source: CDM Smith

Supplement C-Data Table: CFASPP Level										
Air Cargo Measure Category	Air Cargo Measure Year	CFASPP Region								
		Region 1 Northwest	Region 2 North Central	Region 3 Northeast	Region 4 East Central	Region 5 West Central	Region 6 Central	Region 7 Southwest	Region 8 Treasure Coast	Region 9 Southeast
Historic Annual Air Cargo Tonnage (short tons)	2006 Tons	20,688	503	86,832	227,807	149,266	-	21,849	-	2,182,178
	2007 Tons	18,160	422	83,224	209,717	137,888	-	20,608	-	2,288,181
	2008 Tons	16,840	358	81,596	182,064	133,819	-	17,443	-	2,138,051
	2009 Tons	10,948	274	72,133	153,774	110,596	-	17,235	-	1,826,299
	2010 Tons	10,722	117	59,962	153,889	112,464	-	17,493	-	2,141,613
	2011 Tons	12,144	31	72,658	165,455	110,936	-	16,602	-	2,147,282
	2012 Tons	16,373	2	74,897	195,073	113,037	-	17,224	-	2,245,776
	2013 Tons	14,945	3	73,061	190,601	113,401	-	16,346	-	2,250,946
	2014 Tons	14,612	1	71,308	174,776	115,254	-	17,061	-	2,317,816
	2015 Tons	14,323	1	72,554	189,442	125,661	-	16,813	-	2,320,004
Forecast Annual Air Cargo Tonnage (short tons)	2019 Tons	16,220	1	79,080	194,000	127,820	-	18,800	-	2,570,430
	2024 Tons	17,970	1	87,700	215,160	141,750	-	20,860	-	2,850,530
	2034 Tons	22,100	2	107,850	264,600	174,320	-	25,650	-	3,505,730
Historic Annual Dedicated Air Cargo Aircraft Operations	2006 Operations	2,541	622	4,339	7,260	4,968	-	1,819	587	45,618
	2007 Operations	2,557	638	4,352	7,457	4,915	-	1,818	615	44,985
	2008 Operations	2,584	841	4,151	6,148	4,714	-	1,427	533	44,428
	2009 Operations	1,381	426	3,165	5,198	3,047	-	1,488	477	39,590
	2010 Operations	1,591	237	2,567	4,901	2,441	-	1,071	42	41,805
	2011 Operations	1,912	107	2,322	4,771	2,394	-	1,087	-	42,906
	2012 Operations	2,146	36	2,234	4,633	2,361	3	1,089	-	44,568
	2013 Operations	1,945	28	2,255	4,587	2,627	-	1,077	-	43,524
	2014 Operations	1,951	60	2,300	4,813	2,782	6	1,110	2	43,928

Supplement C-Data Table: CFASPP Level										
Air Cargo Measure Category	Air Cargo Measure Year	CFASPP Region								
		Region 1 Northwest	Region 2 North Central	Region 3 Northeast	Region 4 East Central	Region 5 West Central	Region 6 Central	Region 7 Southwest	Region 8 Treasure Coast	Region 9 Southeast
	2015 Operations	2,029	43	2,328	5,739	3,220	2	1,128	-	44,543
Forecast Annual Dedicated Air Cargo Aircraft Operations	2019 Operations	1,960	4	2,420	5,067	2,930	-	1,170	-	45,630
	2024 Operations	2,060	4	2,550	5,328	3,080	-	1,230	-	48,020
	2034 Operations	2,290	5	2,820	5,898	3,410	-	1,360	-	53,180
Average Daily Air Cargo Lift Capacity (short tons)	2006 Average Daily Lift Capacity	64	2	86	503	273	-	118	-	4,275
	2007 Average Daily Lift Capacity	62	2	166	546	239	-	105	-	3,525
	2008 Average Daily Lift Capacity	61	4	236	615	309	-	95	-	4,795
	2012 Average Daily Lift Capacity	75	0	163	781	397	-	53	-	5,324
	2016 Average Daily Lift Capacity	67	1	161	869	510	-	45	-	5,184
Average Weekly RFS Capacity (short tons)	2006 Average Weekly RFS Capacity	113	-	225	773	473	-	-	-	1,043
	2007 Average Weekly RFS Capacity	165	-	225	795	473	-	-	-	1,253
	2008 Average Weekly RFS Capacity	90	-	540	1,748	863	-	-	-	2,899
	2012 Average Weekly RFS Capacity	240	-	870	2,625	1,395	-	-	-	3,818
	2016 Average Weekly RFS Capacity	623	-	1,118	3,053	1,748	-	53	-	5,588
Dedicated Annual Air Cargo Operations (GA)	2012 GA Air Cargo Operations	31	14	1,914	3,012	910	15	76	26	4,797
	2016 GA Air Cargo Operations	17	64	517	551	933	28	109	61	2,733
Forecast Dedicated Air Cargo Operations (GA)	2019 GA Air Cargo Operations	17	65	525	559	947	28	111	61	2,775
	2024 GA Air Cargo Operations	18	67	546	582	987	30	115	65	2,893
	2034 GA Air Cargo Operations	20	74	600	639	1,083	33	125	70	3,173

Supplement C-Data Table: CFASPP Level										
Air Cargo Measure Category	Air Cargo Measure Year	CFASPP Region								
		Region 1 Northwest	Region 2 North Central	Region 3 Northeast	Region 4 East Central	Region 5 West Central	Region 6 Central	Region 7 Southwest	Region 8 Treasure Coast	Region 9 Southeast
GA Air Cargo Capacity and Estimated Tonnage (short tons)	2016 GA Air Cargo Available Capacity (Inbound + Outbound)	18	1,097	372	859	660	59	142	97	3,052
	2016 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	11	658	223	516	396	35	85	58	1,831
Forecast GA Air Cargo Estimated Tonnage (short tons)	2019 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	11	668	226	524	402	36	87	59	1,859
	2024 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	11	696	236	545	419	38	90	61	1,937
	2034 GA Air Cargo Estimated Tonnage (Inbound + Outbound)	12	764	259	598	460	41	99	67	2,125

Source: CDM Smith

Supplement D-DATA TABLES: AIRPORT LEVEL

Supplement D presents all relevant air cargo data at the individual airport level. All commercial service airports with measurable air cargo activity are included, as are the top general aviation airports with measurable air cargo activity. The airports included in Supplement D are listed in the table below, subsequently followed by the individual airport data tables themselves. The full data set used to generate these tables can be accessed by [clicking here](#).

Commercial Service Airports		General Aviation Airports	
Airport ID	2015 Tons	Airport ID	2016 Tons
MIA	2,210,776	OPF	1,164.62
MCO	187,855	OCF	654.79
TPA	101,633	ORL	414.42
FLL	82,577	MTH	393.43
JAX	72,554	VDF	392.87
PBI	26,167	FXE	240.8
PIE	24,028	VQQ	204.65
RSW	16,487	ISM	83.37
TLH	7,768	APF	39.58
PNS	6,555	FPR	36.89
SFB	1,316	LAL	32.32
EYW	484	BCT	21.13
SRQ	326	FMY	19.7
DAB	142	SUA	16.39
MLB	129	DTS	8.32
GNV	1	TMB	7.41
ECP	-	DED	6.73
		VNC	6.7

Source: CDM Smith

Miami International Airport						Orlando International Airport					
MIA		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)	MCO		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	2,018,291	37,165	3,969	870	Historic	2006	218,267	7,247	499	773
	2007	2,120,159	35,926	3,194	1,013		2007	201,800	7,448	533	795
	2008	1,992,029	35,624	4,374	2,753		2008	175,937	6,144	589	1,748
	2009	1,717,091	32,831	-	-		2009	151,182	5,190	-	-
	2010	2,024,032	35,030	-	-		2010	149,798	4,896	-	-
	2011	2,030,793	36,211	-	-		2011	161,462	4,750	-	-
	2012	2,127,772	38,060	4,691	3,713		2012	190,647	4,587	760	2,625
	2013	2,144,445	37,130	-	-		2013	187,015	4,577	-	-
	2014	2,203,726	37,430	-	-		2014	172,869	4,804	-	-
	2015	2,210,776	37,487	-	-		2015	187,855	5,724	-	-
Forecast	2016	-	-	4,813	5,513	2016	-	-	849	3,053	
	2019	2,443,890	39,390	-	-	Forecast	2019	191,700	5,060	-	-
	2024	2,710,230	41,450	-	-		2024	212,600	5,320	-	-
2034	3,333,160	45,900	-	-	2034		261,470	5,890	-	-	

Tampa International Airport						Ft. Lauderdale/Hollywood International Airport					
TPA		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)	FLL		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	120,297	1,908	139	473	Historic	2006	163,319	5,203	228	135
	2007	108,046	2,079	141	473		2007	151,258	5,390	258	203
	2008	113,131	2,589	188	863		2008	130,547	4,919	327	143
	2009	94,343	1,632	-	-		2009	95,486	3,866	-	-
	2010	96,873	1,647	-	-		2010	98,067	3,902	-	-
	2011	95,876	1,595	-	-		2011	95,931	3,902	-	-
	2012	94,253	1,592	329	1,395		2012	96,935	3,713	506	90
	2013	93,557	1,853	-	-		2013	84,115	3,807	-	-
	2014	93,684	1,984	-	-		2014	85,945	3,903	-	-
	2015	101,633	2,248	-	-		2015	82,577	4,438	-	-
Forecast	2016	-	-	428	1,748	2016	-	-	316	75	
	2019	103,900	2,090	-	-	Forecast	2019	95,320	4,110	-	-
	2024	115,220	2,200	-	-		2024	105,690	4,320	-	-
2034	141,700	2,430	-	-	2034		130,000	4,790	-	-	

Jacksonville International Airport						Palm Beach International Airport					
JAX		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)	PBI		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	86,832	4,339	86	225	Historic	2006	-	1,743	77	38
	2007	83,224	4,352	166	225		2007	16,203	2,086	68	38
	2008	81,596	4,151	236	540		2008	14,959	2,227	91	4
	2009	72,133	3,165	-	-		2009	13,243	1,511	-	-
	2010	59,962	2,567	-	-		2010	19,014	1,575	-	-
	2011	72,658	2,322	-	-		2011	20,118	1,572	-	-
	2012	74,897	2,234	163	870		2012	20,613	1,556	124	15
	2013	73,061	2,255	-	-		2013	21,889	1,280	-	-
	2014	71,308	2,300	-	-		2014	27,642	1,287	-	-
	2015	72,554	2,328	-	-		2015	26,167	1,293	-	-
Forecast	2016	-	-	161	1,118	2016	-	-	53	-	
	2019	79,080	2,420	-	-	Forecast	2019	30,660	1,350	-	-
	2024	87,700	2,550	-	-		2024	33,990	1,430	-	-
2034	107,850	2,820	-	-	2034		41,810	1,580	-	-	

St. Pete-Clearwater International Airport					
PIE		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	28,969	3,060	134	-
	2007	29,842	2,836	99	-
	2008	20,688	2,125	121	-
	2009	16,253	1,415	-	-
	2010	15,591	794	-	-
	2011	15,060	799	-	-
	2012	18,784	769	68	-
	2013	19,844	774	-	-
	2014	21,570	798	-	-
	2015	24,028	972	-	-
Forecast	2016	-	-	83	-
	2019	23,920	840	-	-
	2024	26,530	880	-	-
	2034	32,620	980	-	-

Southwest Florida International Airport					
RSW		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	21,459	1,817	118	-
	2007	20,103	1,818	103	-
	2008	16,968	1,427	95	-
	2009	16,833	1,488	-	-
	2010	17,087	1,071	-	-
	2011	16,278	1,087	-	-
	2012	16,931	1,089	52	-
	2013	16,088	1,077	-	-
	2014	16,747	1,110	-	-
	2015	16,487	1,126	-	-
Forecast	2016	-	-	45	53
	2019	18,550	1,170	-	-
	2024	20,580	1,230	-	-
	2034	25,310	1,360	-	-

Tallahassee International Airport					
TLH		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	17,452	2,037	32	-
	2007	14,510	2,059	39	-
	2008	13,934	2,076	37	-
	2009	10,631	1,370	-	-
	2010	10,417	1,586	-	-
	2011	10,688	1,820	-	-
	2012	9,929	1,620	31	-
	2013	8,439	1,406	-	-
	2014	7,893	1,416	-	-
	2015	7,768	1,492	-	-
Forecast	2016	-	-	26	-
	2019	8,760	1,400	-	-
	2024	9,710	1,470	-	-
	2034	11,930	1,630	-	-

Pensacola International Airport					
PNS		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	3,236	500	16	113
	2007	3,650	498	15	165
	2008	2,906	505	15	90
	2009	317	11	-	-
	2010	305	-	-	-
	2011	1,456	90	-	-
	2012	6,444	526	41	240
	2013	6,506	539	-	-
	2014	6,668	535	-	-
	2015	6,555	537	-	-
Forecast	2016	-	-	37	623
	2019	7,400	560	-	-
	2024	8,200	590	-	-
	2034	10,090	660	-	-

Orlando-Sanford International Airport					
SFB		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	9,145	1	3	-
	2007	7,641	4	12	-
	2008	5,919	-	26	-
	2009	2,442	-	-	-
	2010	3,919	1	-	-
	2011	3,331	15	-	-
	2012	3,504	38	21	-
	2013	3,431	2	-	-
	2014	1,627	5	-	-
	2015	1,316	8	-	-
Forecast	2016	-	-	20	-
	2019	1,990	5	-	-
	2024	2,210	6	-	-
	2034	2,710	6	-	-

Key West International Airport					
EYW		Annual Air	Annual	Average Daily	Average
		Cargo Tonnage (short tons)	Dedicated Air Cargo Aircraft Operations	Air Cargo Lift Capacity (short tons)	Weekly RFS Capacity (short tons)
Historic	2006	568	866	1	-
	2007	561	858	5	-
	2008	516	818	2	-
	2009	479	706	-	-
	2010	500	711	-	-
	2011	440	660	-	-
	2012	456	672	3	-
	2013	497	726	-	-
	2014	503	739	-	-
	2015	484	729	-	-
Forecast	2016	-	-	3	-
	2019	560	780	-	-
	2024	620	820	-	-
	2034	760	910	-	-

Supplement D – Data Tables: Airport Level

Sarasota/Bradenton International Airport						Daytona Beach International Airport					
SRQ		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)	DAB		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	390	-	-	-	Historic	2006	186	2	-	-
	2007	505	-	2	-		2007	170	2	-	-
	2008	475	-	-	-		2008	117	-	-	-
	2009	402	-	-	-		2009	89	-	-	-
	2010	406	-	-	-		2010	93	-	-	-
	2011	324	-	-	-		2011	108	-	-	-
	2012	293	-	1	-		2012	139	4	-	-
	2013	258	-	-	-		2013	155	2	-	-
	2014	314	-	-	-		2014	146	-	-	-
	2015	326	2	-	-		2015	142	2	-	-
Forecast	2019	250	-	-	-	Forecast	2019	160	-	-	-
	2024	280	-	-	-		2024	180	-	-	-
	2034	340	-	-	-		2034	220	-	-	-

Melbourne International Airport						Gainesville Regional Airport					
MLB		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)	GNV		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	209	2	-	-	Historic	2006	503	622	2	-
	2007	106	2	-	-		2007	422	509	2	-
	2008	91	2	-	-		2008	358	468	4	-
	2009	61	4	-	-		2009	274	387	-	-
	2010	79	2	-	-		2010	117	199	-	-
	2011	554	5	-	-		2011	31	66	-	-
	2012	783	2	-	-		2012	2	4	0	-
	2013	-	-	-	-		2013	3	4	-	-
	2014	134	2	-	-		2014	1	4	-	-
	2015	129	1	-	-		2015	1	10	-	-
Forecast	2019	150	2	-	-	Forecast	2019	1	4	-	-
	2024	170	2	-	-		2024	1	4	-	-
	2034	200	2	-	-		2034	2	5	-	-

Northwest Florida Beaches International Airport					
ECP		Annual Air Cargo Tonnage (short tons)	Annual Dedicated Air Cargo Aircraft Operations	Average Daily Air Cargo Lift Capacity (short tons)	Average Weekly RFS Capacity (short tons)
Historic	2006	-	-	16	-
	2007	-	-	9	-
	2008	-	-	9	-
	2009	-	-	-	-
	2010	-	-	-	-
	2011	-	-	-	-
	2012	-	-	4	-
	2013	-	-	-	-
	2014	51	-	-	-
	2015	-	-	-	-
Forecast	2019	60	-	-	-
	2024	60	-	-	-
	2034	80	-	-	-

Source: CDM Smith

Opa-Locka Executive Airport				Ocala International-Jim Taylor Field				Executive Airport			
OPF		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	OCF		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	ORL		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	2,627	-	Historic	2012	11	-	Historic	2012	2,920	-
	2016	1,641	1,164.62		2016	53	654.79		2016	468	414.42
Forecast	2019	1,667	1,182.71	Forecast	2019	54	664.99	Forecast	2019	475	420.86
	2024	1,737	1,232.35		2024	56	692.90		2024	495	438.53
	2034	1,905	1,351.78		2034	62	760.05		2034	543	481.02

The Florida Keys Marathon Airport				Tampa Executive Airport				Ft. Lauderdale Executive Airport			
MTH		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	VDF		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	FXE		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	306	-	Historic	2012	899	-	Historic	2012	1,809	-
	2016	470	393.43		2016	930	392.87		2016	546	240.80
Forecast	2019	477	399.54	Forecast	2019	944	398.98	Forecast	2019	554	244.54
	2024	497	416.31		2024	984	415.72		2024	578	254.80
	2034	546	456.65		2034	1,080	456.01		2034	634	279.49

Cecil Airport				Kissimmee Gateway Airport				Naples Municipal Airport			
VQQ		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	ISM		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	APF		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	164	-	Historic	2012	60	-	Historic	2012	37	-
	2016	485	204.65		2016	60	83.37		2016	49	39.58
Forecast	2019	493	207.83	Forecast	2019	61	84.66	Forecast	2019	50	40.20
	2024	513	216.56		2024	63	88.21		2024	52	41.88
	2034	563	237.54		2034	70	96.76		2034	57	45.94

Treasure Coast International Airport				Lakeland Linder Regional Airport				Boca Raton Airport			
FPR		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	LAL		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	BCT		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	7	-	Historic	2012	12	-	Historic	2012	31	-
	2016	31	36.89		2016	17	32.32		2016	50	21.13
Forecast	2019	31	37.47	Forecast	2019	17	32.84	Forecast	2019	51	21.45
	2024	33	39.04		2024	18	34.22		2024	53	22.35
	2034	36	42.82		2034	20	37.53		2034	58	24.52

Page Field				Witham Field				Destin Executive Airport			
FMY		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	SUA		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	DTS		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	24	-	Historic	2012	12	-	Historic	2012	22	-
	2016	33	19.70		2016	15	16.39		2016	13	8.32
Forecast	2019	34	20.01	Forecast	2019	15	16.65	Forecast	2019	13	8.45
	2024	35	20.85		2024	16	17.35		2024	14	8.80
	2034	38	22.87		2034	17	19.03		2034	15	9.65

Miami Executive Airport				DeLand Municipal - Sidney H. Taylor				Venice Municipal Airport			
TMB		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	DED		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)	VNC		Annual Dedicated GA Air Cargo Operations	Estimated GA Air Cargo Tonnage (short tons)
Historic	2012	24	-	Historic	2012	-	-	Historic	2012	2	-
	2016	17	7.41		2016	4	6.73		2016	7	6.70
Forecast	2019	17	7.53	Forecast	2019	4	6.83	Forecast	2019	7	6.80
	2024	18	7.84		2024	4	7.12		2024	7	7.09
	2034	20	8.60		2034	5	7.81		2034	8	7.78

Source: CDM Smith

REFERENCES

The references listed below represent additional sources of information related to air cargo that were not specifically cited in this study:

- Air Cargo Development – A Strategic Plan for Erie (May2007), Eclat Consulting
http://www.erieairport.org/assets/pdfs/Eclat_Air_Cargo_Development_Strategy_2007.pdf
- Miami International Airport, Cargo Hub 2015-2016, MIA Marketing
http://www.miami-airport.com/pdfdoc/MIA_Cargo_Brochure.pdf
- ACI-NA Air Cargo Manager 2014, ACI-NA Air Cargo Committee
http://www.aci-na.org/sites/default/files/air_cargo_manager.pdf
- ACI-NA Air Cargo Guide (December 2013)
http://www.aci-na.org/sites/default/files/aircargo_guide_2013.pdf
- The Orlando Air Cargo Market (August 19, 2015), Webber Air Cargo
- Air Cargo Mode Choice and Demand Study (July 2, 2010), State of California, Trans Systems
http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/Air_Cargo_Mode_Choice_&_Demand_Study_080210.pdf
- Estimating the Economic Impact of Air Cargo Operations at Airports, Part 1: User’s Guidebook and Part 2: Research Report, ACRP
<http://www.trb.org/Main/Blurbs/171800.aspx>
- ACRP Report 143, Guidebook for Air Cargo Facility Planning and Development (October 2, 2015)
<http://www.trb.org/Main/Blurbs/173274.aspx>

APPENDICES

Appendix A: WORLD'S LARGEST FORWARDERS BY AIR FREIGHT

Exhibit A-1: World's Largest Forwarders by Air Freight, Metric Tons

A&A Rank (last year's rank in parentheses)	Provider	2014 Gross Revenues (US\$Mn)	2014 Airfreight Tonnes	2013 Airfreight Tonnes	2012 Airfreight Tonnes
1	DHL Supply Chain & Global Forwarding	32,193	2,272,000	2,215,000	2,327,000
2	Kuehne + Nagel	23,293	1,194,000	1,134,000	1,093,000
3	DB Schenker Logistics	19,861	1,112,000	1,092,000	1,095,000
4 (6)	UPS Supply Chain Solutions	5,758	912,500	775,000	862,000
5 (4)	Kintetsu World Express	2,942	872,300	924,000	1,072,000
6 (5)	Panalpina	7,338	858,000	825,100	801,000
7	Expeditors	6,565	823,094	764,376	729,527
8	Nippon Express	17,916	654,101	668,522	773,773
9 (10)	SDV (Bolloré Group)	7,483	550,000	522,000	510,000
10 (9)	Hellmann Worldwide Logistics	3,800	507,361	549,948	383,194
11	CEVA Logistics	7,864	495,600	513,000	550,000
12	Sinotrans	7,463	481,900	396,100	417,200
13	Agility	4,300	372,700	375,000	490,000
14	UTi Worldwide	4,180	368,000	368,000	361,000
15	Yusen Logistics	3,945	310,000	310,000	337,130
16 (17)	DSV	8,661	287,662	259,365	259,057
17 (16)	Kerry Logistics	2,723	282,200	278,000	289,000
18 (21)	GEODIS	5,960	270,600	210,000	210,000
19 (18)	NNR Global Logistics	1,745	252,068	252,068	not listed
20†	FedEx Trade Networks and FedEx Supply Chain	1,462	250,000	not listed	not listed
21 (22)	Dimerco Express	560	204,332	176,000	not listed
22†	Pilot Freight Services	548	200,000	not listed	not listed
23 (19)	Damco	3,212	190,000	226,626	210,600
24†	Hitachi Transport System	5,920	170,000	not listed	not listed
25 (23)	Logwin	1,501	146,000	143,000	155,000

*Revenues and metric tons are company reported or Armstrong & Associates, Inc. estimates. Revenues have been converted to US\$ using the average exchange rate in order to make non-currency related growth comparisons.

†First time appearing on this Top 25 list.

Source: Air Cargo World

Appendix B: TOP 25 CARGO AIRLINES OR AIRLINE GROUPS

Exhibit B-1: Top 25 Cargo Airlines or Airline Groups, 2014 FTK*

Rank	Airline (or Airline Group)	2014 Cargo Traffic (FTKs millions)
1	Federal Express	16,072
2	Emirates	11,326
3	UPS Airlines	10,923
4	Lufthansa	10,897
5	Cathay Pacific Group	10,044
6	Air France-KLM	9,817
7	Korean Air	8,254
8	DHL Express	7,850
9	Cargolux	6,364
10	Singapore Airlines	6,151
11	Qatar Airways	6,036
12	Atlas Air	5,916
13	China Airlines	5,416
14	IAG Group	5,410
15	Air China	5,194
16	China Southern Airlines	5,055
17	China Eastern Airlines	4,601
18	Etihad Airways	4,304
19	LATAM Group	4,169
20	EVA Air	4,065
21	All Nippon Airways	4,031
22	Asiana Airlines	4,000
23	United Airlines	3,630
24	Delta Air Lines	3,441
25	American Airlines	3,395

Source: Air Cargo World

* FTK – Freight Ton Kilometers

Appendix C: FTP REFERENCES TO AVIATION AND AIR CARGO

Exhibit C-1: FTP References to Aviation and Air Cargo

Goal	Safety and Security for Residents, Visitors, and Businesses
Emphasis Areas	Increase the safety and security of freight movement using all modes, including safe and secure truck parking and other logistics facilities, and separation of or reduced conflict between freight and passenger vehicles.
	Increase the efficiency and capacity of customs, immigration, and other security processes at airports, seaports, and other hubs to accommodate growth in demand including peak flows related to larger vehicles.
Innovation	Use technology, information, and operations strategies for all modes to improve transportation security and emergency preparedness and response.
	Enhance transportation security systems to address continuing, new, and emerging threats, such as biosecurity, food security, invasive species, nuclear materials, and human trafficking.
	Reduce the vulnerability of transportation technologies to hacking, cyberattacks, system failure, and other disruptions
Collaboration	Continue to develop and implement safety and security improvement plans for all modes of transportation at the state, regional, and local levels, such as Florida’s Strategic Highway Safety Plan.
	Identify opportunities to work with federal, military and civil, state, and local partners and the private sector to integrate new aviation and space technologies while ensuring the safety and security of the airspace.
Customers	Educate all customers, including visitors, about safety and security issues and improvement strategies for all modes.
	Enhance security regulations, processes, communications, information systems, and infrastructure to improve customer service and reduce customer wait time.
Data and Processes	Support accurate, timely, and complete data collection and reporting of safety and security incidents and exposure for all modes.
	Identify risk factors and develop targeted plans that consider the benefits and costs of potential safety and security improvements.
Goal	Agile, Resilient, and Quality Infrastructure
Emphasis Areas:	Plan and develop investments in terminal and corridor capacity that are consistent with regional and local visions and plans and are anticipated to provide economic benefits.
Innovation:	Develop multimodal hubs to provide access to multiple modes and services at a single location and accommodate larger or advanced commercial passenger and freight vehicles.
Goal	Efficient and Reliable Mobility for People and Freight
Objectives	Reduce delays related to bottlenecks, gaps, and crashes and other incidents for all modes of Florida’s transportation system.
	Increase the reliability of all modes of Florida’s transportation system.
	Increase the efficiency of the supply chain for freight moving to, from, and through Florida.
Emphasis Areas	Reduce delays associated with bottlenecks, crashes, work zones, special events, and other incidents through: <ul style="list-style-type: none"> • Improved management of existing infrastructure; • “Quick fix” improvements; and • Strategic investments in additional system capacity.
	Increase the efficiency and capacity of Florida’s major airports, seaports, spaceports, and other freight and passenger terminals through strategic investments in new capacity and enhanced operations.
	Improve last-mile connectivity to Florida’s major airports, seaports, spaceports, and other freight and passenger terminals from other modes.

Goal	Efficient and Reliable Mobility for People and Freight (continued)
Innovation	Use emerging technologies to reduce delay and improve reliability and customer service, such as: <ul style="list-style-type: none"> • Intelligent transportation systems; • Automated, connected, or shared vehicles; • Origin to destination trip planning for all customers; and • A universal, customer friendly payment system that works across transportation modes and jurisdictional boundaries.
	Increase the efficiency of the supply chain and distribution network to, from, and through Florida, including: <ul style="list-style-type: none"> • Improving the balance of inbound and outbound freight flows by manufacturing more goods in Florida; • Expanding intermodal logistics centers and other freight terminals; • Enhancing real-time route planning, asset tracking, and load matching; • Facilitating off peak freight movement; and • Expanding use of new technologies such as automated and connected truck technologies and unmanned aerial vehicles.
Data and Processes	Adapt infrastructure design and performance standards to emphasize person and freight mobility rather than vehicle throughput.
Goal:	More Transportation Choices for People and Freight
Objectives	Increase the number of quality options for moving freight to, from, and within Florida
Emphasis Areas	Expand interregional travel options for residents, visitors, and freight, including improved intrastate air, rail, transit, and water transportation services.
Data and Processes	Develop additional performance measures for all modes of transportation, including modal connectivity.
Goal	Transportation Solutions that Support Florida’s Global Economic Competitiveness
Emphasis Areas	Improve terminal infrastructure and expand connectivity to other modes to make Florida’s airports and seaports more attractive for investment, including opportunities for more direct international and domestic flights, ferry service and coastal shipping, home port and port-of-call cruise activity, and first-call import and last-call export ocean carrier service.
Collaboration	Coordinate short-term transportation system maintenance, operations, and capacity decisions with capital investment and job creation activities involving Florida’s statewide targeted industries.
	Coordinate long-term, strategic transportation investments to support development of statewide and regional logistics, manufacturing, and innovation clusters, consistent with the Florida Strategic Plan for Economic Development and regional economic development strategies.
Goal	Transportation Solutions that Support Quality Places to Live, Learn, Work, and Play
Emphasis Areas	Plan for and balance transportation for the movement of people and freight with compatible land uses.
Innovation	Use non-highway transportation modes and new technologies for moving people and goods to reduce the need for road expansions and potential negative impacts on communities.
Goal:	Transportation Solutions that Support Florida’s Environment and Conserve Energy
Emphasis Areas	Continue coordination between transportation planning and environmental planning, including wildlife corridors, water quantity and quality, air quality including greenhouse gas emissions, noise, and recreational space.
	Minimize energy used to build, maintain, and operate transportation infrastructure.

Appendix D: SIS POLICY PLAN OBJECTIVES RELATED TO AVIATION AND AIR CARGO

Exhibit D-1: SIS Policy Plan Objectives related to Aviation and Air Cargo

Objective:	Ensure the efficiency and reliability of multimodal transportation connectivity between Florida’s economic regions and between Florida and other states and nations.
Approaches	Maintain a high priority on expanding the capacity, connectivity, and efficiency of SIS facilities that play a critical role in connecting Florida with national and global markets.
	Create or expand high-quality options for interregional passenger and freight transportation, including passenger and freight rail, water, and air services, to meet market demand, provide competitive choices for travelers, and better support underserved regions of Florida.
	Adapt SIS facilities to changing customer needs and market trends
	Improve customer service at SIS facilities, including working with regulatory agencies to increase the efficiency of customs, immigration, permitting, tolling and other payment systems, and other business processes.
Objective:	Expand transportation choices and integrate modes for interregional trips.
Approaches	Continue to improve SIS intermodal connectors to provide safe and efficient transfers between modes and systems.
	Leverage SIS, other federal and state, regional, local, and private investments to improve truck and rail access to airports, seaports, and clusters of manufacturing, logistics, and distribution facilities.
	Increase emphasis on colocation of modes and services at SIS hubs.
	Improve synchronization and connectivity between SIS modes.
Objective:	Provide transportation systems to support Florida as a global hub for trade, tourism, talent, innovation, business, and investment.
Approaches	Enhance infrastructure and connectivity to make SIS facilities and surrounding regions more attractive for both private and public investment.
	Coordinate SIS investments to support development of strategic statewide and regional economic development opportunities, consistent with the Florida Strategic Plan for Economic Development, regional visions, and economic, trade, tourism, and workforce development strategies.
	Continue support for emerging facilities that support catalytic economic development opportunities in fast-growing and rural areas.
	Promote the strategic investments and efficiency improvements Florida is making in all modes of transportation.

Appendix E: AIR CARGO DATA SOURCES – ADVANTAGES AND LIMITATIONS

Exhibit E-1: Air Cargo Data Sources – Advantages and Limitations

Data Source	Advantages	Limitations
<i>Airport Records and Statistics</i>	<ul style="list-style-type: none"> Kept by airport on a carrier-level basis. Tonnage can be organized into market share by carrier, type (all-cargo aircraft versus passenger belly compartment), trade geography (i.e., domestic and international) as applicable. Reports provide monthly frequencies (take offs and landings) and aircraft types. 	<ul style="list-style-type: none"> Reported in a variety of ways with no single standard for how, or if, airports generate public or internal reports. May be posted online, but often have to request reports and statistics from airport management.
<i>Airports Council International – North America</i>	<ul style="list-style-type: none"> Data supplied directly by airport management and includes mail and freight break outs. It also provides a ranking among North American airports. ACI also reports annual airport aircraft operations (take offs and landings) and passenger enplanements in addition to cargo. Member airports report annual tonnages Publishes a Top 50 data set by year on its web site and a more extensive set for members only. 	<ul style="list-style-type: none"> Beginning in 2012 totals for freight, mail, and all air cargo are not broken-out by direction. Annual data may not be released until summer quarter of following year. Only top 50 airports data is free, remaining reporting airports are available for a nominal fee. Some notable airports don't participate or miss deadlines.
<i>FAA ACAIS: All-Cargo Aircraft</i>	<ul style="list-style-type: none"> Includes maximum landed weight by aircraft model, cargo carrier and carrier code. 	<ul style="list-style-type: none"> Excludes air cargo moved on passenger aircraft, including widebody international flights. Includes only airports handling over 100 million lbs. Does not accurately measure the cargo weight because aircraft, fuel, and crew weights are included.
<i>Official Airline Guide – Air Cargo Guide</i>	<ul style="list-style-type: none"> Used to determine air cargo "lift" capacity of scheduled passenger and all-cargo aircraft. Kept by airport on a carrier-level basis. Tonnage can be organized into market share by carrier, type (all-cargo aircraft versus passenger belly compartment), trade geography (i.e., domestic and international) as applicable. Reports provide monthly frequencies (take offs and landings) and aircraft types. 	<ul style="list-style-type: none"> Requires careful analysis of aircraft cargo capacity. Actual tonnage traffic is not provided. Represents future schedules, not actual hard data. Does not provide actual cargo carried, or aircraft capacity on flights Does not include integrated express carriers. Only relevant for commercial service airports with widebody, passenger, and all-cargo aircraft operations; does not capture information relevant to regional/feeder air cargo carrier operations.

Data Source	Advantages	Limitations
<i>USDOT Data T100</i>	<ul style="list-style-type: none"> • Combines domestic and international data from by U.S. air carriers by carrier, origin, destination and service class for enplaned passengers, freight, and mail. • Data available as far back as 1990, while pre-1990 data exists in supplemental air carrier summary data. • Passengers, operations (departures), and tonnages for freight and mail are provided by specific airline operational segment (lowest level). • Provides traffic statistics for airports that do not provide their own traffic reports and for airports excluded from ACI-NA data. • Useful in identifying historic trends for individual airports and/or specific geographic areas. • Trends for individual airlines can be identified (mergers, service cuts, service starts, closures, etc.). 	<ul style="list-style-type: none"> • Excludes flights with both origin and destination in a foreign country. • Data only reported for large certified carriers with operating revenues of \$20 million or more – this excludes many small regional and feeder air cargo airlines that operate at commercial service and GA airports. • Since data is presented by the lowest level (airline operational segment), user required to compile, sort, add value to, and interpret raw data into desired information.
<i>CASS-USA Market Monitor</i>	<ul style="list-style-type: none"> • Provides monthly air cargo export tonnages by foreign region for 78 IATA member airlines. • While data does not capture the entire universe of air cargo activity it provides a sample of U.S. export trends. 	<ul style="list-style-type: none"> • CASS USA Market Monitor, until the second quarter of 2013, divided data into six world regions which included: Africa, Asia, Europe, Middle East, North & Central America, and South America. From the third quarter of 2013 and onward data is presented in nine world regions which include: Africa, Asia Pacific, Commonwealth of Independent States, Europe, LATAM & The Caribbean, Middle East & North Africa, North Asia, and North Atlantic & North America. • Excludes airport specific data.
<i>US Census – USA Trade Online Customs data</i>	<ul style="list-style-type: none"> • Foreign trade tonnage and value by airport, by direction, country (except Canada), and commodity. Two perspectives: <ul style="list-style-type: none"> • <i>Through-airport</i> – Other state freight may transit through Florida airports. • <i>Statewide</i> – Florida freight may transit through other state airports. 	<ul style="list-style-type: none"> • Does not provide Florida volumes through Florida airports. • Domestic volumes not included.
<i>FAFv4.1</i>	<ul style="list-style-type: none"> • Incorporates extensive domestic (Commodity Flow Survey) and international (Census) movement data. • Identifies air cargo tonnage and value that originates in Florida and moves through Florida airports. • Provides tonnage and value data by commodity. 	<ul style="list-style-type: none"> • Last update done in 2012 is updated to years 2014 and 2015 based on year 2040 forecasts. • Commodity detail is limited to aggregate industry level. • Airport detail is not available.
<i>TRANSEARCH</i>	<ul style="list-style-type: none"> • Provides detailed commodity data that coordinates with IMPLAN economic model. • Data used in Rail and Seaport Plans 	<ul style="list-style-type: none"> • Air cargo data is very limited. • Airport detail is not available. • Non-NAFTA trade movements are not included as foreign trade.

Appendix F: AIR CARGO SOURCE DATA SHEETS

Individual examples of Air Cargo Source Data Sheets have been prepared for each data source used in this Air Cargo Study. These sheets summarize each source's properties and depict graphs representing sample data from the respective source. A detailed discussion of these data sources is provided in Chapter 6 of this document.

AIRPORT RECORDS AND STATISTICS

SUMMARY:

U.S. commercial service airports internally track total cargo volume, as well as subsets such as freight (including express) and mail on a directional (inbound and outbound) basis. Commonly, these data sets are managed by airport accounting departments compiled from monthly operations reports used to settle landing fees and satisfy other carrier reporting requirements. Cargo may also be organized into domestic and international increments. In addition to tonnage data, monthly airline reports provide critical inputs pursuant to monthly frequencies (take offs and landings) and aircraft types.

Airports report this data in a variety of ways. There is no single standard for how or if airports generate public or internal reports from this and other data. Data may be posted online, but it is not uncommon to have to request the reports and statistics from airport management.

MORE ABOUT THE DATA:

Developer: Individual Airports

Update Frequency: Monthly and annually

Geographical Coverage: Airport specific

Geographical Resolution: Airport

Modal Coverage: Typically air only; truck data not collected

Data Format: Web based, HTML, MS Excel

Licensing Agreement: None

Acquisition Cost: Free



POTENTIAL APPLICATIONS:

Planning; Forecasts; Freight Flow

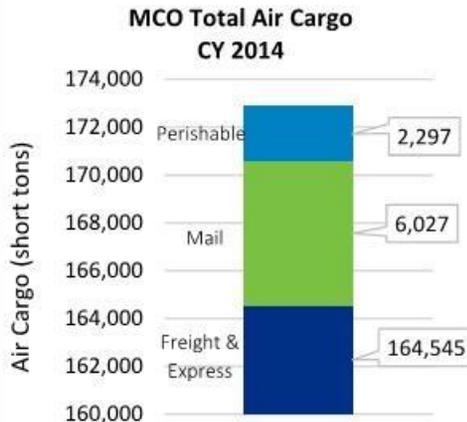
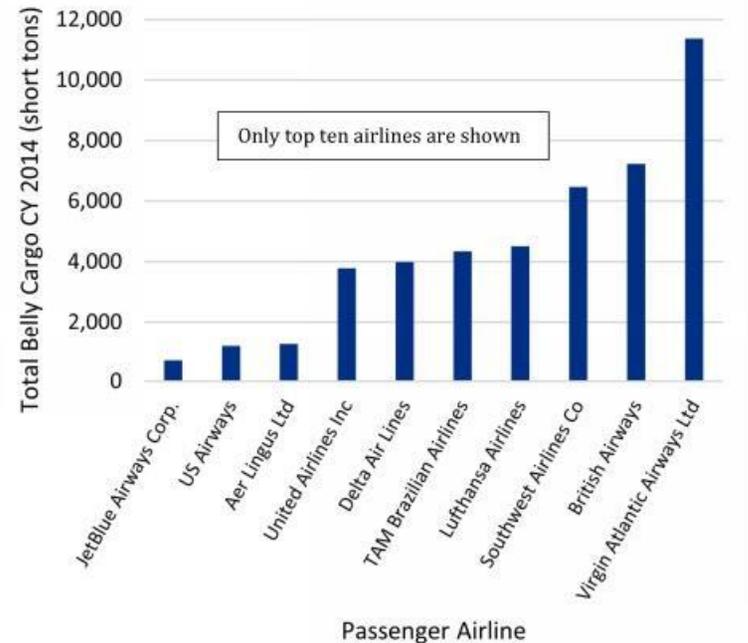
ADVANTAGES:

- Kept by airport on a carrier-level basis.
- Tonnage can be organized into market share by carrier, type (all-cargo aircraft versus passenger belly compartment), trade geography (i.e., domestic and international) as applicable.
- Reports provide monthly frequencies (take offs and landings) and aircraft types.

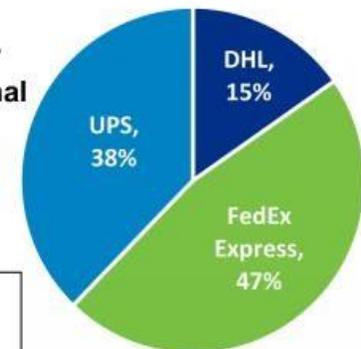
LIMITATIONS:

- Reported in a variety of ways with no single standard for how, or if, airports generate public or internal reports.
- May be posted online, but often have to request reports and statistics from airport management.

2014 Air Cargo Tonnage for Passenger Carriers Orlando International Airport



Integrated Express Carriers 2014 Air Cargo Market Share* for Orlando International Airport



*Market share calculated from total tonnage handled by Integrated Express Carriers

AIRPORTS COUNCIL INTERNATIONAL – NORTH AMERICA

SUMMARY:

Member airports report annual tonnages to Airports Council International - North America, which publishes an annual Top 50 data set on its website and offers a more extensive set for purchase.

ACI-NA provides total annual air cargo tonnage by freight (international and domestic) and mail for U.S. and Canadian airports. Other information provided by ACI-NA includes total annual commercial passengers (international and domestic) and total annual aircraft operations by aircraft type. Through 2011, this data was provided by directional flow (enplaned/deplaned). From 2012 onward, ACI-NA only provides sums for each measure. All ACI-NA traffic tonnage is presented in metric tons and may require conversion to US tons.

MORE ABOUT THE DATA:

Developer: Airports Council International, North America

Update Frequency: Annual

Temporal Coverage: Up-to-the-minute

Geographical Coverage: North America

Geographical Resolution: Airport

Modal Coverage: Air only

Data Format: Web based, HTML, MS Excel

Licensing Agreement: None

Acquisition Cost: Top 50 (Free), Entire list - \$100

Contact: www.ACI-NA.ORG



POTENTIAL APPLICATIONS:

- Planning
- Forecasts

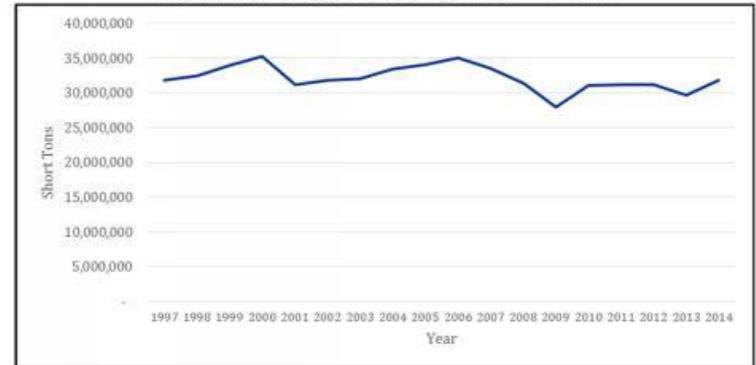
ADVANTAGES:

- Data supplied directly by airport management and includes mail and freight break outs. It also provides a ranking among North American airports.
- ACI also reports annual airport aircraft operations (take offs and landings) and passenger enplanements in addition to cargo.

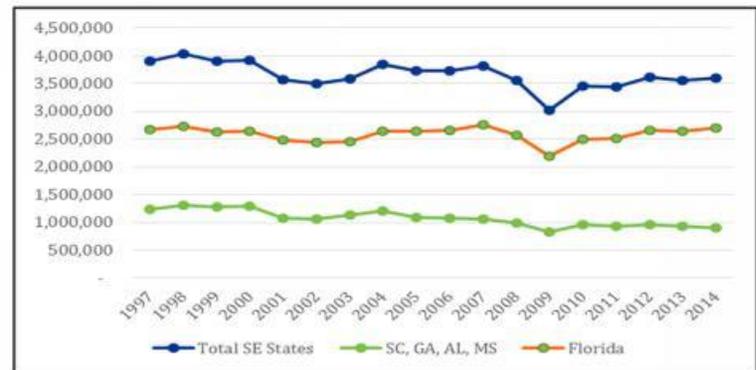
LIMITATIONS:

- Annual data may not be released until summer quarter of following year.
- Only top 50 airports data is free, remaining reporting airports are available for a nominal fee.
- Not all airports report statistics to ACI.

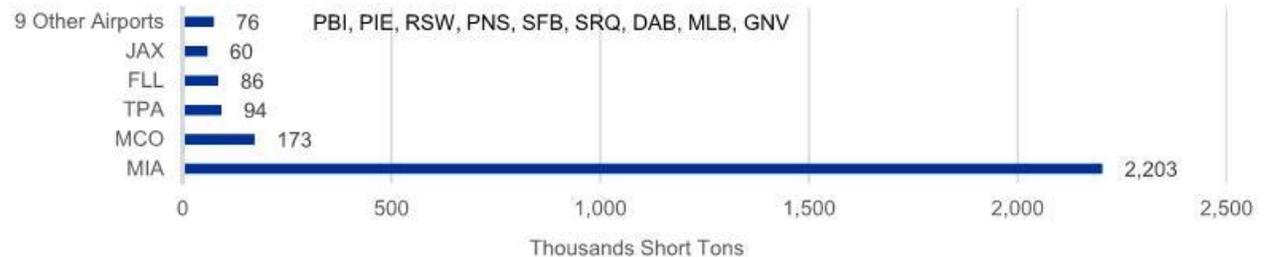
Historical Air Cargo Tonnage – North America Airports, 1997 – 2014



Historical Southeast U.S. Air Cargo Tonnage (U.S. Short Tons) 1997 – 2014



2014 Air Cargo Tonnage by Florida Airports



FAA CARGO AIRCRAFT LANDED WEIGHTS REPORT – QUALIFYING FLORIDA AIRPORTS

SUMMARY:

The FAA collects the data via Form 5100-108 and includes maximum landed weight by aircraft model, cargo carrier and carrier code. Passenger aircraft also move air cargo, especially on widebody international flights, and this cargo volume is not collected since passenger carriers are exempt from completing the FAA's air cargo landed weight forms.

MORE ABOUT THE DATA:

Developer: FAA - All-Cargo Reporting with Form 5100-108

Update Frequency: Annually

Geographical Coverage: 114 Qualifying Airports

Geographical Resolution: Limited to airports with an aggregate landed weight in excess of 100 million lbs. (50,000 tons) annually

Modal Coverage: Cargo aircraft only

Data Format: MS Excel in Pounds

Licensing Agreement: None

Acquisition Cost: Free

Contact:

http://www.faa.gov/airports/planning_capacity/passenger_allcargo_statistics/passenger/



POTENTIAL APPLICATIONS:

- Planning

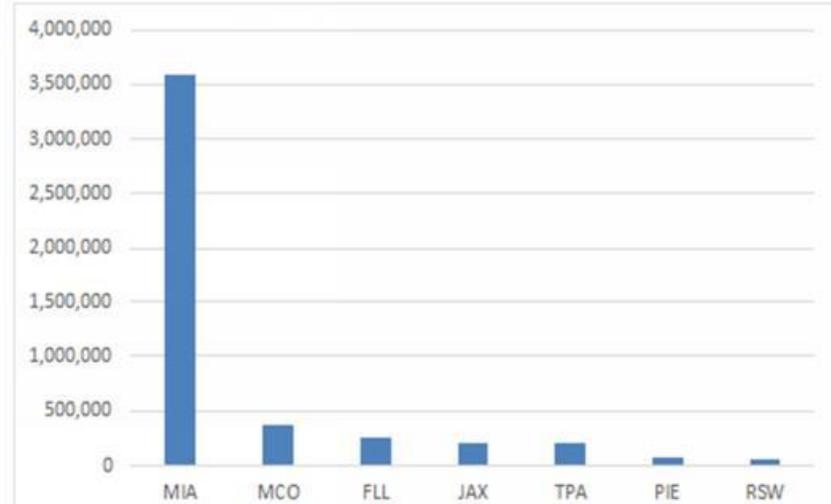
ADVANTAGES:

- Includes maximum landed weight by aircraft model, cargo carrier and carrier code.

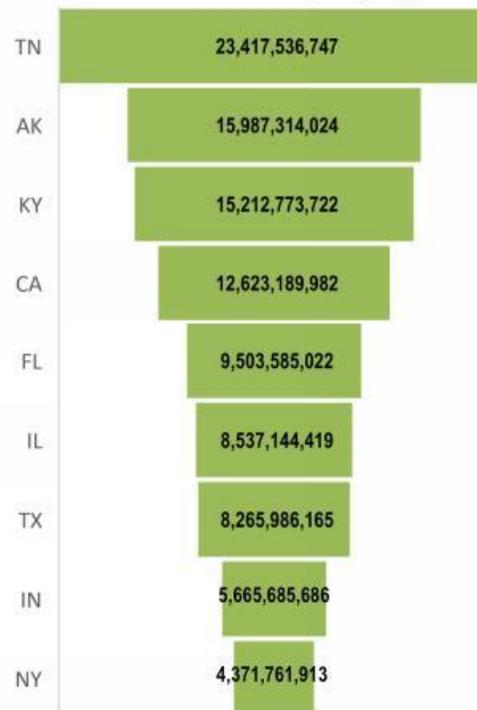
LIMITATIONS:

- Excludes air cargo moved on passenger aircraft, including widebody international flights.
- Includes only airports handling over 100 million lbs.
- Does not accurately measure the cargo weight because aircraft, fuel, and crew weights are included.

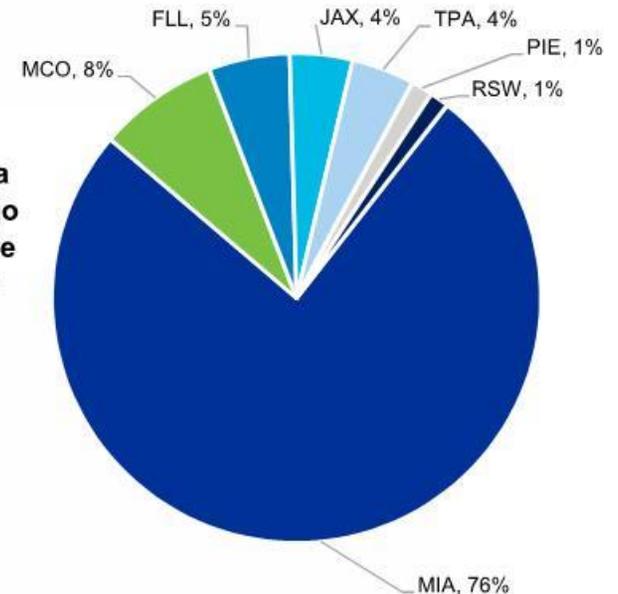
2014 Cargo Aircraft Landed Weights by Florida Airports (Tons)



2014 Top Ten States Listed by Total Landed Weight (lbs)



2014 Florida Airport Cargo Market Share by Aircraft Landed Weight



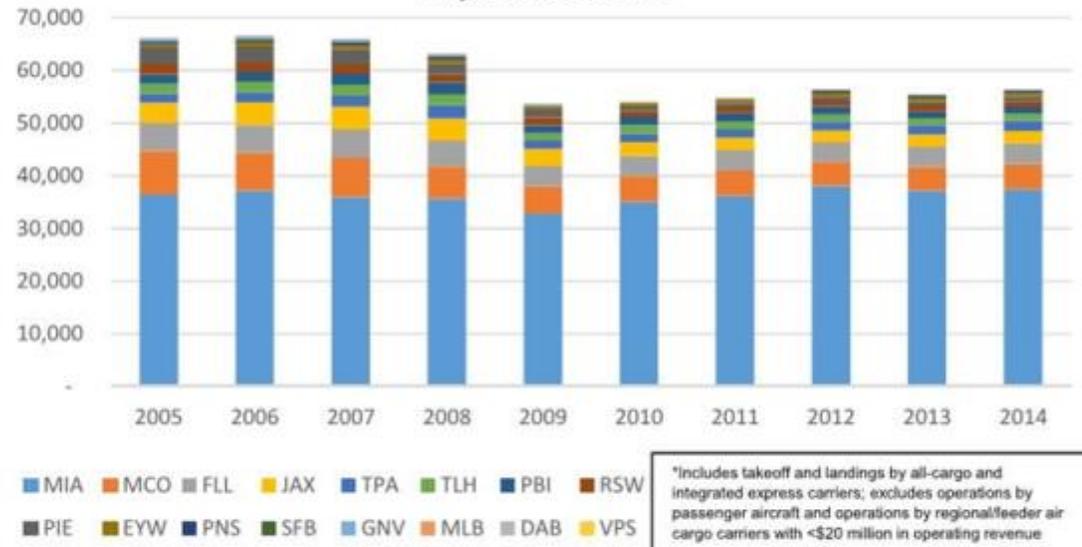
BUREAU OF TRANSPORTATION STATISTICS T-100 DATA

SUMMARY:

The Air Carrier Statistics database, also known as the T-100 data bank, contains domestic and international airline market and segment data. Monthly air carrier traffic information is reported for certificated U.S. air carriers and foreign carriers having at least one point of service in the United States or its territories. The data is collected by the Office of Airline Information, Bureau of Transportation Statistics, Research and Innovative Technology Administration.

This database provides international market, international segment, combined domestic and international market, combined domestic and international segment data by certificated U.S. and foreign air carriers. This database is frequently used by the aviation industry, the press, and the legislature to produce reports and analyses on air traffic patterns, carrier market shares, as well as passenger, freight, and mail cargo flow within the aviation mode. The data is conducive to producing carrier load-factors, but does not contain carrier financial information.

Dedicated Air Cargo Operations at Florida Commercial Service Airports 2005-2014



POTENTIAL APPLICATIONS:

- Planning

ADVANTAGES:

- Data available as far back as 1990, while pre-1990 data exists in supplemental air carrier summary data.
- Passengers, operations (departures), and tonnages for freight and mail are provided by specific airline operational segment (lowest level).
- Provides traffic statistics for airports that do not provide their own traffic reports and for airports excluded from ACI-NA data.
- Useful in identifying historic trends for individual airports and/or specific geographic areas.
- Trends for individual airlines can be identified (mergers, service cuts, service starts, closures, etc.).

LIMITATIONS:

- Data only reported for large certified carriers with operating revenues of \$20 million or more – this excludes many small regional and feeder air cargo airlines that operate at commercial service and GA airports.
- Since data is presented by the lowest level (airline operational segment), user required to compile, sort, add value to, and interpret raw data into desired information.

MORE ABOUT THE DATA:

Developer: United States Department of Transportation, Bureau of Transportation Statistics

Update Frequency: Monthly

Temporal Coverage: Up-to-the-minute

Geographical Coverage: United States

Geographical Resolution: Airport

Modal Coverage: Air only

Data Format: Web based, HTML, MS Excel

Licensing Agreement: None

Acquisition Cost: Free

Contact: www.transtats.bts.gov



SUMMARY:

The U.S. Census Bureau monitors foreign trade in tonnage and value terms by direction, by country (except Canada), and by commodity type. Data is tabulated by point of entry and/or exit, which includes water ports and airports. Participation is required by all shippers, and is on goods valued at more than \$2,500 per commodity.

Data is made available through the USA Trade Online tool, which provides foreign trade tonnage and value by direction, country, and commodity. Tonnage is presented in metric terms, and values are presented in current terms. Data provided from two perspectives: *Through* data may include other state freight that transits through Florida airports; and *Statewide* data may include freight that transits through other state airports. This nuance is important since neither provides Florida volumes through Florida airports.

MORE ABOUT THE DATA:

Developer: US Census and Treasury Dept.

Update Frequency: Monthly

Temporal Coverage: Annual

Geographical Coverage: U.S.

Geographical Resolution: State, district, airport

Modal Coverage: Water and air

Data Format: Web based, HTML, MS Excel

Licensing Agreement: None

Acquisition Cost: Free

Contact: <https://usatrade.census.gov/>



POTENTIAL APPLICATIONS:

- Planning
- Freight Flow
- Economic Impact

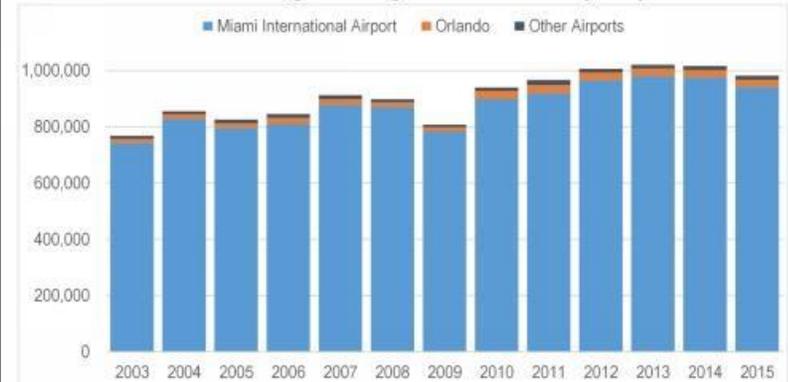
ADVANTAGES:

- Historical foreign trade tonnage and value by airport, by direction, country (except Canada), and commodity. Two perspectives:
 - *Through-airport* – Other state freight may transit through Florida airports.
 - *Statewide* – Florida freight may transit through other state airports.
- Provides tonnage and value data by commodity.

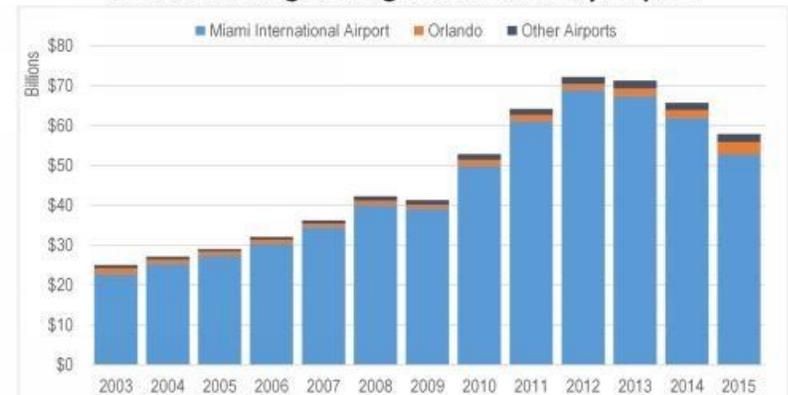
LIMITATIONS:

- Does not provide Florida volumes through Florida airports.
- Domestic volumes not included.

Florida Air Cargo Foreign Trade Tons by Airport



Florida Air Cargo Foreign Trade Value by Airport



Miami Int'l Airport Air Cargo Foreign Trade Tons and Value by Commodity (2015)



FREIGHT ANALYSIS FRAMEWORK

SUMMARY:

An integrated database of freight movement by modes (truck, rail, water, air, and pipeline), produced by the Federal Highway Administration (FHWA) and Bureau of Transportation Statistics (BTS), based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the Census. Provides commodity and tonnage and value detail by direction, geography (origin/destination), mode, year, term, etc.

Provides comprehensive picture of total air freight flows through Florida airports and breakdown of flows originating and/or terminating in Florida (economically relevant) versus those simply transiting (economically irrelevant beyond relatively minor freight handling impacts).

MORE ABOUT THE DATA:

Developer: Federal Highway Administration (FHWA) and Bureau of Transportation Statistics (BTS)

Update Frequency: Every five years

Temporal Coverage: Annual

Geographical Coverage: U.S.

Geographical Resolution: State, BEA district

Modal Coverage: Truck, rail, water, air, and pipeline

Data Format: Web based, HTML, MS Excel

Licensing Agreement: None

Acquisition Cost: Free

Contact: http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm



POTENTIAL APPLICATIONS:

- Planning
- Freight Flow
- Economic Impact

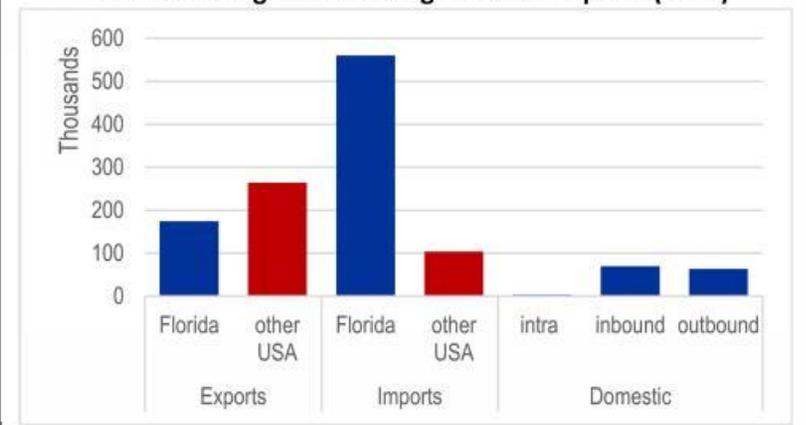
ADVANTAGES:

- Incorporates extensive domestic (CFS) and international (Census) movement data.
- Identifies international tonnage and value that originates or terminates in Florida versus movements through Florida.
- Provides tonnage and value data by commodity

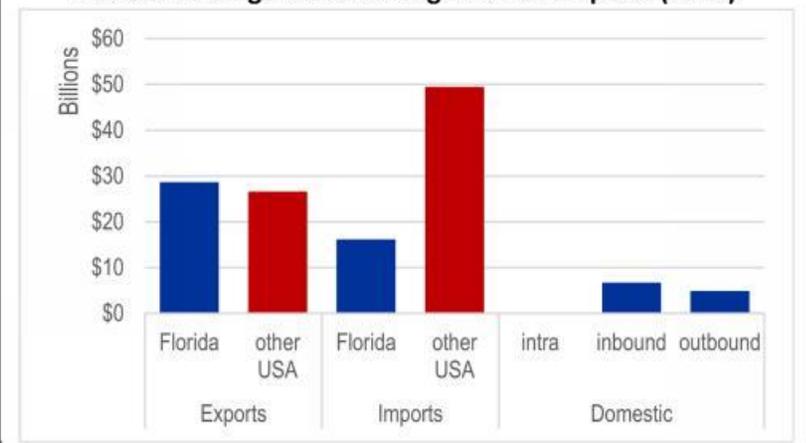
LIMITATIONS:

- Last data year (2012), is updated to years 2014 and 2015 based on year 2040 forecasts.
- Commodity detail is limited to aggregate industry level.
- Airport Detail is not available.

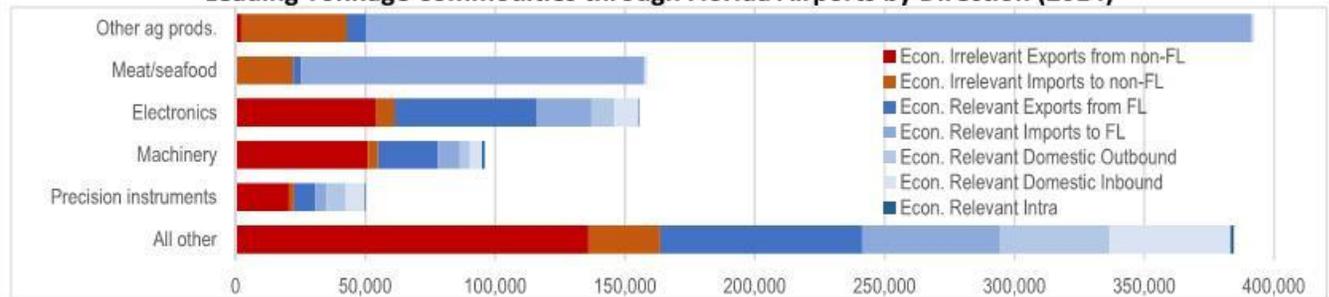
Florida Air Cargo Tons through Florida Airports (2014)



Florida Air Cargo Value through Florida Airports (2014)



Leading Tonnage Commodities through Florida Airports by Direction (2014)



TRANSEARCH FRAMEWORK

SUMMARY:

A comprehensive database of North American freight flows, compiled from industry, commodity, and proprietary data sources. Transearch combines primary shipment data obtained from the nation's largest rail and truck freight carriers with information from public, commercial, and proprietary sources to generate a base year estimate of freight flows at the county level.

Oriented to NAFTA-related (i.e., Canada and Mexico) surface transport modes, the applicability to airborne data is limited. Airborne domestic data is limited to participating airlines, and international trade beyond NAFTA is not available. Purchased for the previous Florida Freight Plan, the source is dated (year 2011 flows). Nonetheless, the source provides a reference/comparison to the other freight flow sources.

MORE ABOUT THE DATA:

Developer: IHS Global Insight **Update Frequency:** Annual

Temporal Coverage: Annual

Geographical Coverage: U.S. and NAFTA

Geographical Resolution: County, State,

Modal Coverage: Truck, rail, water, air, and pipeline

Data Format: Access

Licensing Agreement: Required

Acquisition Cost: \$\$\$

Contact: <https://www.ihs.com/products/transportation-research-freight-transportation-research.html>



POTENTIAL APPLICATIONS:

- Planning
- Freight Flow
- Economic Impact

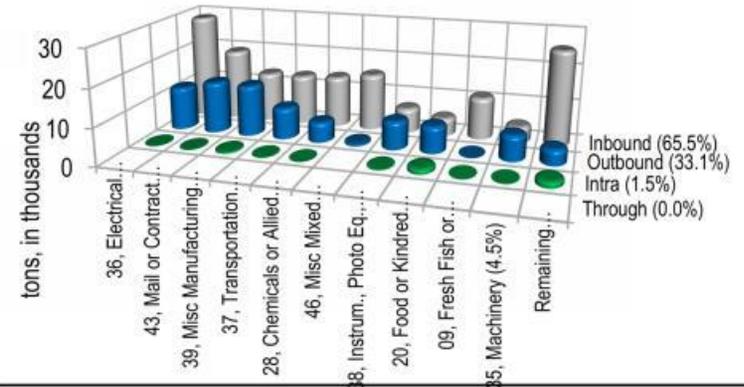
ADVANTAGES:

- Provides detailed commodity data that coordinates with IMPLAN economic model.
- Data used in Rail and Seaport Plans

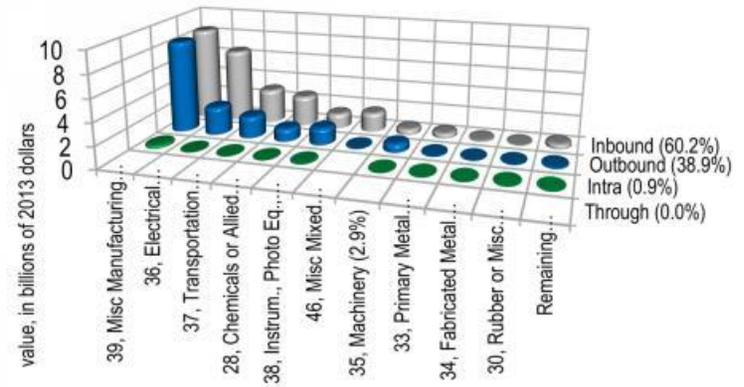
LIMITATIONS:

- Most recent year data is 2011.
- Airport detail is not available.
- Non-NAFTA trade movements are not included as foreign trade.

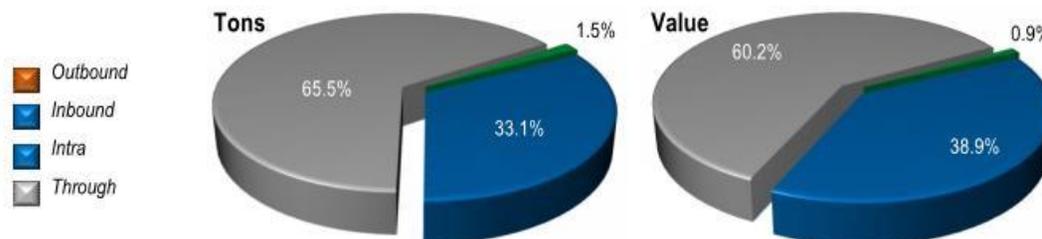
Florida Air Cargo Tons by Direction and Commodity, 2011



Florida Air Cargo Value by Direction and Commodity, 2011



Florida Air Cargo Tons and Value by Direction, 2011



Appendix G: DATA SOURCES DEFINITION

Airport Records – Almost all U.S. commercial service airports track their total cargo volume, sometimes with detail such as freight (including express) and mail on a directional (inbound and outbound) basis. Commonly, these datasets are managed by airport accounting departments compiled from monthly operations reports used to settle landing fees and satisfy other carrier reporting requirements. For applicable airports, cargo may also be organized into domestic and international increments. No single standard exists for how, or if, airports generate public or internal reports from this and other data. While the web page of the Miami International Airport contains extensive monthly data on airport operations and Customs entries (i.e., by country and commodity), other airports may include nothing more than a single entry for total annual cargo in their public reports.

USDOT Data T100 – U.S. DOT’s Bureau of Transportation Statistics (BTS) maintains the passenger and air cargo databases. The BTS falls under the Office of the Assistant Secretary for Research and Technology (OST-R), which is part of the Office of the Secretary of Transportation (OST).⁸⁷ The website (<http://www.rita.dot.gov/bts/>) contains U.S. DOT reports and databases as well as commercial organizations that provide U.S. DOT data. Air cargo data is obtained from the T100. This source combines domestic and international market data reported by U.S. air carriers, and contains market data by carrier, origin/destination, and service class for enplaned passengers, freight, and mail. Express carrier data is included under freight. Excludes freight values, commodity breakdown, and flights with both origin and destination in a foreign country.

US Census, USA Trade Online – The U.S. Census Bureau monitors foreign trade (US Customs data) in tonnage and value terms by direction, by country (except Canada), and by commodity type. Data is tabulated by point of entry and/or exit, which includes seaports and airports (both commercial and GA). Such entry/exit points are referred to as “ports” grouped into two “districts” (Miami or Tampa). Data reported herein pertains only to the air-bound cargo shipments through such customs “ports.” While the airport associated with some of these “ports” are obvious (e.g., “Miami International Airport”), others are less so (e.g., “Boca Raton”, assumed to be “Coral Creek Airport”).

Legally, the United States Code, Title 13, requires program participation by all shippers, and is assisted by the Treasury Department. Import/export data is collected on goods valued at more than \$2,500 per commodity shipped by individuals and organizations (including importers, exporters, freight forwarders, and carriers).

Census data is made available for public use through the USA Trade Online tool. This tool provides foreign trade tonnage and value by direction, country (except Canada), and commodity type. Tonnage data are presented in metric terms, and dollar values are presented in current terms. The tool presents data from two perspectives: *Through-airport* data may include other state freight that transits through Florida airports; and *Statewide* data may include freight that transits through other state airports. This nuance is important since neither provides Florida volumes through Florida airports.

⁸⁷ previously administered by the Research and Innovative Technology Administration (RITA)

Freight Analysis Framework v4.1 – Freight Analysis Framework is an integrated database of freight shipment for all primary transportation modes (truck, rail, water, air, and pipeline), produced by the Federal Highway Administration (FHWA) in collaboration with the Bureau of Transportation Statistics (BTS), based primarily on domestic data via the 2012 Commodity Flow Survey (CFS) and international trade data from the Census. It provides searchable data by direction, origin/destination geography, mode, year, terms, etc. The most recent version 4.1 is being queried for both year 2014 and 2015. It is noted that year 2014 and 2015 data are estimated based on the most recent year 2012 update and year 2040 forecasts. Unlike the extensive commodity type detail (500+) provided by the Census and TRANSEARCH, FAF only offers a consolidated commodity summary (40+).

http://ops.fhwa.dot.gov/FREIGHT/freight_analysis/faf/index.htm

TRANSEARCH – Developed by IHS Global Insight, TRANSEARCH is a comprehensive database of North American freight flows, compiled from more than a hundred industry, commodity, and proprietary data sources. TRANSEARCH combines primary shipment data obtained from the nation’s largest rail and truck freight carriers with information from public, commercial, and proprietary sources to generate a base year estimate of freight flows at the county level. As the database is mostly oriented to surface transportation modes, the applicability to airborne data is limited. In particular, the database only includes NAFTA-related (i.e., Canada and Mexico) international trade partners, thereby limiting comparability of airborne trade data to other comprehensive sources. Purchased for the previous Florida Freight Plan, the source is dated (year 2011 flows). Nonetheless, the source provides a good reference/comparison to the other freight flow sources. <https://www.ihs.com/products/transearch-freight-transportation-research.html>.

Appendix H: AIRPORT RECORDS DATA

Tabulated to monitor movement demand, airport records data typically includes geography (domestic vs. international), and direction (inbound vs. outbound), as summarized below. However, data is reported differently (e.g., some include express others may not), typically includes multiple counts of transit shipments, and provides no commodity breakdown or value. For these reasons, airport records are not a good source for estimating the economic impact associated with air freight commodities. Airport records data is presented to enable the reader to compare/contrast reported volumes with other sources, especially the FAF data used in the economic impact analyses.

**Exhibit H-1: Airport Records – Florida Airport Tonnage by Direction (2014)
(Short Tons)**

ID	Airport	Domestic			International			Total
		Inbound	Outbound	Subtotal	Inbound	Outbound	Subtotal	
DAB	Daytona Beach Int'l	72	74	146	0	0	0	146
VPS	Destin-Ft. Walton Beach	0	0	0	0	0	0	0
FLL	Fort Lauderdale/Hollywood Int'l	31,780	46,630	78,410	2,339	1,152	3,491	81,900
GNV	Gainesville Reg.	0	0	0	0	0	0	0
JAX	Jacksonville Int'l	33,244	34,463	67,708	0	0	0	67,708
EYW	Key West Int'l	0	0	0	0	0	0	0
MLB	Melbourne Int'l	45	89	134	0	0	0	134
MIA	Miami Int'l	150,713	106,184	256,897	1,043,358	873,957	1,917,315	2,174,212
SGJ	Northeast Florida Reg.	0	0	0	0	0	0	0
ECP	Northwest Florida Beaches Int'l	0	0	0	0	0	0	0
MCO	Orlando Int'l	70,282	67,125	137,407	14,317	15,118	29,435	166,842
SFB	Orlando Sanford Int'l	0	0	0	1,119	508	1,627	1,627
PBI	Palm Beach Int'l	0	0	0	0	0	0	0
PNS	Pensacola Int'l	0	0	0	0	0	0	0
PGD	Punta Gorda	0	0	0	0	0	0	0
SRQ	Sarasota/Bradenton Int'l	87	133	220	0	0	0	220
RSW	Southwest Florida Int'l	0	0	0	0	0	0	0
PIE	St. Pete-Clearwater Int'l	11,458	9,040	20,498	137	34	171	20,669
TLH	Tallahassee Int'l	0	0	0	0	0	0	0
TPA	Tampa Int'l	40,745	44,437	85,182	1,609	1,755	3,365	88,547
	Total	338,427	308,175	646,602	1,062,880	892,524	1,955,404	2,602,005

Source: Individual airports

Appendix I: US DOT T100 DATA

Tabulated to monitor movement demand, T100 data typically includes geography (domestic vs, international), and direction (inbound vs. outbound), as summarized below. However, data includes express and multiple counts of transit shipments, but provides no commodity breakdown or value. For these reasons, T100 Data is not a good source for estimating the economic impact associated with air freight commodities.

Exhibit I-1: USDOT T100 – Florida Airport Tonnage by Direction (2014)
(Short Tons)

ID	Airport	Domestic			International			Total
		Inbound	Outbound	Subtotal	Inbound	Outbound	Subtotal	
DAB	Daytona Beach Int'l	82	64	146	-	-	-	146
VPS	Destin-Ft. Walton Beach	13	6	19	-	-	-	19
FLL	Fort Lauderdale/Hollywood Int'l	50,635	48,048	98,683	2,083	520	2,602	101,285
GNV	Gainesville Reg.	18	4	22	-	-	-	22
JAX	Jacksonville Int'l	37,758	38,045	75,803	-	100	100	75,904
EYW	Key West Int'l	367	143	510	-	-	-	510
MLB	Melbourne Int'l	98	89	187	59	-	59	246
MIA	Miami Int'l	1,237,896	989,655	2,227,551	983,176	795,888	1,779,064	4,006,615
SGJ	Northeast Florida Reg.	-	-	-	-	-	-	-
ECP	Northwest Florida Beaches Int'l	32	19	51	-	-	-	51
MCO	Orlando Int'l	99,554	80,916	180,470	17,598	13,675	31,273	211,743
SFB	Orlando Sanford Int'l	850	623	1,473	438	214	652	2,125
PBI	Palm Beach Int'l	15,945	11,623	27,568	147	80	227	27,795
PNS	Pensacola Int'l	4,327	2,192	6,519	43	15	58	6,577
PGD	Punta Gorda	-	-	-	-	-	-	-
SRQ	Sarasota/Bradenton Int'l	91	134	225	1	1	1	226
RSW	Southwest Florida Int'l	11,767	6,236	18,002	2,425	937	3,362	21,364
PIE	St. Pete-Clearwater Int'l	12,475	8,556	21,030	6	12	18	21,048
TLH	Tallahassee Int'l	5,279	4,497	9,776	-	-	-	9,776
TPA	Tampa Int'l	48,363	45,542	93,906	3,110	2,105	5,215	99,121
	Total	1,525,552	1,236,391	2,761,942	1,009,086	813,545	1,822,632	4,584,574

Source: USDOT Data T100

Appendix J: U.S. CENSUS DATA

Tabulated to monitor trade shipments, Census data provides detailed historical foreign trade commodity tonnage and value by direction (inbound vs. outbound) by customs district, as summarized below. Further, information excludes multiple counts of transshipment data. However, domestic shipment data is not available. This serious limitation precludes its use as a primary source in the estimation of economic impacts associated with air freight shipments via Florida airports. Nonetheless, Census data does provide a major component of the FAF foreign data.

Thorough review of the Census foreign data indicated that it is a robust data source. Further, the foreign Census tonnage and value shipments compared favorably to those reported by FAF; volumes and values were extremely close for the different years evaluated. This comparison increased confidence in the FAF foreign data component.

The following figures and tables present Census air freight tonnage and value *through Florida airports*, most of which originates and/or terminates in Florida.⁸⁸

- *Historical Trend* – **Exhibit J-1** and **Exhibit J-2** present historical trend of total tons and value, respectively, for all Florida airports with a breakdown of the dominant Miami International and the second largest Orlando International.⁸⁹ Information is supported by subsequent appendix tables.
- *Commodity Breakdown (2014)* – **Exhibit J-3** and **Exhibit J-4** summarize year 2014 commodity shipments (all directions) for all Florida airports.

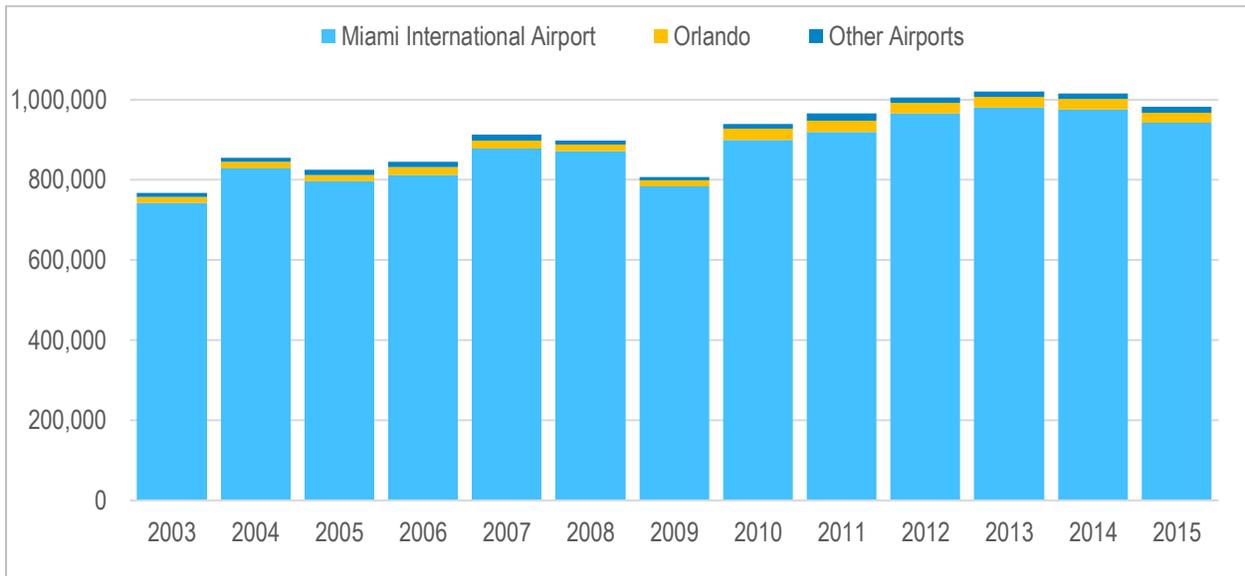
Three sets of tables are presented that support the four figures.

- *Tons by Airport* – The first set presents historical *ton* exports (**Exhibit J-5**), imports (**Exhibit J-6**), and total (**Exhibit J-7**), by airport.
- *Value by Airport* – The second set presents historical *value* exports (**Exhibit J-8**), imports (**Exhibit J-9**) and total (**Exhibit J-10**), by airport.
- *Total Movements by Commodity* – The third set summarizes historical total foreign trade tonnage (**Exhibit J-11**) and value (**Exhibit J-12**), by commodity for all Florida airports. The top ten annual commodities are highlighted to help identify trends. Note, the 99 commodity types tracked by the Census require three pages to present each table. Also note, volume is presented in metric tons (original source data) versus **Exhibit 10-3** and **Exhibit 10-4** summaries, which are converted to short tons to facilitate comparison to other sources.

⁸⁸ Note, the same figures and tables could be presented for Florida airfreight through all airports (both Florida and out-of-state airports). However, additional data would add little value to this economic-based airfreight analysis.

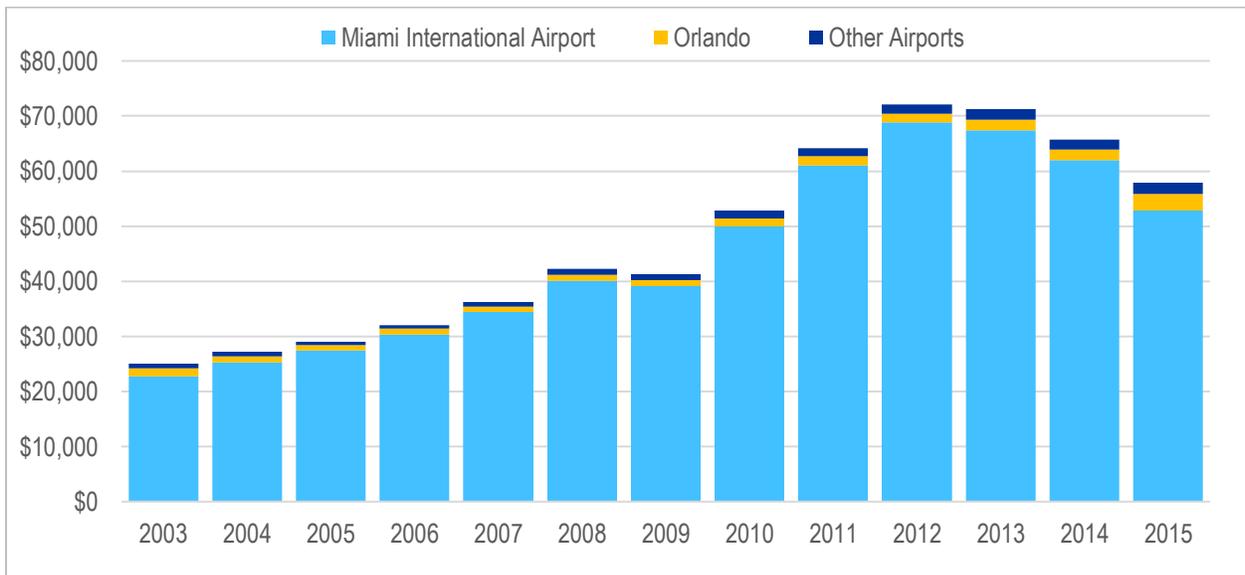
⁸⁹ Miami International annually accounts for over 95% of tonnage and over 90% of value.

Exhibit J-1: Census – Foreign Trade Total Tons by Airport (2003-2015)
(Metric Tons)



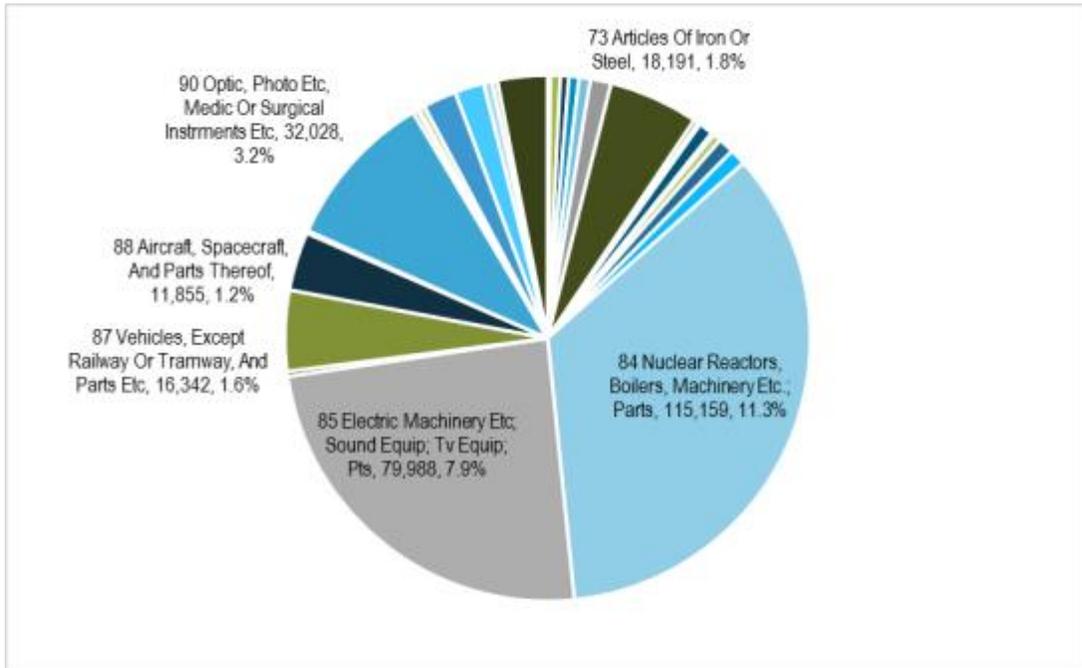
Source: US Census, USA Trade Online
See Exhibit J-7 for numerical data
Note, includes all freight thru Florida airports (terminating in Florida and other States)

Exhibit J-2: Census – Foreign Trade Total Value by Airport (2003-2015)



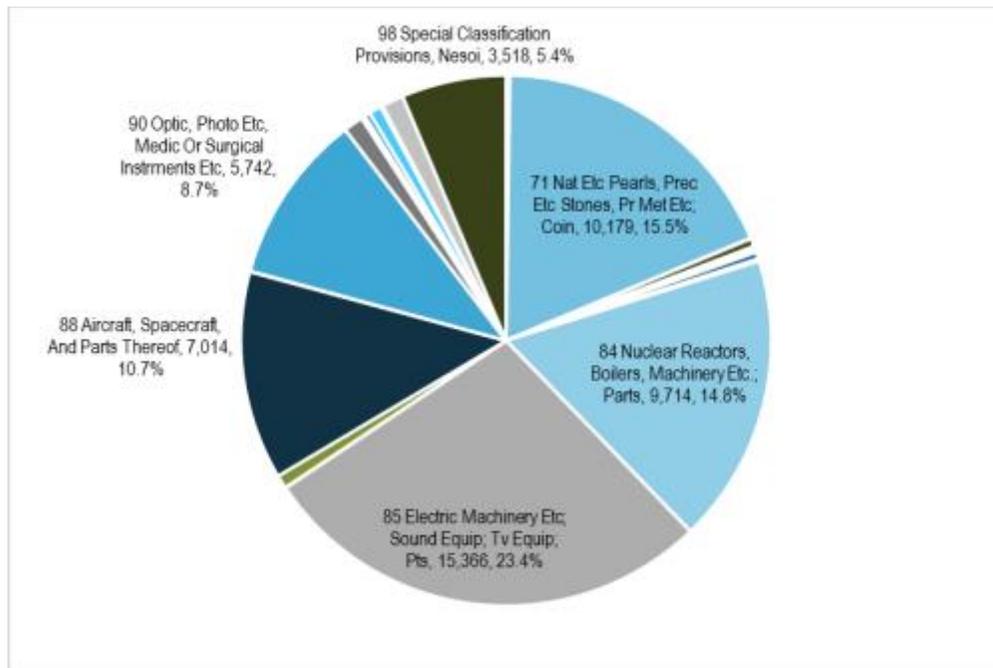
Source: US Census, USA Trade Online
See Exhibit J-10 for numerical data
Note, includes all freight thru Florida airports (terminating in Florida and other States)

Exhibit J-3: Census – Foreign Airport Trade Volume by Commodity (2014)
(Metric Tons)



Source: US Census, USA Trade Online; Exhibit J-11 see for tabular data)

Exhibit J-4: Census – Foreign Airport Trade Value by Commodity (2014)



Source: US Census, USA Trade Online; (see Exhibit J-12 for tabular data)

**Exhibit J-5: Census – Export Tons by Airport (2003-2015)
(Metric Tons)**

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	3	0	2	1	1	2	2	4	0	0	2	0	0
Daytona Beach International Airport	0	4	22	87	974	109	70	8	4	7	29	11	4
Fernandina	0	0	0	0	0	2	4	0	0	0	0	1	1
Fort Myers Airport	320	437	329	290	201	134	405	240	430	785	65	106	78
Fort Pierce	11	28	33	84	46	74	57	70	104	51	77	58	22
Ft. Lauderdale International Airport	170	364	3,681	2,906	2,966	1,701	1,265	1,948	2,286	2,027	1,916	2,806	2,522
Jacksonville	108	40	17	25	74	139	113	260	153	265	117	91	229
Key West	7	77	73	176	106	160	242	141	124	60	89	38	71
Leesburg Regional Airport	0	0	0	0	0	0	0	0	0	1	0	0	0
Melbourne Regional Airport	0	31	8	11	1	39	88	20	164	123	68	107	134
Miami International Airport	226,553	257,737	266,523	295,419	332,377	355,870	314,522	382,637	403,224	392,270	376,738	370,769	328,643
Miami	0	0	0	0	0	0	0	0	0	0	0	0	0
Naples Municipal User Fee Airport	0	0	0	0	0	0	0	0	4	5	5	6	4
Ocala Regional Airport	1	1	1	1	0	0	4	1	7	3	0	0	0
Orlando Executive Airport	0	0	0	0	0	0	0	25	265	402	503	239	123
Orlando	4,823	6,164	7,060	10,412	10,381	9,505	7,722	11,745	11,490	11,963	13,111	11,737	9,605
Orlando-Sanford Airport	910	1,332	1,407	2,110	2,235	1,652	1,089	1,745	1,552	979	897	454	766
Panama City	18	9	0	0	0	1	0	0	1	7	1	0	0
Pensacola	0	7	2	5	3	1	0	0	0	0	0	0	0
Port Canaveral	41	0	0	0	0	0	0	0	0	0	0	0	0
Port Everglades	129	238	114	87	61	123	44	37	14	26	22	32	11
Port Manatee	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarasota-Bradenton Airport	4	4	4	4	6	17	18	2	10	20	8	11	12
St. Petersburg	1	16	1	3	10	7	0	1	0	0	0	1	0
Tampa	1,729	1,919	2,473	1,521	2,312	1,914	1,781	1,952	2,203	2,201	2,712	2,388	2,128
West Palm Beach	23	54	98	546	506	155	38	110	114	129	184	92	74
Florida Airports	234,852	268,461	281,848	313,689	352,261	371,607	327,463	400,945	422,148	411,324	396,543	388,947	344,430
<i>Florida Airports (Short tons)</i>	<i>258,880</i>	<i>295,928</i>	<i>310,684</i>	<i>345,783</i>	<i>388,301</i>	<i>409,626</i>	<i>360,965</i>	<i>441,966</i>	<i>465,338</i>	<i>453,407</i>	<i>437,114</i>	<i>428,740</i>	<i>379,669</i>

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

**Exhibit J-6: Census – Import Tons by Airport (2003-2015)
(Metric Tons)**

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	0	0	0	0	0	0	0	0	0	0	0	2	0
Daytona Beach International Airport	1	3	3	1	0	0	0	44	0	0	4	0	0
Fernandina	0	0	0	0	0	0	0	0	0	0	0	0	1
Fort Myers Airport	176	288	169	221	187	104	128	236	244	308	473	1,101	415
Fort Pierce	7	4	12	7	10	2	3	5	4	5	1	22	27
Ft. Lauderdale International Airport	398	211	369	555	676	610	622	404	289	552	397	1,344	2,454
Jacksonville	20	29	81	19	34	102	107	204	116	148	62	53	40
Key West	0	2	13	7	0	0	0	6	0	2	2	0	1
Leesburg Regional Airport	0	0	0	0	0	0	0	0	0	0	0	0	0
Melbourne Regional Airport	0	0	6	0	0	1	0	1	192	6	6	23	27
Miami International Airport	516,304	570,726	530,311	515,951	546,689	515,293	468,927	517,619	516,133	574,469	604,419	605,561	614,197
Miami	2,326	720	60	79	20	129	129	73	4,305	168	106	201	86
Naples Municipal User Fee Airport	0	0	0	0	0	0	0	0	0	0	0	0	0
Ocala Regional Airport	0	0	0	0	0	0	0	0	0	6	0	0	0
Orlando Executive Airport	0	0	0	0	1	2	59	427	13	8	26	26	51
Orlando	9,727	10,585	9,026	10,196	9,000	7,219	7,837	15,404	17,715	14,543	13,423	13,704	14,523
Orlando-Sanford Airport	1,769	2,251	1,770	1,947	1,727	1,381	579	1,492	1,665	2,091	1,731	1,516	1,210
Panama City	0	1	4	0	5	1	0	0	0	10	2	10	0
Pensacola	0	0	0	0	0	1	0	0	0	0	8	7	1
Port Canaveral	74	36	38	14	0	0	29	30	76	35	20	31	29
Port Everglades	156	125	256	155	204	110	67	232	294	122	82	193	504
Port Manatee	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarasota-Bradenton Airport	0	0	0	0	0	0	0	0	0	0	0	0	1
St. Petersburg	0	0	0	0	14	0	0	0	2	2	3	1	3
Tampa	1,936	2,109	1,764	2,478	1,593	1,385	1,784	2,494	3,028	2,613	3,101	3,566	3,893
West Palm Beach	37	40	13	6	19	25	16	98	10	9	6	7	31
Florida Airports	532,932	587,130	543,896	531,636	560,180	526,365	480,287	538,769	544,087	595,098	623,872	627,367	637,495
<i>Florida Airports (Short tons)</i>	<i>587,456</i>	<i>647,200</i>	<i>599,542</i>	<i>586,028</i>	<i>617,492</i>	<i>580,217</i>	<i>529,425</i>	<i>593,890</i>	<i>599,753</i>	<i>655,982</i>	<i>687,700</i>	<i>691,553</i>	<i>702,717</i>

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

**Exhibit J-7: Census – Total Tons by Airport (2003-2015)
(Metric Tons)**

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	3	0	2	1	2	2	2	4	0	0	2	2	0
Daytona Beach International Airport	1	7	25	87	974	109	70	52	4	7	33	11	5
Fernandina	0	0	0	0	0	2	4	0	0	1	0	1	2
Fort Myers Airport	496	725	498	512	389	238	533	476	674	1,094	538	1,207	493
Fort Pierce	18	32	45	91	56	77	59	74	107	55	78	80	49
Ft. Lauderdale International Airport	567	575	4,050	3,461	3,642	2,311	1,887	2,352	2,575	2,579	2,313	4,150	4,975
Jacksonville	129	68	98	44	108	240	221	464	269	413	179	144	269
Key West	7	79	86	183	106	160	242	147	124	62	91	38	73
Leesburg Regional Airport	0	0	0	0	0	0	0	0	0	1	0	0	0
Melbourne Regional Airport	0	31	14	11	1	39	88	21	357	129	73	130	161
Miami International Airport	742,857	828,463	796,835	811,370	879,066	871,163	783,449	900,256	919,357	966,739	981,157	976,330	942,840
Miami	2,326	720	60	79	20	129	129	73	4,305	168	106	201	86
Naples Municipal User Fee Airport	0	0	0	0	0	0	0	0	4	5	5	6	4
Ocala Regional Airport	1	1	1	1	0	0	4	1	7	9	0	0	0
Orlando Executive Airport	0	0	0	0	1	2	59	452	278	410	529	264	174
Orlando	14,550	16,749	16,087	20,607	19,382	16,724	15,560	27,149	29,206	26,505	26,534	25,441	24,128
Orlando-Sanford Airport	2,679	3,583	3,177	4,057	3,961	3,033	1,668	3,237	3,217	3,071	2,628	1,970	1,977
Panama City	18	11	4	1	5	2	0	0	1	17	3	10	0
Pensacola	1	7	2	5	3	2	0	0	0	0	8	7	1
Port Canaveral	115	36	38	14	0	0	29	30	76	35	20	31	29
Port Everglades	285	363	370	242	265	233	111	269	308	148	104	225	515
Port Manatee	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarasota-Bradenton Airport	4	4	4	4	6	17	18	2	10	20	8	11	13
St. Petersburg	1	16	1	3	24	7	0	1	2	2	3	2	3
Tampa	3,665	4,028	4,237	3,999	3,905	3,299	3,564	4,446	5,231	4,814	5,813	5,954	6,022
West Palm Beach	60	93	111	552	525	180	54	208	124	138	190	100	105
Florida Airports	767,784	855,592	825,744	845,325	912,441	897,971	807,750	939,714	966,235	1,006,422	1,020,415	1,016,314	981,925
<i>Florida Airports (Short tons)</i>	<i>846,336</i>	<i>943,128</i>	<i>910,226</i>	<i>931,811</i>	<i>1,005,793</i>	<i>989,843</i>	<i>890,391</i>	<i>1,035,856</i>	<i>1,065,091</i>	<i>1,109,389</i>	<i>1,124,814</i>	<i>1,120,293</i>	<i>1,082,386</i>

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

Exhibit J-8: Census – Export Value (millions) by Airport (2003-2015)

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	\$0.15	\$0.03	\$0.02	\$0.30	\$0.10	\$0.06	\$0.22	\$0.51	\$0.03	\$0.01	\$0.02	\$0.12	\$0.00
Daytona Beach International Airport	\$0.12	\$0.46	\$0.33	\$3.34	\$20.73	\$3.33	\$1.79	\$9.60	\$1.87	\$2.29	\$11.09	\$2.33	\$3.11
Fernandina	\$0.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2.32	\$0.00	\$0.04	\$0.03	\$0.00	\$0.01	\$0.10
Fort Myers Airport	\$4.20	\$10.98	\$4.50	\$5.12	\$19.76	\$20.52	\$31.38	\$34.89	\$27.25	\$15.41	\$7.02	\$5.93	\$4.54
Fort Pierce	\$1.09	\$1.09	\$2.83	\$8.64	\$6.25	\$18.37	\$13.82	\$22.07	\$28.75	\$20.82	\$33.20	\$44.64	\$4.42
Ft. Lauderdale International Airport	\$18.71	\$105.92	\$94.63	\$213.43	\$257.64	\$446.86	\$489.74	\$579.28	\$580.67	\$617.06	\$798.88	\$633.08	\$445.51
Jacksonville	\$2.01	\$1.90	\$0.38	\$2.54	\$5.29	\$8.41	\$4.40	\$18.25	\$7.69	\$16.31	\$16.12	\$43.99	\$19.88
Key West	\$0.13	\$1.89	\$2.53	\$11.91	\$9.98	\$16.71	\$23.30	\$22.20	\$19.80	\$7.77	\$3.53	\$5.81	\$30.94
Leesburg Regional Airport	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.01	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.00	\$0.00
Melbourne Regional Airport	\$0.02	\$12.34	\$3.04	\$1.32	\$0.22	\$9.36	\$31.48	\$2.90	\$18.02	\$23.08	\$25.91	\$49.04	\$567.20
Miami International Airport	\$13,957.97	\$16,197.92	\$17,754.71	\$20,666.47	\$24,030.69	\$29,201.96	\$27,480.47	\$34,570.94	\$40,983.67	\$43,908.68	\$39,600.01	\$37,720.47	\$32,056.11
Miami	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Naples Municipal User Fee Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.56	\$0.65	\$0.48	\$0.68	\$0.50
Ocala Regional Airport	\$0.05	\$0.03	\$2.31	\$0.17	\$0.00	\$0.01	\$2.46	\$0.21	\$0.45	\$0.95	\$0.09	\$0.02	\$0.01
Orlando Executive Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.04	\$2.74	\$30.36	\$36.92	\$31.39	\$19.29	\$13.27
Orlando	\$344.33	\$365.17	\$573.20	\$617.37	\$508.14	\$654.96	\$623.19	\$792.28	\$772.98	\$735.72	\$1,040.63	\$1,064.58	\$2,031.93
Orlando-Sanford Airport	\$56.21	\$150.74	\$45.30	\$62.81	\$47.88	\$56.20	\$25.63	\$42.58	\$42.39	\$25.54	\$21.47	\$11.96	\$16.83
Panama City	\$0.49	\$0.03	\$0.00	\$0.01	\$0.00	\$0.10	\$0.00	\$0.01	\$0.09	\$0.05	\$0.03	\$0.00	\$0.00
Pensacola	\$0.01	\$0.06	\$0.02	\$0.66	\$0.08	\$0.43	\$0.02	\$0.00	\$0.00	\$0.04	\$0.01	\$0.02	\$0.05
Port Canaveral	\$9.16	\$0.00	\$0.04	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Port Everglades	\$22.43	\$14.67	\$28.07	\$5.63	\$1.93	\$12.48	\$0.86	\$0.76	\$2.17	\$2.46	\$7.84	\$3.94	\$1.06
Port Manatee	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.00	\$0.02	\$0.00	\$0.02	\$0.00	\$0.01
Sarasota-Bradenton Airport	\$3.08	\$3.54	\$3.39	\$4.34	\$5.42	\$5.97	\$22.31	\$1.37	\$8.16	\$10.15	\$10.11	\$9.37	\$8.76
St. Petersburg	\$0.38	\$1.88	\$0.03	\$0.38	\$2.46	\$0.57	\$0.03	\$0.02	\$0.00	\$0.10	\$0.00	\$0.04	\$0.00
Tampa	\$98.94	\$91.04	\$125.10	\$115.19	\$149.12	\$169.88	\$162.18	\$184.62	\$175.72	\$175.89	\$184.69	\$177.70	\$161.23
West Palm Beach	\$0.18	\$3.89	\$3.46	\$33.78	\$95.56	\$73.46	\$10.31	\$107.48	\$129.17	\$104.15	\$162.25	\$173.80	\$58.45
Florida Airports	\$14,519.7	\$16,963.6	\$18,643.9	\$21,753.4	\$25,161.3	\$30,699.7	\$28,925.9	\$36,392.7	\$42,829.9	\$45,704.1	\$41,954.8	\$39,966.8	\$35,423.9

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

Exhibit J-9: Census – Import Value (millions) by Airport (2003-2015)

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	\$0.01	\$0.00	\$0.00	\$0.00	\$0.03	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.14	\$0.00
Daytona Beach International Airport	\$0.09	\$0.35	\$0.28	\$0.03	\$0.00	\$0.00	\$0.00	\$0.29	\$0.05	\$0.00	\$0.03	\$0.00	\$0.03
Fernandina	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.05	\$0.00	\$0.00	\$0.00	\$0.13	\$0.00	\$0.02	\$0.12
Fort Myers Airport	\$8.91	\$16.50	\$14.53	\$16.36	\$8.55	\$5.29	\$7.43	\$9.69	\$12.72	\$14.19	\$24.20	\$43.05	\$39.86
Fort Pierce	\$0.94	\$0.41	\$0.40	\$0.38	\$0.60	\$0.07	\$0.70	\$0.36	\$0.14	\$0.71	\$1.32	\$2.04	\$5.74
Ft. Lauderdale International Airport	\$39.76	\$15.00	\$27.92	\$11.09	\$21.42	\$68.75	\$179.35	\$111.67	\$38.85	\$191.71	\$178.90	\$184.05	\$186.90
Jacksonville	\$1.53	\$1.35	\$15.38	\$2.05	\$1.68	\$1.08	\$3.39	\$26.93	\$39.91	\$14.97	\$1.71	\$3.35	\$2.09
Key West	\$0.10	\$0.11	\$1.13	\$0.21	\$0.02	\$0.04	\$0.04	\$0.04	\$0.06	\$0.26	\$0.01	\$0.00	\$0.01
Leesburg Regional Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Melbourne Regional Airport	\$0.03	\$0.04	\$0.06	\$0.00	\$0.00	\$0.01	\$0.02	\$0.07	\$1.42	\$0.45	\$1.14	\$18.30	\$6.19
Miami International Airport	\$8,754.78	\$9,126.19	\$9,650.07	\$9,623.83	\$10,436.01	\$10,827.33	\$11,666.41	\$15,323.78	\$20,082.77	\$24,985.64	\$27,793.29	\$24,214.09	\$20,781.03
Miami	\$291.85	\$153.39	\$9.34	\$2.06	\$0.56	\$4.07	\$5.53	\$6.70	\$33.04	\$32.73	\$7.92	\$11.04	\$14.85
Naples Municipal User Fee Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Ocala Regional Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.12	\$0.00	\$0.01	\$0.00
Orlando Executive Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.17	\$5.77	\$47.01	\$0.08	\$0.27	\$15.31	\$1.45	\$1.89
Orlando	\$1,200.11	\$687.44	\$454.14	\$473.35	\$437.29	\$480.52	\$380.55	\$705.10	\$869.95	\$789.73	\$907.52	\$923.23	\$997.42
Orlando-Sanford Airport	\$48.71	\$89.00	\$64.62	\$52.41	\$71.00	\$78.71	\$34.58	\$49.90	\$60.76	\$158.77	\$134.06	\$96.15	\$94.57
Panama City	\$0.00	\$0.23	\$1.18	\$0.06	\$0.20	\$0.11	\$0.00	\$0.00	\$0.00	\$0.94	\$0.05	\$0.18	\$0.03
Pensacola	\$0.01	\$0.01	\$0.00	\$0.00	\$0.02	\$0.04	\$0.00	\$0.00	\$0.00	\$0.00	\$1.14	\$0.14	\$0.01
Port Canaveral	\$86.11	\$9.08	\$5.79	\$10.58	\$0.00	\$0.01	\$15.56	\$17.89	\$28.63	\$28.97	\$24.93	\$20.25	\$40.82
Port Everglades	\$3.08	\$2.58	\$2.39	\$2.90	\$2.64	\$1.52	\$1.27	\$2.64	\$2.72	\$2.08	\$6.76	\$6.08	\$6.87
Port Manatee	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Sarasota-Bradenton Airport	\$0.00	\$0.00	\$0.02	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02
St. Petersburg	\$0.00	\$0.00	\$0.00	\$0.00	\$1.52	\$0.00	\$0.00	\$0.00	\$0.01	\$0.02	\$0.09	\$0.03	\$0.02
Tampa	\$55.76	\$88.48	\$142.29	\$125.56	\$96.37	\$90.70	\$96.30	\$123.65	\$178.60	\$214.20	\$220.48	\$204.20	\$244.97
West Palm Beach	\$13.78	\$5.89	\$6.22	\$0.43	\$2.56	\$1.84	\$1.21	\$0.62	\$1.45	\$0.48	\$0.07	\$13.09	\$10.71
Florida Airports	\$10,505.6	\$10,196.0	\$10,395.7	\$10,321.3	\$11,080.5	\$11,560.3	\$12,398.1	\$16,426.3	\$21,351.1	\$26,436.4	\$29,318.9	\$25,740.9	\$22,434.1

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

Exhibit J-10: Census – Total Value (millions) by Airport (2003-2015)

Airport/Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boca Grande	\$0.15	\$0.03	\$0.02	\$0.30	\$0.14	\$0.06	\$0.22	\$0.51	\$0.03	\$0.01	\$0.02	\$0.26	\$0.00
Daytona Beach International Airport	\$0.21	\$0.81	\$0.61	\$3.37	\$20.73	\$3.33	\$1.79	\$9.89	\$1.92	\$2.29	\$11.12	\$2.33	\$3.14
Fernandina	\$0.10	\$0.00	\$0.00	\$0.00	\$0.00	\$0.05	\$2.32	\$0.00	\$0.04	\$0.15	\$0.00	\$0.03	\$0.23
Fort Myers Airport	\$13.11	\$27.48	\$19.03	\$21.47	\$28.31	\$25.80	\$38.81	\$44.58	\$39.97	\$29.60	\$31.22	\$48.98	\$44.40
Fort Pierce	\$2.03	\$1.50	\$3.23	\$9.02	\$6.85	\$18.45	\$14.52	\$22.42	\$28.89	\$21.52	\$34.52	\$46.67	\$10.16
Ft. Lauderdale International Airport	\$58.48	\$120.93	\$122.55	\$224.52	\$279.06	\$515.61	\$669.09	\$690.95	\$619.52	\$808.77	\$977.78	\$817.14	\$632.41
Jacksonville	\$3.53	\$3.25	\$15.76	\$4.59	\$6.98	\$9.50	\$7.79	\$45.17	\$47.60	\$31.28	\$17.83	\$47.34	\$21.96
Key West	\$0.23	\$2.00	\$3.66	\$12.12	\$10.00	\$16.75	\$23.33	\$22.24	\$19.86	\$8.02	\$3.55	\$5.81	\$30.94
Leesburg Regional Airport	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.01	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.00	\$0.00
Melbourne Regional Airport	\$0.04	\$12.38	\$3.10	\$1.32	\$0.23	\$9.37	\$31.50	\$2.97	\$19.44	\$23.53	\$27.04	\$67.34	\$573.39
Miami International Airport	\$22,712.75	\$25,324.12	\$27,404.77	\$30,290.30	\$34,466.70	\$40,029.29	\$39,146.88	\$49,894.72	\$61,066.44	\$68,894.32	\$67,393.30	\$61,934.55	\$52,837.14
Miami	\$291.85	\$153.39	\$9.34	\$2.06	\$0.56	\$4.07	\$5.53	\$6.70	\$33.04	\$32.73	\$7.92	\$11.04	\$14.85
Naples Municipal User Fee Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.56	\$0.65	\$0.48	\$0.68	\$0.50
Ocala Regional Airport	\$0.05	\$0.03	\$2.31	\$0.17	\$0.00	\$0.01	\$2.46	\$0.21	\$0.45	\$1.07	\$0.09	\$0.02	\$0.01
Orlando Executive Airport	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.17	\$5.80	\$49.75	\$30.43	\$37.19	\$46.70	\$20.74	\$15.16
Orlando	\$1,544.44	\$1,052.60	\$1,027.34	\$1,090.72	\$945.43	\$1,135.49	\$1,003.74	\$1,497.38	\$1,642.92	\$1,525.44	\$1,948.15	\$1,987.82	\$3,029.35
Orlando-Sanford Airport	\$104.92	\$239.74	\$109.92	\$115.22	\$118.87	\$134.91	\$60.21	\$92.48	\$103.15	\$184.31	\$155.53	\$108.11	\$111.40
Panama City	\$0.49	\$0.27	\$1.18	\$0.07	\$0.20	\$0.21	\$0.00	\$0.01	\$0.09	\$0.99	\$0.09	\$0.18	\$0.03
Pensacola	\$0.02	\$0.07	\$0.02	\$0.66	\$0.10	\$0.47	\$0.02	\$0.00	\$0.00	\$0.04	\$1.14	\$0.16	\$0.06
Port Canaveral	\$95.26	\$9.08	\$5.83	\$10.58	\$0.00	\$0.01	\$15.56	\$17.89	\$28.63	\$28.98	\$24.93	\$20.25	\$40.82
Port Everglades	\$25.51	\$17.25	\$30.46	\$8.54	\$4.57	\$14.00	\$2.13	\$3.40	\$4.89	\$4.54	\$14.60	\$10.02	\$7.93
Port Manatee	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.00	\$0.00	\$0.02	\$0.00	\$0.02	\$0.00	\$0.01
Sarasota-Bradenton Airport	\$3.08	\$3.54	\$3.41	\$4.34	\$5.42	\$5.97	\$22.31	\$1.37	\$8.16	\$10.15	\$10.11	\$9.37	\$8.78
St. Petersburg	\$0.38	\$1.88	\$0.03	\$0.38	\$3.98	\$0.57	\$0.03	\$0.02	\$0.01	\$0.12	\$0.09	\$0.08	\$0.02
Tampa	\$154.70	\$179.52	\$267.39	\$240.75	\$245.49	\$260.58	\$258.48	\$308.27	\$354.32	\$390.09	\$405.17	\$381.90	\$406.20
West Palm Beach	\$13.96	\$9.78	\$9.68	\$34.21	\$98.12	\$75.30	\$11.52	\$108.10	\$130.62	\$104.63	\$162.32	\$186.90	\$69.16
Florida Airports	\$25,025.3	\$27,159.6	\$29,039.6	\$32,074.7	\$36,241.8	\$42,260.0	\$41,324.0	\$52,819.0	\$64,181.0	\$72,140.4	\$71,273.7	\$65,707.7	\$57,858.1

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

**Exhibit J-11: Census – Total Foreign Tons by Commodity (2003-2015)
(Metric Tons)**

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
00	Total (in short tons)	846,336	943,128	910,226	931,811	1,005,793	989,843	890,391	1,035,856	1,065,091	1,109,389	1,124,814	1,120,293	1,082,386
00	Total (in metric tons)	767,784	855,592	825,744	845,325	912,441	897,971	807,750	939,714	966,235	1,006,422	1,020,415	1,016,314	981,925
Top Commodities														
03	Fish, Crustaceans & Aquatic Invertebrates	151,500	141,157	143,781	134,140	141,144	133,871	112,865	104,669	111,339	134,949	146,033	154,793	163,348
06	Live Trees, Plants, Bulbs Etc.; Cut Flowers Etc.	139,715	165,849	159,615	158,918	164,282	159,293	149,621	163,494	171,066	183,817	192,507	189,687	181,341
07	Edible Vegetables & Certain Roots & Tubers	64,905	63,553	58,223	66,729	71,626	69,748	86,146	87,694	93,427	93,497	104,689	113,395	114,940
08	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	16,346	15,040	19,985	21,802	26,802	23,998	29,402	34,062	27,063	33,516	33,966	42,043	36,111
10	Cereals	6,452	3,605	6,221	13,806	26,266	31,628	12,408	21,208	15,017	32,990	41,922	10,142	3,590
33	Essential Oils Etc; Perfumery, Cosmetic Etc Preps	7,342	7,671	7,826	7,555	8,998	9,295	9,351	12,492	14,155	14,455	15,457	14,246	13,967
39	Plastics And Articles Thereof	10,329	12,932	11,729	11,715	13,313	14,262	13,639	17,067	15,828	16,058	15,027	16,288	17,265
61	Apparel Articles And Accessories, Knit Or Crochet	33,097	41,849	25,561	31,135	22,435	18,062	14,401	17,041	12,689	11,025	11,608	12,153	13,093
62	Apparel Articles And Accessories, Not Knit Etc.	25,670	32,601	22,983	14,973	11,772	9,143	6,574	7,694	6,454	6,097	6,457	9,892	7,992
64	Footwear, Gaiters Etc. And Parts Thereof	10,538	11,036	6,774	5,680	3,900	2,807	2,627	3,670	3,158	2,839	2,446	2,710	2,627
73	Articles Of Iron Or Steel	3,417	4,671	7,076	10,152	15,602	15,878	14,478	17,167	18,661	18,772	18,884	18,191	14,040
84	Nuclear Reactors, Boilers, Machinery Etc.; Parts	81,586	101,891	99,184	112,694	124,882	131,395	108,902	141,866	150,200	136,252	117,014	115,159	101,967
85	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	46,186	54,256	58,911	61,578	77,141	76,367	60,751	81,635	81,954	75,531	76,789	79,988	76,921
87	Vehicles, Except Railway Or Tramway, And Parts Etc	10,325	23,252	25,865	15,999	15,797	11,931	9,794	14,011	20,186	16,052	13,496	16,342	13,712
90	Optic, Photo Etc, Medic Or Surgical Instrments Etc	14,687	16,848	19,525	22,923	22,643	25,119	22,975	27,425	29,380	29,574	30,936	32,028	31,343
Remaining Commodities														
01	Live Animals	3,308	2,976	3,322	3,817	4,084	4,148	3,124	3,105	3,314	2,838	2,957	2,986	3,350
02	Meat And Edible Meat Offal	606	316	302	395	501	730	374	370	370	262	501	430	626
04	Dairy Prods; Birds Eggs; Honey; Ed Animal Pr Nesoi	6,827	7,523	9,754	9,772	9,189	6,668	9,414	9,801	11,158	13,583	10,474	7,845	7,687
05	Products Of Animal Origin, Nesoi	201	390	255	316	550	937	1,398	678	473	611	761	768	490
09	Coffee, Tea, Mate & Spices	471	1,305	1,406	1,576	1,707	1,671	1,718	2,356	2,644	1,348	1,521	2,360	1,905
11	Milling Products; Malt; Starch; Inulin; Wht Gluten	126	122	211	156	121	175	226	150	63	224	419	213	194
12	Oil Seeds Etc.; Misc Grain, Seed, Fruit, Plant Etc	4,162	3,904	4,731	3,790	4,797	5,553	4,963	5,483	5,391	9,043	7,561	9,323	9,585
13	Lac; Gums, Resins & Other Vegetable Sap & Extract	172	155	233	230	354	503	284	440	465	408	515	565	458
14	Vegetable Plaiting Materials & Products Nesoi	17	33	22	32	62	37	66	83	229	212	92	68	53
15	Animal Or Vegetable Fats, Oils Etc. & Waxes	519	552	587	498	426	487	526	1,048	890	958	1,046	977	914
16	Edible Preparations Of Meat, Fish, Crustaceans Etc	3,248	2,428	1,824	1,803	1,706	2,526	3,259	2,937	3,279	2,569	3,299	3,347	4,518
17	Sugars And Sugar Confectionary	823	1,337	748	749	781	756	715	1,907	999	1,279	1,381	1,126	1,033
18	Cocoa And Cocoa Preparations	228	257	593	262	555	296	347	391	398	603	268	466	454
19	Prep Cereal, Flour, Starch Or Milk; Bakers Wares	895	852	737	1,094	1,147	1,094	1,131	1,141	946	909	1,099	1,264	1,266
20	Prep Vegetables, Fruit, Nuts Or Other Plant Parts	562	629	524	867	514	409	520	703	729	438	872	676	920
21	Miscellaneous Edible Preparations	1,825	3,288	2,809	2,373	2,299	2,719	4,021	4,564	4,729	3,938	4,572	4,166	3,775
22	Beverages, Spirits And Vinegar	975	861	905	1,565	1,391	861	807	1,147	1,304	1,211	1,260	1,510	1,635
23	Food Industry Residues & Waste; Prep Animal Feed	1,099	762	833	433	340	645	627	799	420	307	629	522	889

Continued...

Continued... Census – Total Foreign Tons by Commodity (2003-2015)

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
24	Tobacco And Manufactured Tobacco Substitutes	3,970	4,410	4,011	3,565	3,559	3,506	3,056	2,982	3,184	2,913	3,210	2,844	3,149
25	Salt; Sulfur; Earth & Stone; Lime & Cement Plaster	758	1,135	885	1,477	1,557	1,087	842	1,229	1,079	1,990	2,349	1,535	1,700
26	Ores, Slag And Ash	173	95	180	290	1,062	345	345	687	841	706	304	90	216
27	Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax	778	339	1,243	2,602	1,850	1,658	1,431	2,620	4,122	3,272	3,331	3,488	4,809
28	Inorg Chem; Prec & Rare-earth Met & Radioact Compd	1,498	1,896	2,054	1,922	3,030	2,999	2,849	4,991	4,160	4,097	3,478	2,924	3,477
29	Organic Chemicals	3,917	5,191	5,099	5,238	7,137	7,333	7,767	7,894	12,658	15,884	10,247	6,304	5,707
30	Pharmaceutical Products	7,156	5,544	6,108	6,380	7,006	8,423	7,859	9,484	10,174	10,185	9,395	10,135	9,323
31	Fertilizers	15	21	29	68	43	903	613	660	887	739	254	534	650
32	Tanning & Dye Ext Etc; Dye, Paint, Putty Etc; Inks	2,718	3,167	3,099	3,394	4,334	5,971	5,733	7,159	6,105	6,270	4,773	5,500	5,056
34	Soap Etc; Waxes, Polish Etc; Candles; Dental Preps	1,088	837	835	1,340	1,498	1,330	1,409	2,199	2,612	2,554	2,351	3,382	2,641
35	Albuminoidal Subst; Modified Starch; Glue; Enzymes	851	599	588	627	607	863	1,027	1,211	1,198	1,445	1,449	1,707	1,695
36	Explosives; Pyrotechnics; Matches; Pyro Alloys Etc	368	430	460	607	680	782	890	2,438	2,468	1,634	1,488	982	696
37	Photographic Or Cinematographic Goods	2,685	2,841	3,321	2,677	2,569	2,222	1,650	1,515	1,245	1,014	948	835	691
38	Miscellaneous Chemical Products	3,536	4,459	5,057	5,177	5,080	7,036	7,725	7,946	9,073	7,857	9,205	10,681	9,212
40	Rubber And Articles Thereof	2,669	5,122	3,037	2,928	3,282	3,789	2,890	5,567	4,809	4,836	5,089	4,880	5,448
41	Raw Hides And Skins (no Furskins) And Leather	5,489	6,443	4,101	2,056	2,422	1,434	1,058	1,402	1,092	1,479	1,266	1,601	1,435
42	Leather Art; Saddlery Etc; Handbags Etc; Gut Art	1,792	1,967	1,906	1,650	1,669	1,711	1,377	1,905	1,879	2,129	2,206	2,263	2,040
43	Furskins And Artificial Fur; Manufactures Thereof	497	241	150	187	266	215	126	157	167	221	308	353	455
44	Wood And Articles Of Wood; Wood Charcoal	1,821	1,838	1,789	1,806	2,415	2,280	1,908	3,300	3,376	2,209	2,706	2,318	2,979
45	Cork And Articles Of Cork	60	30	50	28	29	140	59	27	25	32	34	38	53
46	Mfr Of Straw, Esparto Etc.; Basketware & Wickerwrk	40	41	36	73	69	51	20	60	34	53	27	36	33
47	Wood Pulp Etc; Recovd (waste & Scrap) ppr & pprbd	30	3	79	111	259	22	288	1,153	403	233	171	182	476
48	Paper & Paperboard & Articles (inc Papr Pulp Artl)	8,981	9,337	7,507	10,128	8,496	8,228	6,136	7,560	7,421	6,120	7,749	6,484	6,275
49	Printed Books, Newspapers Etc; Manuscripts Etc	7,329	7,307	6,991	6,576	6,305	5,672	4,255	4,431	4,493	4,599	5,113	4,211	3,497
50	Silk, Including Yarns And Woven Fabric Thereof	59	64	63	80	51	58	41	67	54	42	29	58	74
51	Wool & Animal Hair, Including Yarn & Woven Fabric	206	276	268	212	218	203	140	229	319	228	223	330	279
52	Cotton, Including Yarn And Woven Fabric Thereof	1,419	1,388	1,062	979	541	323	375	371	640	399	402	297	268
53	Veg Text Fib Nesoi; Veg Fib & Paper Yns & Wov Fab	51	97	77	105	147	130	79	51	138	19	19	43	60
54	Manmade Filaments, Including Yarns & Woven Fabrics	3,636	3,598	3,056	3,486	2,231	1,756	1,135	1,747	1,641	860	1,019	1,253	1,482
55	Manmade Staple Fibers, Incl Yarns & Woven Fabrics	1,354	1,325	1,038	655	649	758	442	884	773	666	683	847	718
56	Wadding, Felt Etc; Sp Yarn; Twine, Ropes Etc.	890	1,028	684	1,002	719	855	735	1,679	1,244	1,448	1,359	1,717	2,391
57	Carpets And Other Textile Floor Coverings	604	667	687	699	782	787	782	950	789	894	913	835	906
58	Spec Wov Fabrics; Tufted Fab; Lace; Tapestries Etc	1,626	2,152	1,348	1,455	1,200	1,135	736	916	784	711	680	563	652

Continued...

Continued... Census – Total Foreign Tons by Commodity (2003-2015)

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
59	Impregnated Etc Text Fabrics; Tex Art For Industry	1,574	3,382	1,293	1,256	1,926	1,217	1,112	1,701	1,068	1,106	1,312	1,331	1,276
60	Knitted Or Crocheted Fabrics	2,176	1,950	870	850	984	989	670	618	558	548	825	945	1,192
63	Textile Art Nesoi; Needlecraft Sets; Worn Text Art	3,154	2,081	1,696	1,598	1,805	1,147	1,355	1,989	1,150	1,430	1,407	1,388	1,434
65	Headgear And Parts Thereof	346	329	335	335	366	313	251	243	270	268	259	235	246
66	Umbrellas, Walking-sticks, Riding-crops Etc, Parts	196	37	92	102	94	67	81	97	134	121	117	87	83
67	Prep Feathers, Down Etc; Artif Flowers; H Hair Art	71	70	169	163	192	259	183	149	159	271	531	583	193
68	Art Of Stone, Plaster, Cement, Asbestos, Mica Etc.	1,515	1,839	1,662	2,048	1,895	1,916	1,418	1,581	1,433	2,233	1,858	1,990	2,108
69	Ceramic Products	1,070	1,929	1,415	1,390	1,320	1,224	1,198	1,148	1,502	2,035	2,181	1,700	1,441
70	Glass And Glassware	1,947	2,813	2,224	2,064	2,499	2,275	1,955	2,200	1,870	2,535	1,743	2,053	2,134
71	Nat Etc Pearls, Prec Etc Stones, Pr Met Etc; Coin	1,475	1,450	1,496	1,953	2,007	1,584	1,646	1,827	1,961	2,027	2,074	2,294	2,363
72	Iron And Steel	2,212	1,679	2,102	2,956	4,806	6,400	5,482	5,537	7,175	5,154	4,762	4,199	4,071
74	Copper And Articles Thereof	616	754	791	1,021	1,137	1,035	952	1,154	1,162	970	859	944	759
75	Nickel And Articles Thereof	145	175	241	192	232	274	234	371	453	436	366	522	459
76	Aluminum And Articles Thereof	1,455	1,691	1,754	1,879	2,125	1,930	1,859	2,642	2,440	3,035	2,988	2,875	3,346
78	Lead And Articles Thereof	367	647	728	965	126	266	340	157	95	106	93	184	226
79	Zinc And Articles Thereof	28	73	45	58	81	189	71	103	114	198	64	75	156
80	Tin And Articles Thereof	23	38	40	380	148	53	24	33	99	84	143	279	108
81	Base Metals Nesoi; Cermet; Articles Thereof	214	379	365	601	723	995	562	620	730	1,613	1,785	1,657	1,137
82	Tools, Cutlery Etc. Of Base Metal & Parts Thereof	2,268	2,337	4,010	3,162	3,925	3,855	2,354	3,303	3,647	3,718	3,361	3,200	2,973
83	Miscellaneous Articles Of Base Metal	2,931	3,040	1,923	2,265	2,891	3,056	2,268	2,726	3,026	3,733	3,767	3,303	2,953
86	Railway Or Tramway Stock Etc; Traffic Signal Equip	404	491	510	855	1,172	1,394	1,375	1,558	1,880	1,366	804	1,007	827
88	Aircraft, Spacecraft, And Parts Thereof	5,328	7,429	7,313	7,372	7,758	8,396	8,180	10,062	10,618	11,096	11,594	11,855	11,789
89	Ships, Boats And Floating Structures	171	196	270	280	335	330	422	614	489	439	495	527	366
91	Clocks And Watches And Parts Thereof	511	631	705	690	789	678	617	823	886	916	930	934	2,162
92	Musical Instruments; Parts And Accessories Thereof	266	249	297	347	364	406	301	366	476	280	357	350	246
93	Arms And Ammunition; Parts And Accessories Thereof	795	806	881	910	1,263	1,499	1,878	1,895	1,465	2,132	2,406	1,269	1,714
94	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	6,803	6,846	5,395	4,606	6,376	5,012	4,055	4,529	4,927	5,114	5,613	6,780	8,517
95	Toys, Games & Sport Equipment; Parts & Accessories	3,451	3,317	3,764	3,844	4,110	4,943	5,519	7,137	6,855	5,995	5,984	5,930	5,033
97	Works Of Art, Collectors' Pieces And Antiques	615	591	795	623	961	821	707	624	797	982	1,159	1,101	1,228
98	Special Classification Provisions, Nesoi	6,785	7,966	10,399	9,380	8,858	6,277	5,717	7,896	8,564	10,741	9,565	10,080	9,177
99	Special Import Provisions, Nesoi	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

Exhibit J-12: Census – Total Foreign Trade Value (millions) by Commodity (2003-2015)

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
00	Total (in millions of dollars)	\$25,025	\$27,160	\$29,040	\$32,075	\$36,242	\$42,260	\$41,324	\$52,819	\$64,181	\$72,140	\$71,274	\$65,708	\$57,858
Top Commodities														
03	Fish, Crustaceans & Aquatic Invertebrates	\$667	\$649	\$736	\$852	\$913	\$890	\$766	\$792	\$881	\$945	\$1,197	\$1,312	\$1,196
06	Live Trees, Plants, Bulbs Etc.; Cut Flowers Etc.	\$561	\$665	\$671	\$719	\$791	\$757	\$717	\$784	\$821	\$910	\$942	\$951	\$947
29	Organic Chemicals	\$1,112	\$975	\$826	\$633	\$708	\$811	\$547	\$1,002	\$2,114	\$1,076	\$2,126	\$1,120	\$822
30	Pharmaceutical Products	\$1,593	\$1,206	\$1,053	\$966	\$1,102	\$1,381	\$1,239	\$1,578	\$1,999	\$2,084	\$2,243	\$2,620	\$2,618
61	Apparel Articles And Accessories, Knit Or Crochet	\$597	\$741	\$565	\$667	\$541	\$468	\$358	\$418	\$375	\$338	\$355	\$394	\$413
71	Nat Etc Pearls, Prec Etc Stones, Pr Met Etc; Coin	\$1,674	\$1,665	\$1,638	\$2,053	\$2,525	\$4,008	\$6,116	\$8,877	\$13,366	\$16,768	\$12,547	\$10,179	\$7,358
84	Nuclear Reactors, Boilers, Machinery Etc.; Parts	\$5,825	\$5,557	\$6,452	\$7,668	\$9,038	\$10,047	\$10,171	\$11,391	\$11,344	\$11,489	\$10,565	\$9,714	\$8,730
85	Electric Machinery Etc; Sound Equip; Tv Equip; Pts	\$5,775	\$6,364	\$7,031	\$7,478	\$8,096	\$9,455	\$7,725	\$11,291	\$13,950	\$17,173	\$18,600	\$15,366	\$11,011
88	Aircraft, Spacecraft, And Parts Thereof	\$1,174	\$2,464	\$2,463	\$3,051	\$3,489	\$4,529	\$4,180	\$5,224	\$5,907	\$6,298	\$6,737	\$7,014	\$7,581
90	Optic, Photo Etc, Medic Or Surgical Instrmnts Etc	\$1,572	\$1,773	\$2,121	\$2,652	\$2,981	\$3,647	\$3,626	\$4,378	\$4,926	\$5,329	\$5,531	\$5,742	\$5,757
98	Works Of Art, Collectors' Pieces And Antiques	\$261	\$334	\$502	\$411	\$656	\$471	\$531	\$432	\$499	\$682	\$696	\$738	\$962
98	Special Classification Provisions, Nesoi	\$856	\$940	\$1,168	\$1,100	\$1,000	\$1,135	\$1,140	\$1,244	\$1,949	\$2,629	\$3,037	\$3,518	\$3,639
Remaining Commodities														
01	Live Animals	\$54	\$50	\$89	\$112	\$105	\$128	\$116	\$126	\$165	\$142	\$164	\$172	\$263
02	Meat And Edible Meat Offal	\$4	\$2	\$2	\$2	\$2	\$3	\$2	\$2	\$2	\$1	\$2	\$3	\$4
04	Dairy Prods; Birds Eggs; Honey; Ed Animal Pr Nesoi	\$16	\$19	\$23	\$25	\$29	\$24	\$35	\$39	\$45	\$56	\$47	\$36	\$36
05	Products Of Animal Origin, Nesoi	\$6	\$8	\$8	\$12	\$16	\$18	\$20	\$24	\$28	\$33	\$31	\$39	\$32
07	Edible Vegetables & Certain Roots & Tubers	\$93	\$106	\$99	\$109	\$145	\$120	\$146	\$181	\$191	\$234	\$286	\$268	\$299
08	Edible Fruit & Nuts; Citrus Fruit Or Melon Peel	\$24	\$30	\$43	\$53	\$76	\$66	\$83	\$113	\$87	\$116	\$116	\$158	\$135
09	Coffee, Tea, Mate & Spices	\$3	\$5	\$6	\$6	\$7	\$7	\$9	\$10	\$12	\$6	\$7	\$10	\$10
10	Cereals	\$11	\$6	\$13	\$30	\$51	\$79	\$44	\$65	\$56	\$120	\$175	\$53	\$23
11	Milling Products; Malt; Starch; Inulin; Wht Gluten	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$0	\$1	\$1	\$1	\$0
12	Oil Seeds Etc.; Misc Grain, Seed, Fruit, Plant Etc	\$38	\$39	\$51	\$56	\$69	\$77	\$80	\$95	\$100	\$124	\$135	\$163	\$160
13	Lac; Gums, Resins & Other Vegetable Sap & Extract	\$3	\$3	\$5	\$4	\$6	\$9	\$5	\$11	\$15	\$15	\$17	\$22	\$21
14	Vegetable Plaiting Materials & Products Nesoi	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$0	\$0	\$0	\$0
15	Animal Or Vegetable Fats, Oils Etc. & Waxes	\$2	\$2	\$5	\$2	\$2	\$2	\$2	\$3	\$9	\$13	\$8	\$10	\$6
16	Edible Preparations Of Meat, Fish, Crustaceans Etc	\$30	\$23	\$19	\$19	\$18	\$31	\$33	\$36	\$34	\$28	\$39	\$43	\$54
17	Sugars And Sugar Confectionary	\$3	\$5	\$3	\$2	\$1	\$1	\$1	\$3	\$2	\$5	\$4	\$3	\$5
18	Cocoa And Cocoa Preparations	\$2	\$2	\$3	\$2	\$4	\$2	\$2	\$3	\$3	\$6	\$3	\$4	\$3
19	Prep Cereal, Flour, Starch Or Milk; Bakers Wares	\$3	\$2	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$3	\$4	\$5	\$6
20	Prep Vegetables, Fruit, Nuts Or Other Plant Parts	\$2	\$1	\$1	\$2	\$1	\$1	\$2	\$2	\$2	\$1	\$3	\$2	\$2
21	Miscellaneous Edible Preparations	\$12	\$18	\$25	\$36	\$34	\$29	\$45	\$51	\$90	\$67	\$68	\$61	\$61
22	Beverages, Spirits And Vinegar	\$5	\$3	\$4	\$9	\$5	\$4	\$4	\$5	\$7	\$4	\$7	\$8	\$8
23	Food Industry Residues & Waste; Prep Animal Feed	\$3	\$5	\$4	\$2	\$2	\$3	\$2	\$3	\$3	\$3	\$12	\$12	\$15

Continued...

Continued... Census – Total Foreign Trade Value (millions) by Commodity (2003-2015)

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
24	Tobacco And Manufactured Tobacco Substitutes	\$80	\$85	\$82	\$78	\$78	\$80	\$77	\$75	\$76	\$68	\$77	\$75	\$83
25	Salt; Sulfur; Earth & Stone; Lime & Cement Plaster	\$1	\$2	\$1	\$1	\$2	\$2	\$2	\$2	\$2	\$2	\$3	\$2	\$2
26	Ores, Slag And Ash	\$4	\$1	\$6	\$4	\$9	\$6	\$9	\$16	\$10	\$44	\$27	\$25	\$25
27	Mineral Fuel, Oil Etc.; Bitumin Subst; Mineral Wax	\$1	\$1	\$2	\$4	\$4	\$4	\$5	\$6	\$10	\$12	\$8	\$10	\$9
28	Inorg Chem; Prec & Rare-earth Met & Radioact Compd	\$19	\$22	\$16	\$22	\$42	\$51	\$42	\$75	\$63	\$88	\$60	\$48	\$51
31	Fertilizers	\$1	\$1	\$1	\$1	\$1	\$4	\$5	\$6	\$5	\$10	\$8	\$16	\$20
32	Tanning & Dye Ext Etc; Dye, Paint, Putty Etc; Inks	\$60	\$44	\$43	\$45	\$66	\$91	\$97	\$109	\$103	\$104	\$91	\$104	\$102
33	Essential Oils Etc; Perfumery, Cosmetic Etc Preps	\$201	\$222	\$238	\$230	\$281	\$312	\$306	\$455	\$552	\$573	\$550	\$529	\$486
34	Soap Etc; Waxes, Polish Etc; Candles; Dental Preps	\$6	\$5	\$6	\$13	\$16	\$17	\$12	\$20	\$27	\$28	\$28	\$35	\$24
35	Albuminoidal Subst; Modified Starch; Glue; Enzymes	\$13	\$9	\$9	\$11	\$12	\$16	\$18	\$20	\$26	\$32	\$31	\$29	\$24
36	Explosives; Pyrotechnics; Matches; Pyro Alloys Etc	\$8	\$11	\$14	\$20	\$19	\$26	\$28	\$50	\$70	\$69	\$64	\$53	\$37
37	Photographic Or Cinematographic Goods	\$50	\$51	\$64	\$52	\$53	\$51	\$38	\$37	\$35	\$34	\$38	\$34	\$23
38	Miscellaneous Chemical Products	\$135	\$168	\$197	\$203	\$241	\$307	\$308	\$381	\$422	\$400	\$485	\$653	\$444
39	Plastics And Articles Thereof	\$164	\$174	\$176	\$211	\$264	\$280	\$287	\$335	\$376	\$394	\$365	\$377	\$385
40	Rubber And Articles Thereof	\$38	\$47	\$44	\$43	\$53	\$60	\$52	\$90	\$93	\$121	\$115	\$130	\$140
41	Raw Hides And Skins (no Furskins) And Leather	\$119	\$135	\$100	\$59	\$71	\$47	\$30	\$34	\$31	\$48	\$42	\$45	\$38
42	Leather Art; Saddlery Etc; Handbags Etc; Gut Art	\$49	\$50	\$52	\$54	\$59	\$67	\$55	\$64	\$79	\$88	\$104	\$112	\$95
43	Furskins And Artificial Fur; Manufactures Thereof	\$10	\$6	\$5	\$5	\$8	\$6	\$3	\$4	\$5	\$6	\$9	\$11	\$12
44	Wood And Articles Of Wood; Wood Charcoal	\$10	\$11	\$13	\$11	\$16	\$20	\$14	\$20	\$17	\$16	\$16	\$15	\$18
45	Cork And Articles Of Cork	\$1	\$0	\$1	\$0	\$0	\$1	\$0	\$0	\$0	\$1	\$0	\$1	\$2
46	Mfr Of Straw, Esparto Etc.; Basketware & Wickenwrk	\$0	\$0	\$0	\$1	\$1	\$0	\$0	\$1	\$0	\$1	\$1	\$1	\$0
47	Wood Pulp Etc; Recovd (waste & Scrap) ppr & pprbd	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$0	\$0	\$0	\$0	\$0
48	Paper & Paperboard & Articles (inc Papr Pulp Art)	\$52	\$51	\$49	\$63	\$54	\$50	\$37	\$42	\$38	\$36	\$44	\$43	\$41
49	Printed Books, Newspapers Etc; Manuscripts Etc	\$120	\$141	\$173	\$114	\$191	\$185	\$131	\$140	\$143	\$137	\$133	\$112	\$106
50	Silk, Including Yarns And Woven Fabric Thereof	\$3	\$3	\$4	\$4	\$3	\$3	\$2	\$2	\$3	\$2	\$1	\$2	\$1
51	Wool & Animal Hair, Including Yarn & Woven Fabric	\$5	\$7	\$6	\$5	\$7	\$6	\$4	\$7	\$8	\$8	\$8	\$12	\$11
52	Cotton, Including Yarn And Woven Fabric Thereof	\$14	\$13	\$10	\$9	\$7	\$5	\$5	\$5	\$6	\$6	\$6	\$5	\$4
53	Veg Text Fib Nesoi; Veg Fib & Paper Yns & Wov Fab	\$1	\$1	\$1	\$1	\$2	\$1	\$1	\$1	\$1	\$0	\$1	\$1	\$1
54	Manmade Filaments, Including Yarns & Woven Fabrics	\$43	\$37	\$38	\$47	\$39	\$30	\$19	\$26	\$28	\$18	\$21	\$23	\$25
55	Manmade Staple Fibers, Incl Yarns & Woven Fabrics	\$17	\$19	\$11	\$7	\$8	\$9	\$6	\$14	\$12	\$11	\$10	\$13	\$10
56	Wadding, Felt Etc; Sp Yarn; Twine, Ropes Etc.	\$13	\$10	\$11	\$12	\$11	\$15	\$10	\$20	\$21	\$21	\$27	\$30	\$30
57	Carpets And Other Textile Floor Coverings	\$12	\$13	\$12	\$12	\$13	\$12	\$10	\$11	\$10	\$12	\$13	\$15	\$15
58	Spec Wov Fabrics; Tufted Fab; Lace; Tapestries Etc	\$29	\$40	\$26	\$27	\$21	\$23	\$14	\$20	\$21	\$20	\$21	\$18	\$20

Continued...

Continued... Census – Total Foreign Trade Value (millions) by Commodity (2003-2015)

2D HS	Harminized System Commodities	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
59	Impregnated Etc Text Fabrics; Tex Art For Industry	\$31	\$53	\$24	\$23	\$30	\$26	\$24	\$35	\$29	\$30	\$38	\$40	\$40
60	Knitted Or Crocheted Fabrics	\$21	\$23	\$12	\$13	\$15	\$15	\$9	\$9	\$8	\$9	\$14	\$15	\$18
62	Apparel Articles And Accessories, Not Knit Etc.	\$510	\$615	\$482	\$343	\$300	\$254	\$179	\$212	\$209	\$200	\$226	\$271	\$293
63	Textile Art Nesoi; Needlecraft Sets; Worn Text Art	\$31	\$27	\$28	\$33	\$32	\$24	\$26	\$37	\$32	\$37	\$37	\$35	\$36
64	Footwear, Gaiters Etc. And Parts Thereof	\$168	\$195	\$148	\$135	\$109	\$84	\$68	\$101	\$106	\$97	\$88	\$118	\$108
65	Headgear And Parts Thereof	\$8	\$9	\$10	\$9	\$11	\$11	\$8	\$9	\$13	\$13	\$14	\$14	\$17
66	Umbrellas, Walking-sticks, Riding-crops Etc, Parts	\$1	\$0	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
67	Prep Feathers, Down Etc; Artif Flowers; H Hair Art	\$1	\$2	\$2	\$3	\$4	\$6	\$4	\$7	\$5	\$8	\$11	\$16	\$13
68	Art Of Stone, Plaster, Cement, Asbestos, Mica Etc.	\$10	\$13	\$15	\$17	\$21	\$27	\$20	\$29	\$29	\$31	\$34	\$33	\$32
69	Ceramic Products	\$18	\$24	\$18	\$20	\$23	\$21	\$16	\$15	\$25	\$30	\$24	\$24	\$23
70	Glass And Glassware	\$27	\$35	\$33	\$34	\$43	\$45	\$43	\$45	\$52	\$49	\$45	\$56	\$52
72	Iron And Steel	\$8	\$8	\$11	\$12	\$11	\$19	\$16	\$18	\$22	\$23	\$20	\$22	\$20
73	Articles Of Iron Or Steel	\$60	\$74	\$88	\$106	\$122	\$149	\$160	\$193	\$219	\$246	\$263	\$272	\$265
74	Copper And Articles Thereof	\$10	\$13	\$13	\$17	\$20	\$31	\$19	\$25	\$21	\$22	\$18	\$17	\$15
75	Nickel And Articles Thereof	\$3	\$6	\$12	\$8	\$14	\$20	\$22	\$20	\$24	\$25	\$24	\$28	\$28
76	Aluminum And Articles Thereof	\$19	\$21	\$25	\$26	\$35	\$35	\$31	\$48	\$57	\$67	\$70	\$79	\$82
78	Lead And Articles Thereof	\$1	\$2	\$2	\$2	\$0	\$1	\$0	\$1	\$1	\$1	\$1	\$2	\$3
79	Zinc And Articles Thereof	\$0	\$0	\$0	\$0	\$0	\$1	\$1	\$1	\$1	\$1	\$1	\$1	\$1
80	Tin And Articles Thereof	\$0	\$0	\$0	\$3	\$1	\$0	\$0	\$1	\$1	\$1	\$0	\$3	\$2
81	Base Metals Nesoi; Cermets; Articles Thereof	\$10	\$19	\$27	\$33	\$41	\$54	\$30	\$34	\$61	\$58	\$69	\$77	\$67
82	Tools, Cutlery Etc. Of Base Metal & Parts Thereof	\$78	\$94	\$125	\$131	\$148	\$168	\$124	\$196	\$214	\$235	\$220	\$226	\$191
83	Miscellaneous Articles Of Base Metal	\$44	\$44	\$33	\$42	\$49	\$50	\$41	\$49	\$60	\$72	\$81	\$84	\$85
86	Railway Or Tramway Stock Etc; Traffic Signal Equip	\$10	\$8	\$9	\$23	\$22	\$35	\$29	\$37	\$42	\$43	\$28	\$19	\$20
87	Vehicles, Except Railway Or Tramway, And Parts Etc	\$140	\$206	\$283	\$272	\$313	\$287	\$224	\$325	\$405	\$357	\$372	\$449	\$426
89	Ships, Boats And Floating Structures	\$5	\$6	\$7	\$6	\$7	\$9	\$10	\$28	\$15	\$14	\$15	\$17	\$20
91	Clocks And Watches And Parts Thereof	\$166	\$202	\$215	\$239	\$284	\$330	\$247	\$331	\$461	\$515	\$561	\$661	\$746
92	Musical Instruments; Parts And Accessories Thereof	\$10	\$10	\$11	\$22	\$16	\$16	\$15	\$17	\$19	\$16	\$14	\$17	\$12
93	Arms And Ammunition; Parts And Accessories Thereof	\$50	\$64	\$51	\$58	\$105	\$115	\$159	\$148	\$110	\$160	\$185	\$113	\$162
94	Furniture; Bedding Etc; Lamps Nesoi Etc; Prefab Bd	\$177	\$171	\$127	\$116	\$142	\$116	\$87	\$109	\$148	\$169	\$158	\$192	\$222
95	Toys, Games & Sport Equipment; Parts & Accessories	\$96	\$106	\$131	\$165	\$191	\$257	\$282	\$401	\$447	\$431	\$463	\$414	\$331
96	Miscellaneous Manufactured Articles	\$52	\$66	\$53	\$59	\$66	\$61	\$50	\$64	\$64	\$68	\$68	\$69	\$64
99	Special Import Provisions, Nesoi	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Source: US Census, USA Trade Online

Note, includes all freight thru Florida airports (originating in Florida and other States). Also, several Airport/Geographies shown are listed under seaport custom district labels, per Census convention; nonetheless, all volumes shown herein only reflect air freight. For example, "Port Everglades" is the customs district that includes both the seaport AND the regional airport (probably Ft. Lauderdale/Hollywood, but no readily available information is available to confirm).

Appendix K: FAF DATA

Freight Analysis Framework, v4.1 provides statewide air freight summary data of Florida shipments inclusive of both geography (foreign and domestic) by aggregate commodity (40 types) in both tonnage and value terms. Each shipment is accounted for only once (no double-counting of transshipments). As such, FAF provides most comprehensive and detailed source for estimating the economic impacts associated with air freight commodity shipments. The following tables support the report discussion and charts.

Two sets of tables are presented.

- *Tonnage* – The first set presents four tonnage tables; exports (**Exhibit K-1**) broken-out between tonnage from Florida and other states; imports (**Exhibit K-2**) with both Florida and other state origin; domestic tonnage (**Exhibit K-3**) by direction (inbound, outbound, and intra-state); and total Florida (**Exhibit K-4**).
- *Value* – The second set of four tables presents the corresponding values: exports (**Exhibit K-5**), imports (**Exhibit K-6**), and domestic (**Exhibit K-7**); and total Florida (**Exhibit K-8**).

Exhibit K-1: FAF – Export Tonnage (2014)
(Short Tons)

SCTG	Commodity	fr. Florida	fr. Other USA	Exports Total
1	Live animals/fish	1,428	902	2,329
2	Cereal grains	25	677	702
3	Other ag prods.	7,585	2,273	9,858
4	Animal feed	3,230	6,593	9,823
5	Meat/seafood	3,189	169	3,358
6	Milled grain prods.	506	792	1,298
7	Other foodstuffs	3,562	4,894	8,456
8	Alcoholic beverages	560	136	696
9	Tobacco prods.	249	53	302
10	Building stone	144	1	145
11	Natural sands	296	49	345
12	Gravel	0	5	5
13	Nonmetallic minerals	407	322	729
14	Metallic ores	76	1	77
15	Coal	0	0	0
16	Crude petroleum	2	1	3
17	Gasoline	24	20	44
18	Fuel oils	286	93	379
19	Coal-n.e.c.	208	18	226
20	Basic chemicals	3,634	7,538	11,172
21	Pharmaceuticals	2,238	12,299	14,537
22	Fertilizers	369	401	769
23	Chemical prods.	12,770	23,186	35,957
24	Plastics/rubber	5,782	13,985	19,766
25	Logs	21	3	24
26	Wood prods.	1,152	938	2,089
27	Newsprint/paper	1,425	1,572	2,997
28	Paper articles	1,018	860	1,878
29	Printed prods.	1,923	3,274	5,196
30	Textiles/leather	4,827	13,649	18,476
31	Nonmetal min. prods.	2,321	3,185	5,506
32	Base metals	2,022	4,721	6,744
33	Articles-base metal	8,339	17,668	26,007
34	Machinery	23,063	51,047	74,110
35	Electronics	54,477	53,901	108,378
36	Motorized vehicles	4,358	8,341	12,699
37	Transport equip.	4,595	2,766	7,360
38	Precision instruments	8,261	20,685	28,946
39	Furniture	1,598	1,647	3,245
40	Misc. mfg. prods.	7,957	4,546	12,502
41	Waste/scrap	283	678	961
43	Mixed freight	156	110	266
99	Unknown	0	0	0
	Total	174,363	263,997	438,360

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-2: FAF – Import Tonnage (2014)
(Short Tons)

SCTG	Commodity	to Florida	to Other USA	Imports Total
1	Live animals/fish	1,289	413	1,702
2	Cereal grains	0	7,392	7,392
3	Other ag prods.	340,900	40,647	381,546
4	Animal feed	884	520	1,405
5	Meat/seafood	132,099	22,029	154,128
6	Milled grain prods.	658	1	659
7	Other foodstuffs	3,175	438	3,613
8	Alcoholic beverages	751	7	758
9	Tobacco prods.	2,525	177	2,702
10	Building stone	73	0	73
11	Natural sands	0	0	0
12	Gravel	0	0	0
13	Nonmetallic minerals	36	3	40
14	Metallic ores	1	0	1
15	Coal	0	0	0
16	Crude petroleum	2	0	2
17	Gasoline	0	0	0
18	Fuel oils	1	0	1
19	Coal-n.e.c.	4	30	34
20	Basic chemicals	1,094	595	1,688
21	Pharmaceuticals	885	925	1,809
22	Fertilizers	2	0	2
23	Chemical prods.	5,234	608	5,842
24	Plastics/rubber	3,699	1,140	4,838
25	Logs	0	0	0
26	Wood prods.	833	193	1,026
27	Newsprint/paper	59	7	66
28	Paper articles	352	126	478
29	Printed prods.	1,036	486	1,522
30	Textiles/leather	15,277	8,763	24,040
31	Nonmetal min. prods.	1,419	708	2,127
32	Base metals	339	398	737
33	Articles-base metal	2,443	797	3,240
34	Machinery	8,348	3,884	12,232
35	Electronics	21,404	7,426	28,830
36	Motorized vehicles	1,357	1,361	2,718
37	Transport equip.	1,144	288	1,431
38	Precision instruments	4,343	1,919	6,262
39	Furniture	3,844	860	4,704
40	Misc. mfg. prods.	3,851	715	4,566
41	Waste/scrap	96	106	202
43	Mixed freight	546	643	1,189
99	Unknown	0	0	0
	Total	560,001	103,603	663,604

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-3: FAF – Domestic Tonnage (2014)
(Short Tons)

SCTG	Commodity	Intra	Inbound	Outbound	Total
1	Live animals/fish	0	897	1	897
2	Cereal grains	0	0	0	0
3	Other ag prods.	0	397	768	1,165
4	Animal feed	0	0	105	105
5	Meat/seafood	0	1,112	0	1,112
6	Milled grain prods.	0	0	0	0
7	Other foodstuffs	0	401	0	401
8	Alcoholic beverages	0	0	0	0
9	Tobacco prods.	0	0	0	0
10	Building stone	0	0	0	0
11	Natural sands	0	0	0	0
12	Gravel	0	0	0	0
13	Nonmetallic minerals	0	0	0	0
14	Metallic ores	0	0	0	0
15	Coal	0	0	0	0
16	Crude petroleum	0	0	0	0
17	Gasoline	0	0	48	48
18	Fuel oils	0	0	0	0
19	Coal-n.e.c.	0	0	0	0
20	Basic chemicals	0	844	275	1,119
21	Pharmaceuticals	0	4,362	500	4,862
22	Fertilizers	0	0	2,741	2,741
23	Chemical prods.	0	923	276	1,199
24	Plastics/rubber	76	1,375	4,152	5,603
25	Logs	0	0	0	0
26	Wood prods.	0	0	0	0
27	Newsprint/paper	0	0	122	122
28	Paper articles	0	153	0	153
29	Printed prods.	0	3,735	292	4,027
30	Textiles/leather	252	2,554	829	3,635
31	Nonmetal min. prods.	0	286	0	286
32	Base metals	87	759	488	1,334
33	Articles-base metal	0	1,528	3,631	5,159
34	Machinery	991	4,579	4,109	9,679
35	Electronics	322	9,039	8,822	18,183
36	Motorized vehicles	0	18,363	7,781	26,143
37	Transport equip.	750	4,496	18,499	23,745
38	Precision instruments	330	7,553	7,052	14,935
39	Furniture	0	247	242	489
40	Misc. mfg. prods.	48	4,319	2,281	6,648
41	Waste/scrap	0	0	144	144
43	Mixed freight	0	1,369	0	1,370
99	Unknown	0	0	0	0
	Total	2,856	69,291	63,159	135,305

Source: CDM Smith and FHWA FAF v4.1

**Exhibit K-4: FAF – Total Florida-Economic Relevant Tonnage (2014)
(Short Tons)**

SCTG	Commodity	Exports	Imports	Domestic	Total
1	Live animals/fish	1,428	1,289	897	3,614
2	Cereal grains	25	0	0	25
3	Other ag prods.	7,585	340,900	1,165	349,649
4	Animal feed	3,230	884	105	4,220
5	Meat/seafood	3,189	132,099	1,112	136,400
6	Milled grain prods.	506	658	0	1,164
7	Other foodstuffs	3,562	3,175	401	7,139
8	Alcoholic beverages	560	751	0	1,311
9	Tobacco prods.	249	2,525	0	2,773
10	Building stone	144	73	0	217
11	Natural sands	296	0	0	296
12	Gravel	0	0	0	0
13	Nonmetallic minerals	407	36	0	443
14	Metallic ores	76	1	0	77
15	Coal	0	0	0	0
16	Crude petroleum	2	2	0	4
17	Gasoline	24	0	48	72
18	Fuel oils	286	1	0	287
19	Coal-n.e.c.	208	4	0	212
20	Basic chemicals	3,634	1,094	1,119	5,847
21	Pharmaceuticals	2,238	885	4,862	7,984
22	Fertilizers	369	2	2,741	3,112
23	Chemical prods.	12,770	5,234	1,199	19,203
24	Plastics/rubber	5,782	3,699	5,603	15,083
25	Logs	21	0	0	21
26	Wood prods.	1,152	833	0	1,985
27	Newsprint/paper	1,425	59	122	1,606
28	Paper articles	1,018	352	153	1,524
29	Printed prods.	1,923	1,036	4,027	6,986
30	Textiles/leather	4,827	15,277	3,635	23,740
31	Nonmetal min. prods.	2,321	1,419	286	4,026
32	Base metals	2,022	339	1,334	3,695
33	Articles-base metal	8,339	2,443	5,159	15,942
34	Machinery	23,063	8,348	9,679	41,089
35	Electronics	54,477	21,404	18,183	94,064
36	Motorized vehicles	4,358	1,357	26,143	31,858
37	Transport equip.	4,595	1,144	23,745	29,483
38	Precision instruments	8,261	4,343	14,935	27,539
39	Furniture	1,598	3,844	489	5,931
40	Misc. mfg. prods.	7,957	3,851	6,648	18,455
41	Waste/scrap	283	96	144	523
43	Mixed freight	156	546	1,370	2,072
99	Unknown	0	0	0	0
	Total	174,363	560,001	135,305	869,669

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-5: FAF – Export Value (2014)
(Short Tons)

SCTG	Commodity	fr. Florida	fr. Other USA	Exports Total
1	Live animals/fish	\$22,912,500	\$39,939,300	\$62,851,800
2	Cereal grains	\$427,300	\$4,795,500	\$5,222,800
3	Other ag prods.	\$44,085,100	\$120,603,800	\$164,688,900
4	Animal feed	\$15,619,600	\$111,486,000	\$127,105,600
5	Meat/seafood	\$38,983,200	\$800,800	\$39,784,000
6	Milled grain prods.	\$1,429,200	\$3,393,100	\$4,822,300
7	Other foodstuffs	\$23,716,500	\$65,682,000	\$89,398,500
8	Alcoholic beverages	\$215,018,300	\$922,900	\$215,941,200
9	Tobacco prods.	\$4,141,100	\$1,437,800	\$5,578,900
10	Building stone	\$56,200	\$5,300	\$61,500
11	Natural sands	\$702,200	\$65,700	\$767,900
12	Gravel	\$0	\$29,200	\$29,200
13	Nonmetallic minerals	\$750,600	\$1,749,300	\$2,499,900
14	Metallic ores	\$52,860,300	\$1,476,400	\$54,336,700
15	Coal	\$0	\$0	\$0
16	Crude petroleum	\$1,300	\$500	\$1,800
17	Gasoline	\$26,100	\$12,400	\$38,500
18	Fuel oils	\$1,640,400	\$555,000	\$2,195,400
19	Coal-n.e.c.	\$1,114,300	\$57,000	\$1,171,300
20	Basic chemicals	\$81,343,700	\$897,811,000	\$979,154,700
21	Pharmaceuticals	\$602,322,800	\$5,142,922,500	\$5,745,245,300
22	Fertilizers	\$742,000	\$6,910,400	\$7,652,400
23	Chemical prods.	\$460,840,900	\$647,251,300	\$1,108,092,200
24	Plastics/rubber	\$195,329,400	\$264,984,900	\$460,314,300
25	Logs	\$580,400	\$1,720,300	\$2,300,700
26	Wood prods.	\$11,396,400	\$6,660,300	\$18,056,700
27	Newsprint/paper	\$3,204,800	\$3,972,200	\$7,177,000
28	Paper articles	\$6,731,800	\$5,998,700	\$12,730,500
29	Printed prods.	\$40,865,500	\$80,327,600	\$121,193,100
30	Textiles/leather	\$111,886,500	\$287,735,000	\$399,621,500
31	Nonmetal min. prods.	\$66,982,600	\$68,757,700	\$135,740,300
32	Base metals	\$15,674,100	\$81,669,300	\$97,343,400
33	Articles-base metal	\$158,457,600	\$363,577,600	\$522,035,200
34	Machinery	\$2,210,117,100	\$4,190,021,900	\$6,400,139,000
35	Electronics	\$8,329,959,400	\$6,796,153,200	\$15,126,112,600
36	Motorized vehicles	\$105,842,500	\$191,205,000	\$297,047,500
37	Transport equip.	\$1,729,692,300	\$1,493,782,900	\$3,223,475,200
38	Precision instruments	\$1,752,714,800	\$4,095,892,400	\$5,848,607,200
39	Furniture	\$88,574,900	\$57,980,000	\$146,554,900
40	Misc. mfg. prods.	\$11,911,845,400	\$818,409,600	\$12,730,255,000
41	Waste/scrap	\$51,790,300	\$20,974,100	\$72,764,400
43	Mixed freight	\$292,068,700	\$725,368,900	\$1,017,437,600
99	Unknown	\$0	\$0	\$0
	Total	\$28,652,448,100	\$26,603,098,800	\$55,255,546,900

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-6: FAF – Import Value (2014)
(Short Tons)

SCTG	Commodity	to Florida	to Other USA	Imports Total
1	Live animals/fish	\$49,287,300	\$63,992,800	\$113,280,100
2	Cereal grains	\$0	\$32,269,700	\$32,269,700
3	Other ag prods.	\$1,270,354,400	\$204,095,800	\$1,474,450,200
4	Animal feed	\$27,331,200	\$14,311,200	\$41,642,400
5	Meat/seafood	\$861,317,000	\$119,349,100	\$980,666,100
6	Milled grain prods.	\$2,825,600	\$47,800	\$2,873,400
7	Other foodstuffs	\$24,935,800	\$7,290,900	\$32,226,700
8	Alcoholic beverages	\$2,580,900	\$104,600	\$2,685,500
9	Tobacco prods.	\$56,662,200	\$5,607,800	\$62,270,000
10	Building stone	\$365,500	\$0	\$365,500
11	Natural sands	\$0	\$0	\$0
12	Gravel	\$0	\$0	\$0
13	Nonmetallic minerals	\$667,300	\$14,700	\$682,000
14	Metallic ores	\$7,300	\$2,100	\$9,400
15	Coal	\$0	\$0	\$0
16	Crude petroleum	\$4,500	\$600	\$5,100
17	Gasoline	\$100	\$0	\$100
18	Fuel oils	\$57,100	\$0	\$57,100
19	Coal-n.e.c.	\$56,300	\$631,600	\$687,900
20	Basic chemicals	\$933,608,100	\$39,087,699,600	\$40,021,307,700
21	Pharmaceuticals	\$84,392,500	\$412,142,800	\$496,535,300
22	Fertilizers	\$13,300	\$0	\$13,300
23	Chemical prods.	\$237,612,300	\$17,689,100	\$255,301,400
24	Plastics/rubber	\$79,718,800	\$23,407,200	\$103,126,000
25	Logs	\$0	\$0	\$0
26	Wood prods.	\$7,264,400	\$2,200,200	\$9,464,600
27	Newsprint/paper	\$639,600	\$134,900	\$774,500
28	Paper articles	\$3,795,100	\$1,344,700	\$5,139,800
29	Printed prods.	\$23,340,500	\$12,396,000	\$35,736,500
30	Textiles/leather	\$442,506,000	\$284,899,100	\$727,405,100
31	Nonmetal min. prods.	\$12,269,600	\$16,671,900	\$28,941,500
32	Base metals	\$12,389,400	\$4,149,300	\$16,538,700
33	Articles-base metal	\$65,266,500	\$39,031,100	\$104,297,600
34	Machinery	\$901,179,200	\$797,719,900	\$1,698,899,100
35	Electronics	\$4,860,308,200	\$5,721,862,000	\$10,582,170,200
36	Motorized vehicles	\$39,219,500	\$37,804,100	\$77,023,600
37	Transport equip.	\$281,417,700	\$102,511,900	\$383,929,600
38	Precision instruments	\$707,186,500	\$210,447,200	\$917,633,700
39	Furniture	\$117,872,800	\$28,858,400	\$146,731,200
40	Misc. mfg. prods.	\$4,430,156,600	\$1,692,819,800	\$6,122,976,400
41	Waste/scrap	\$542,496,300	\$209,170,700	\$751,667,000
43	Mixed freight	\$49,981,300	\$320,746,800	\$370,728,100
99	Unknown	\$0	\$0	\$0
	Total	\$16,129,086,700	\$49,471,425,400	\$65,600,512,100

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-7: FAF – Domestic Value (2014)
(Short Tons)

SCTG	Commodity	Intra	Inbound	Outbound	Domestic Total
1	Live animals/fish	\$0	\$5,355,900	\$536,700	\$5,892,600
2	Cereal grains	\$0	\$0	\$0	\$0
3	Other ag prods.	\$0	\$19,375,700	\$7,283,000	\$26,658,700
4	Animal feed	\$0	\$0	\$249,700	\$249,700
5	Meat/seafood	\$0	\$35,805,300	\$0	\$35,805,300
6	Milled grain prods.	\$0	\$318,800	\$0	\$318,800
7	Other foodstuffs	\$0	\$858,900	\$0	\$858,900
8	Alcoholic beverages	\$0	\$0	\$0	\$0
9	Tobacco prods.	\$0	\$0	\$0	\$0
10	Building stone	\$0	\$0	\$0	\$0
11	Natural sands	\$0	\$0	\$0	\$0
12	Gravel	\$0	\$0	\$0	\$0
13	Nonmetallic minerals	\$0	\$0	\$0	\$0
14	Metallic ores	\$0	\$0	\$0	\$0
15	Coal	\$0	\$0	\$0	\$0
16	Crude petroleum	\$0	\$0	\$0	\$0
17	Gasoline	\$0	\$0	\$287,600	\$287,600
18	Fuel oils	\$0	\$0	\$0	\$0
19	Coal-n.e.c.	\$0	\$0	\$55,300	\$55,300
20	Basic chemicals	\$0	\$29,064,300	\$466,800	\$29,531,100
21	Pharmaceuticals	\$0	\$668,134,100	\$201,995,300	\$870,129,400
22	Fertilizers	\$0	\$0	\$1,957,200	\$1,957,200
23	Chemical prods.	\$218,900	\$35,985,500	\$1,325,800	\$37,530,200
24	Plastics/rubber	\$7,194,600	\$24,256,200	\$112,198,100	\$143,648,900
25	Logs	\$0	\$0	\$0	\$0
26	Wood prods.	\$0	\$0	\$10,300	\$10,300
27	Newsprint/paper	\$0	\$120,600	\$235,600	\$356,200
28	Paper articles	\$0	\$332,800	\$185,100	\$517,900
29	Printed prods.	\$0	\$71,123,900	\$4,830,200	\$75,954,100
30	Textiles/leather	\$15,128,400	\$134,641,900	\$48,531,700	\$198,302,000
31	Nonmetal min. prods.	\$0	\$14,307,300	\$259,900	\$14,567,200
32	Base metals	\$302,500	\$3,536,100	\$4,562,400	\$8,401,000
33	Articles-base metal	\$0	\$21,062,800	\$62,422,400	\$83,485,200
34	Machinery	\$15,258,500	\$416,150,900	\$219,431,100	\$650,840,500
35	Electronics	\$30,487,700	\$1,496,738,600	\$844,436,000	\$2,371,662,300
36	Motorized vehicles	\$0	\$586,232,900	\$474,712,800	\$1,060,945,700
37	Transport equip.	\$25,195,400	\$1,085,423,800	\$1,224,258,300	\$2,334,877,500
38	Precision instruments	\$43,423,100	\$1,679,809,100	\$1,383,355,100	\$3,106,587,300
39	Furniture	\$0	\$5,269,300	\$10,007,000	\$15,276,300
40	Misc. mfg. prods.	\$1,756,500	\$307,225,100	\$148,535,500	\$457,517,100
41	Waste/scrap	\$0	\$0	\$113,250,500	\$113,250,500
43	Mixed freight	\$377,800	\$38,390,800	\$665,200	\$39,433,800
99	Unknown	\$0	\$0	\$0	\$0
	Total	\$139,343,400	\$6,679,520,600	\$4,866,044,600	\$11,684,908,600

Source: CDM Smith and FHWA FAF v4.1

Exhibit K-8: FAF – Total Florida-Economic Relevant Value (2014)
(Short Tons)

SCTG	Commodity	Exports	Imports	Domestic	Total
1	Live animals/fish	\$22,912,500	\$49,287,300	\$5,892,600	\$78,092,400
2	Cereal grains	\$427,300	\$0	\$0	\$427,300
3	Other ag prods.	\$44,085,100	\$1,270,354,400	\$26,658,700	\$1,341,098,200
4	Animal feed	\$15,619,600	\$27,331,200	\$249,700	\$43,200,500
5	Meat/seafood	\$38,983,200	\$861,317,000	\$35,805,300	\$936,105,500
6	Milled grain prods.	\$1,429,200	\$2,825,600	\$318,800	\$4,573,600
7	Other foodstuffs	\$23,716,500	\$24,935,800	\$858,900	\$49,511,200
8	Alcoholic beverages	\$215,018,300	\$2,580,900	\$0	\$217,599,200
9	Tobacco prods.	\$4,141,100	\$56,662,200	\$0	\$60,803,300
10	Building stone	\$56,200	\$365,500	\$0	\$421,700
11	Natural sands	\$702,200	\$0	\$0	\$702,200
12	Gravel	\$0	\$0	\$0	\$0
13	Nonmetallic minerals	\$750,600	\$667,300	\$0	\$1,417,900
14	Metallic ores	\$52,860,300	\$7,300	\$0	\$52,867,600
15	Coal	\$0	\$0	\$0	\$0
16	Crude petroleum	\$1,300	\$4,500	\$0	\$5,800
17	Gasoline	\$26,100	\$100	\$287,600	\$313,800
18	Fuel oils	\$1,640,400	\$57,100	\$0	\$1,697,500
19	Coal-n.e.c.	\$1,114,300	\$56,300	\$55,300	\$1,225,900
20	Basic chemicals	\$81,343,700	\$933,608,100	\$29,531,100	\$1,044,482,900
21	Pharmaceuticals	\$602,322,800	\$84,392,500	\$870,129,400	\$1,556,844,700
22	Fertilizers	\$742,000	\$13,300	\$1,957,200	\$2,712,500
23	Chemical prods.	\$460,840,900	\$237,612,300	\$37,530,200	\$735,983,400
24	Plastics/rubber	\$195,329,400	\$79,718,800	\$143,648,900	\$418,697,100
25	Logs	\$580,400	\$0	\$0	\$580,400
26	Wood prods.	\$11,396,400	\$7,264,400	\$10,300	\$18,671,100
27	Newsprint/paper	\$3,204,800	\$639,600	\$356,200	\$4,200,600
28	Paper articles	\$6,731,800	\$3,795,100	\$517,900	\$11,044,800
29	Printed prods.	\$40,865,500	\$23,340,500	\$75,954,100	\$140,160,100
30	Textiles/leather	\$111,886,500	\$442,506,000	\$198,302,000	\$752,694,500
31	Nonmetal min. prods.	\$66,982,600	\$12,269,600	\$14,567,200	\$93,819,400
32	Base metals	\$15,674,100	\$12,389,400	\$8,401,000	\$36,464,500
33	Articles-base metal	\$158,457,600	\$65,266,500	\$83,485,200	\$307,209,300
34	Machinery	\$2,210,117,100	\$901,179,200	\$650,840,500	\$3,762,136,800
35	Electronics	\$8,329,959,400	\$4,860,308,200	\$2,371,662,300	\$15,561,929,900
36	Motorized vehicles	\$105,842,500	\$39,219,500	\$1,060,945,700	\$1,206,007,700
37	Transport equip.	\$1,729,692,300	\$281,417,700	\$2,334,877,500	\$4,345,987,500
38	Precision instruments	\$1,752,714,800	\$707,186,500	\$3,106,587,300	\$5,566,488,600
39	Furniture	\$88,574,900	\$117,872,800	\$15,276,300	\$221,724,000
40	Misc. mfg. prods.	\$11,911,845,400	\$4,430,156,600	\$457,517,100	\$16,799,519,100
41	Waste/scrap	\$51,790,300	\$542,496,300	\$113,250,500	\$707,537,100
43	Mixed freight	\$292,068,700	\$49,981,300	\$39,433,800	\$381,483,800
99	Unknown	\$0	\$0	\$0	\$0
	Total	\$28,652,448,100	\$16,129,086,700	\$11,684,908,600	\$56,466,443,400

Source: CDM Smith and FHWA FAF v4.1

Appendix L: TRANSEARCH DATA

TRANSEARCH also provides statewide air freight summary data of Florida inclusive of both geography (partial foreign and over-stated domestic) by commodity in both tonnage and value terms. Further, the air freight commodity data closely aligns with the IMPLAN economic model used to estimate the associated Florida impacts. However, several limitations inhibit use for airport impact estimation purposes including:

- *International Data* – Air freight includes NAFTA (Canada and Mexico), but excludes other regions/countries (i.e., Asia, Europe, South America, etc.).
- *Domestic Data* – Misclassifies connecting international shipments. For example, air freight imports through MIA bound for Chicago are tabulated as domestic, originating in Florida. Doing so, would result in an over-estimation of the Florida impact associated producing such freight.
- *Cost/Temporal* – Costly data precludes easy update to previously acquired year 2011 data.

Nonetheless, the following figures summarize TRANSEARCH air freight data detailed in the ensuing tables. **Exhibit L-1** summarizes the 238,965 tons and \$42.2 billion by direction, while **Exhibit L-2** and **Exhibit L-3** breakout tonnage and value shipments by leading commodity types. Associated volumes and values by commodity type are tabulated for outbound (**Exhibit L-4**), inbound (**Exhibit L-5**), intrastate (**Exhibit L-6**, and total (**Exhibit L-7**).

Exhibit L-1: Transearch – Tons by Direction and Commodity (2011)

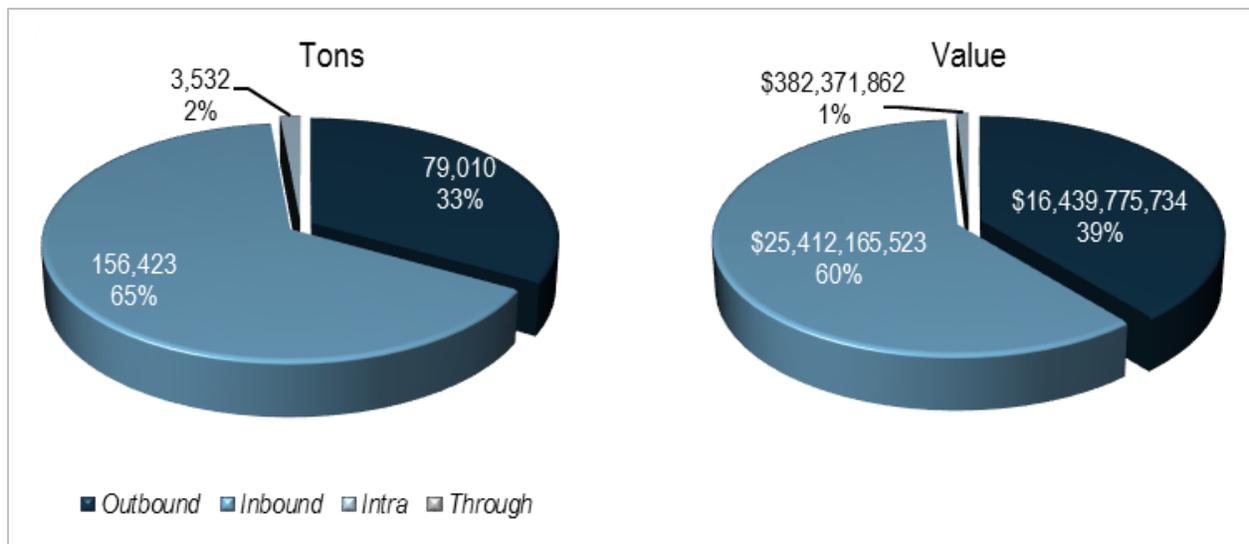


Exhibit L-2: TRANSEARCH – Tons by Direction and Commodity (2011)

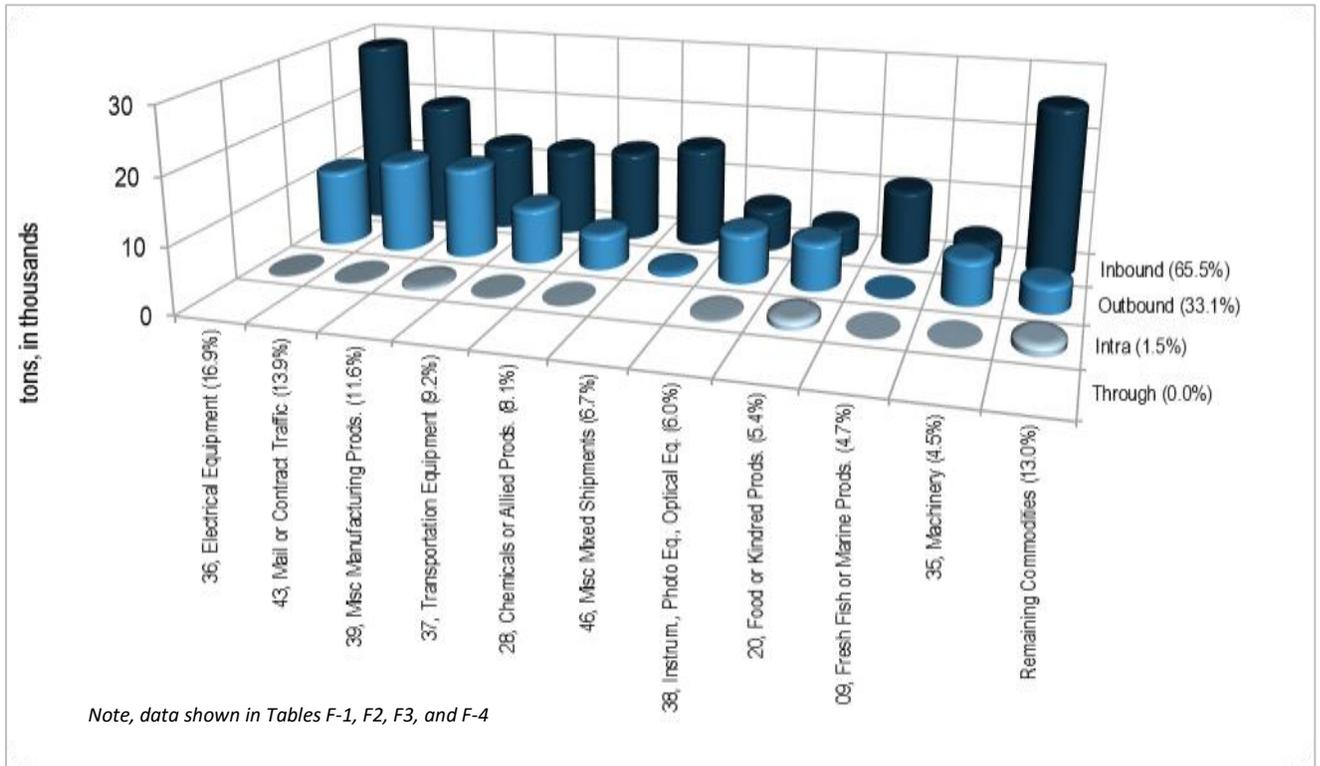


Exhibit L-3: TRANSEARCH – Value by Direction and Commodity (2011)

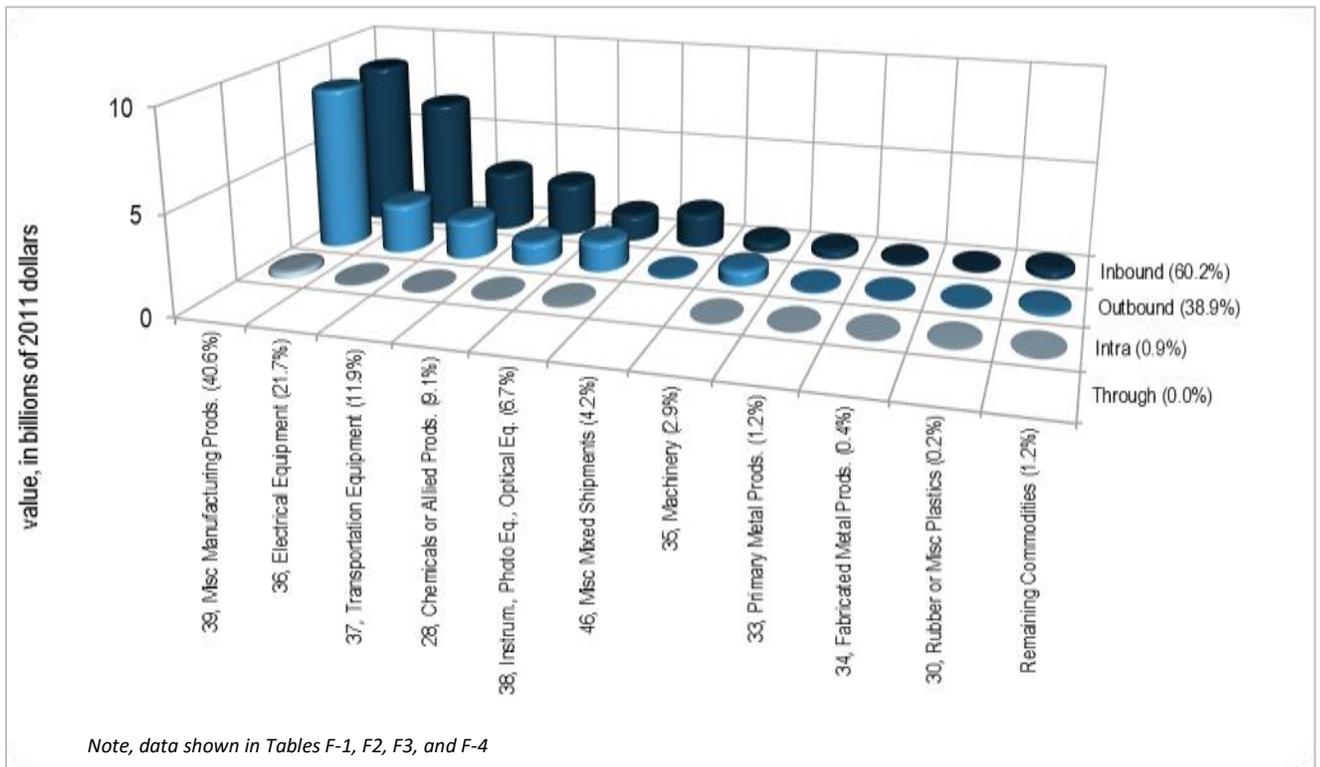


Exhibit L-4: TRANSEARCH – Outbound Tonnage and Value (2011)
(Short Tons)

STCC2	Commodity	Tons		Value		Average Value/Ton
		Amount	Percent	Amount	Percent	
01	Farm Prods.	584	0.7%	3,434,653	0.0%	\$5,886
08	Forest Prods.	3	0.0%	88,665	0.0%	\$29,935
09	Fresh Fish or Marine Prods.	36	0.0%	392,153	0.0%	\$10,748
10	Metallic Ores	0	0.0%	0	0.0%	\$0
11	Coal	0	0.0%	0	0.0%	\$0
13	Crude Petrol. or Natural Gas	0	0.0%	0	0.0%	\$0
14	Nonmetallic Minerals	14	0.0%	26,277	0.0%	\$1,930
19	Ordnance or Accessories	12	0.0%	884,343	0.0%	\$72,986
20	Food or Kindred Prods.	7,079	9.0%	41,631,430	0.3%	\$5,881
21	Tobacco Prods.	8	0.0%	208,640	0.0%	\$26,174
22	Textile Mill Prods.	77	0.1%	1,391,027	0.0%	\$18,175
23	Apparel or Related Prods.	175	0.2%	7,130,624	0.0%	\$40,631
24	Lumber or Wood Prods.	30	0.0%	322,683	0.0%	\$10,652
25	Furniture or Fixtures	114	0.1%	10,497,401	0.1%	\$91,868
26	Pulp, Paper or Allied Prods.	409	0.5%	3,639,560	0.0%	\$8,904
27	Printed Matter	386	0.5%	6,737,676	0.0%	\$17,447
28	Chemicals or Allied Prods.	5,348	6.8%	1,121,833,321	6.8%	\$209,776
29	Petroleum or Coal Prods.	28	0.0%	31,207	0.0%	\$1,109
30	Rubber or Misc. Plastics	728	0.9%	21,961,135	0.1%	\$30,176
31	Leather or Leather Prods.	17	0.0%	1,518,063	0.0%	\$89,637
32	Clay, Concrete, Glass, or Stone	40	0.1%	778,953	0.0%	\$19,622
33	Primary Metal Prods.	669	0.8%	67,693,167	0.4%	\$101,202
34	Fabricated Metal Prods.	731	0.9%	20,726,501	0.1%	\$28,335
35	Machinery	6,605	8.4%	720,570,027	4.4%	\$109,099
36	Electrical Equipment	11,701	14.8%	2,504,285,905	15.2%	\$214,023
37	Transportation Equipment	8,412	10.6%	1,925,562,884	11.7%	\$228,897
38	Instrum., Photo Eq., Optical Eq.	7,480	9.5%	1,476,208,593	9.0%	\$197,354
39	Misc. Manufacturing Prods.	13,791	17.5%	8,404,606,284	51.1%	\$609,435
40	Waste or Scrap Materials	0	0.0%	0	0.0%	\$0
41	Misc. Freight Shipments	1	0.0%	59,562	0.0%	\$42,354
42	Shipping Containers	0	0.0%	0	0.0%	\$0
43	Mail or Contract Traffic	13,930	17.6%	36,421,191	0.2%	\$2,615
44	Freight Forwarder Traffic	0	0.0%	0	0.0%	\$0
45	Shipper Association Traffic	0	0.0%	0	0.0%	\$0
46	Misc. Mixed Shipments	602	0.8%	61,133,810	0.4%	\$101,575
47	Small Packaged Shipments	0	0.0%	0	0.0%	\$0
48	Waste	0	0.0%	0	0.0%	\$0
49	Hazardous Materials	0	0.0%	0	0.0%	\$0
50	Secondary Traffic	0	0.0%	0	0.0%	\$0
60	Unclassified	0	0.0%	0	0.0%	\$0
	Total	79,010	100.0%	\$16,439,775,734	100.0%	\$208,072

Source: TRANSEARCH data for 2011

Exhibit L-5: TRANSEARCH – Inbound Tonnage and Value (2011)
(Short Tons)

STCC2	Commodity	Tons		Value		Average Value/Ton
		Amount	Percent	Amount	Percent	
01	Farm Prods.	1,158	0.7%	8,063,667	0.0%	6,965
08	Forest Prods.	0	0.0%	0	0.0%	0
09	Fresh Fish or Marine Prods.	11,251	7.2%	79,645,264	0.3%	7,079
10	Metallic Ores	0	0.0%	0	0.0%	0
11	Coal	0	0.0%	0	0.0%	0
13	Crude Petrol. or Natural Gas	0	0.0%	0	0.0%	0
14	Nonmetallic Minerals	3,247	2.1%	5,737,019	0.0%	1,767
19	Ordnance or Accessories	0	0.0%	0	0.0%	0
20	Food or Kindred Prods.	4,684	3.0%	32,855,348	0.1%	7,014
21	Tobacco Prods.	7	0.0%	79,545	0.0%	11,550
22	Textile Mill Prods.	3,608	2.3%	63,145,483	0.2%	17,503
23	Apparel or Related Prods.	300	0.2%	7,285,948	0.0%	24,292
24	Lumber or Wood Prods.	4,898	3.1%	22,436,084	0.1%	4,581
25	Furniture or Fixtures	381	0.2%	34,606,546	0.1%	90,812
26	Pulp, Paper or Allied Prods.	22	0.0%	199,953	0.0%	9,087
27	Printed Matter	3,871	2.5%	83,591,866	0.3%	21,596
28	Chemicals or Allied Prods.	13,892	8.9%	2,706,705,438	10.7%	194,846
29	Petroleum or Coal Prods.	0	0.0%	0	0.0%	0
30	Rubber or Misc. Plastics	1,579	1.0%	47,355,607	0.2%	29,985
31	Leather or Leather Prods.	5	0.0%	102,023	0.0%	20,628
32	Clay, Concrete, Glass, or Stone	16	0.0%	1,440,328	0.0%	91,825
33	Primary Metal Prods.	2,127	1.4%	422,331,890	1.7%	198,555
34	Fabricated Metal Prods.	4,443	2.8%	125,011,484	0.5%	28,138
35	Machinery	4,231	2.7%	491,084,913	1.9%	116,069
36	Electrical Equipment	28,602	18.3%	6,633,577,302	26.1%	231,928
37	Transportation Equipment	13,472	8.6%	3,075,191,579	12.1%	228,264
38	Instrum., Photo Eq., Optical Eq.	6,555	4.2%	1,328,483,240	5.2%	202,675
39	Misc. Manufacturing Prods.	13,441	8.6%	8,482,859,023	33.4%	631,102
40	Waste or Scrap Materials	6	0.0%	11,501,142	0.0%	1,937,686
41	Misc. Freight Shipments	2	0.0%	261,453	0.0%	146,495
42	Shipping Containers	0	0.0%	0	0.0%	0
43	Mail or Contract Traffic	19,285	12.3%	50,422,316	0.2%	2,615
44	Freight Forwarder Traffic	0	0.0%	0	0.0%	0
45	Shipper Association Traffic	0	0.0%	0	0.0%	0
46	Misc. Mixed Shipments	15,342	9.8%	1,698,191,063	6.7%	110,686
47	Small Packaged Shipments	0	0.0%	0	0.0%	0
48	Waste	0	0.0%	0	0.0%	0
49	Hazardous Materials	0	0.0%	0	0.0%	0
50	Secondary Traffic	0	0.0%	0	0.0%	0
60	Unclassified	0	0.0%	0	0.0%	0
	Total	156,423	100.0%	\$25,412,165,523	100.0%	\$162,457

Source: prepared by CDM Smith, based on TRANSEARCH data for 2011

Exhibit L-6: TRANSEARCH – Intrastate Tonnage and Value (2011)
(Short Tons)

STCC2	Commodity	Tons		Value		Average Value/Ton
		Amount	Percent	Amount	Percent	
01	Farm Prods.	0	0.0%	0	0.0%	0
08	Forest Prods.	0	0.0%	0	0.0%	0
09	Fresh Fish or Marine Prods.	6	0.2%	53,710	0.0%	8,936
10	Metallic Ores	0	0.0%	0	0.0%	0
11	Coal	0	0.0%	0	0.0%	0
13	Crude Petrol. or Natural Gas	0	0.0%	0	0.0%	0
14	Nonmetallic Minerals	21	0.6%	36,388	0.0%	1,767
19	Ordnance or Accessories	0	0.0%	0	0.0%	0
20	Food or Kindred Prods.	1,228	34.8%	7,119,348	1.9%	5,796
21	Tobacco Prods.	0	0.0%	0	0.0%	0
22	Textile Mill Prods.	2	0.1%	33,014	0.0%	17,506
23	Apparel or Related Prods.	0	0.0%	0	0.0%	0
24	Lumber or Wood Prods.	0	0.0%	0	0.0%	0
25	Furniture or Fixtures	0	0.0%	0	0.0%	0
26	Pulp, Paper or Allied Prods.	0	0.0%	0	0.0%	0
27	Printed Matter	53	1.5%	1,140,691	0.3%	21,613
28	Chemicals or Allied Prods.	2	0.1%	170,639	0.0%	76,041
29	Petroleum or Coal Prods.	0	0.0%	0	0.0%	0
30	Rubber or Misc. Plastics	1,121	31.8%	34,021,260	8.9%	30,337
31	Leather or Leather Prods.	0	0.0%	0	0.0%	0
32	Clay, Concrete, Glass, or Stone	0	0.0%	0	0.0%	0
33	Primary Metal Prods.	2	0.1%	243,937	0.1%	106,585
34	Fabricated Metal Prods.	254	7.2%	7,111,735	1.9%	27,973
35	Machinery	11	0.3%	1,189,497	0.3%	103,775
36	Electrical Equipment	61	1.7%	13,615,801	3.6%	224,524
37	Transportation Equipment	55	1.5%	12,422,062	3.2%	227,462
38	Instrum., Photo Eq., Optical Eq.	199	5.6%	40,615,261	10.6%	203,616
39	Misc. Manufacturing Prods.	432	12.2%	264,379,601	69.1%	612,291
40	Waste or Scrap Materials	0	0.0%	0	0.0%	0
41	Misc. Freight Shipments	0	0.0%	0	0.0%	0
42	Shipping Containers	0	0.0%	0	0.0%	0
43	Mail or Contract Traffic	84	2.4%	218,917	0.1%	2,615
44	Freight Forwarder Traffic	0	0.0%	0	0.0%	0
45	Shipper Association Traffic	0	0.0%	0	0.0%	0
46	Misc. Mixed Shipments	0	0.0%	0	0.0%	0
47	Small Packaged Shipments	0	0.0%	0	0.0%	0
48	Waste	0	0.0%	0	0.0%	0
49	Hazardous Materials	0	0.0%	0	0.0%	0
50	Secondary Traffic	0	0.0%	0	0.0%	0
60	Unclassified	0	0.0%	0	0.0%	0
	Total	3,532	100.0%	\$382,371,862	100.0%	\$108,274

Source: TRANSEARCH data for 2011

**Exhibit L-7: TRANSEARCH – Total Tonnage and Value (2011)
(Short Tons)**

STCC2	Commodity	Tons		Value		Average Value/Ton
		Amount	Percent	Amount	Percent	
01	Farm Prods.	1,741	0.7%	11,498,321	0.0%	6,603
08	Forest Prods.	3	0.0%	88,665	0.0%	29,935
09	Fresh Fish or Marine Prods.	11,294	4.7%	80,091,126	0.2%	7,092
10	Metallic Ores	0	0.0%	0	0.0%	0
11	Coal	0	0.0%	0	0.0%	0
13	Crude Petrol. or Natural Gas	0	0.0%	0	0.0%	0
14	Nonmetallic Minerals	3,281	1.4%	5,799,683	0.0%	1,768
19	Ordnance or Accessories	12	0.0%	884,343	0.0%	72,986
20	Food or Kindred Prods.	12,992	5.4%	81,606,126	0.2%	6,281
21	Tobacco Prods.	15	0.0%	288,185	0.0%	19,396
22	Textile Mill Prods.	3,686	1.5%	64,569,525	0.2%	17,517
23	Apparel or Related Prods.	475	0.2%	14,416,572	0.0%	30,323
24	Lumber or Wood Prods.	4,928	2.1%	22,758,767	0.1%	4,618
25	Furniture or Fixtures	495	0.2%	45,103,948	0.1%	91,056
26	Pulp, Paper or Allied Prods.	431	0.2%	3,839,512	0.0%	8,914
27	Printed Matter	4,310	1.8%	91,470,234	0.2%	21,225
28	Chemicals or Allied Prods.	19,242	8.1%	3,828,709,399	9.1%	198,982
29	Petroleum or Coal Prods.	28	0.0%	31,207	0.0%	1,109
30	Rubber or Misc. Plastics	3,429	1.4%	103,338,002	0.2%	30,141
31	Leather or Leather Prods.	22	0.0%	1,620,086	0.0%	74,039
32	Clay, Concrete, Glass, or Stone	55	0.0%	2,219,281	0.0%	40,071
33	Primary Metal Prods.	2,798	1.2%	490,268,994	1.2%	175,208
34	Fabricated Metal Prods.	5,428	2.3%	152,849,719	0.4%	28,157
35	Machinery	10,847	4.5%	1,212,844,437	2.9%	111,812
36	Electrical Equipment	40,364	16.9%	9,151,479,007	21.7%	226,726
37	Transportation Equipment	21,939	9.2%	5,013,176,525	11.9%	228,505
38	Instrum., Photo Eq., Optical Eq.	14,234	6.0%	2,845,307,094	6.7%	199,892
39	Misc. Manufacturing Prods.	27,664	11.6%	17,151,844,907	40.6%	620,007
40	Waste or Scrap Materials	6	0.0%	11,501,142	0.0%	1,937,686
41	Misc. Freight Shipments	3	0.0%	321,015	0.0%	100,600
42	Shipping Containers	0	0.0%	0	0.0%	0
43	Mail or Contract Traffic	33,299	13.9%	87,062,424	0.2%	2,615
44	Freight Forwarder Traffic	0	0.0%	0	0.0%	0
45	Shipper Association Traffic	0	0.0%	0	0.0%	0
46	Misc. Mixed Shipments	15,944	6.7%	1,759,324,873	4.2%	110,342
47	Small Packaged Shipments	0	0.0%	0	0.0%	0
48	Waste	0	0.0%	0	0.0%	0
49	Hazardous Materials	0	0.0%	0	0.0%	0
50	Secondary Traffic	0	0.0%	0	0.0%	0
60	Unclassified	0	0.0%	0	0.0%	0
	Total	238,965	100.0%	\$42,234,313,119	100.0%	\$176,738

Source: TRANSEARCH data for 2011

Appendix M: AIR FREIGHT TRANSPORT IMPACTS

Air freight transport impacts total 625,410 jobs across Florida, reflecting the combined two impact activities (transport services and trade-related users) and types (direct plus multipliers). A vast majority (95.7%) of these total employment impacts arise from air freight users who trade and move goods via the freight system, with the fractional balance attributable to transport services.

The ensuing discussion details the composition of the employment impact estimates, as well as the other impact measures (e.g., output, value-added, income, and taxes). Impact types (e.g., direct, indirect, and induced) and measures are first presented for air freight transport services, and then for trade-related freight users. The remaining subsections reference the results presented in **Exhibit M-1**.

Exhibit M-1: Impacts by Activity, Measure, and Type, 2014

Measure and Type	Transport Services	Trade Related			Transport and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment *					
Direct	7,920	99,040	196,140	295,180	303,110
Indirect	9,680	74,840	54,970	129,810	139,490
Induced	9,390	90,430	83,000	173,430	182,820
Total	26,990	265,380	333,040	598,420	625,410
Income **					
Direct	\$669	\$7,222	\$7,974	\$15,196	\$15,865
Indirect	\$533	\$4,342	\$2,700	\$7,042	\$7,575
Induced	\$398	\$3,834	\$3,519	\$7,353	\$7,751
Total	\$1,600	\$15,419	\$14,172	\$29,591	\$31,192
Value Added **					
Direct	\$1,262	\$10,573	\$10,486	\$21,059	\$22,321
Indirect	\$772	\$6,927	\$4,697	\$11,623	\$12,395
Induced	\$693	\$6,674	\$6,124	\$12,798	\$13,491
Total	\$2,727	\$24,189	\$21,291	\$45,481	\$48,208
Output **					
Direct	\$2,875	\$30,608	\$19,389	\$49,998	\$52,872
Indirect	\$1,303	\$12,912	\$8,474	\$21,386	\$22,688
Induced	\$1,195	\$11,506	\$10,557	\$22,063	\$23,258
Total	\$5,372	\$55,059	\$38,388	\$93,447	\$98,819
Tax Revenue **					
Direct	\$292	\$494	\$876	\$1,369	\$1,662
Indirect	\$42	\$667	\$428	\$1,095	\$1,137
Induced	\$65	\$626	\$574	\$1,200	\$1,265
Total	\$399	\$1,792	\$1,873	\$3,664	\$4,063

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN*

* employment rounded to the nearest ten job-years; and, totals may not sum due to rounding

** in millions of 2014 dollars

Transport Services Impacts

Facilitating the movement of goods and trade between industry and geography, the provisioning of air freight transport services employs various occupations within the air transportation industry, including pilots, maintenance crews, package handlers and sorters, etc. Such employees provide the critical economic activity surrounding air freight in Florida by physically moving goods; they facilitate the relatively larger economic impact attributable to the production and consumption of the goods traded and moved. Effectively, these transport services employees are the catalysts through which trade-related economic activity occurs.

Provisioning air freight transport services to Florida yields a direct employment impact of 7,920 jobs. As reflective of the multiplier impacts, the indirect and induced effects associated with air freight transport services yield an additional 19,070 jobs (9,680 and 9,390 indirect and induced, respectively) throughout the State. Combined, an estimated 26,990 people owe their jobs, directly or tangentially to the physical movement of air freight. This excludes air freight user impacts associated with the shippers/consignees that ship/receive goods (as quantified in the following subsection).

- *Direct* – Air freight transport services yields a direct impact of 7,920 jobs, earning \$669 million in labor income, producing \$1.26 billion in value-added activity, which equates to \$2.88 billion in economic output, with tax revenues (on direct output) of \$292 million.
- *Total* – Including the Florida multiplier effects, air freight transport services activity impacts total 26,990 jobs, earning \$1.60 billion in labor income, who produce \$2.73 billion in economic value-added, which equates to a total economic output of \$5.37 billion, and yields a tax revenue impact of \$399 million to local, State, and Federal governments.

Trade-Related Impacts

In addition to the air freight transport services impacts detailed above, many consignees and shippers rely heavily on air freight transport services to receive and/or ship goods; in doing so, they generate significant impacts related to the production/absorption of such traded goods via air. While these firms/industries are not entirely dependent on air for shipping freight (as alternative modes are available, such as trucking), it is hard to envision continued operations without such access. In fact, airport access is often instrumental in major manufacturing business location decisions.

If airports did not accommodate demand, consignees and shippers could use other modes (i.e., truck mostly, but possibly water, rail, etc.) to transport freight. However, the use of other modes would likely entail higher transport costs (due to longer transport distances, price, logistics, etc.), lower reliability (esp. for time-sensitive goods, which air freight accommodates well), and could increase overall demand (and resulting handling costs) for all users of other modes (both the diverted air freight users as well as current users). The long-term result would be a partial migration of industry away from Florida to other locations with relatively better airport accessibility, and better modal options/mix.

The analysis identifies the economic impacts associated with industries in Florida that rely on air freight transport services. To estimate such impacts associated with air freight movements requires an

understanding of how the various inbound and outbound/intrastate commodities are used or produced by various industries to generate output, income, and employment. To do so, the IMPLAN® commodity-to-industry matrices and other algorithms were applied to estimate direct impact measures. Indirect and induced multipliers were then applied to the direct impact estimates to derive total economic impacts.

Outbound/Intrastate – 240,378 tons of air freight originating in Florida is either shipped via air out-of-state (237,522 tons) or internally (2,856 tons). Combined, air freight originating in Florida is valued at \$33.7 billion, and is associated with an estimated 265,380 total jobs (see **Exhibit M-1**).

Inbound – 629,291 tons of inbound freight originating beyond Florida, valued at \$22.8 billion, are used by Florida industries and institutions, and are associated with 333,040 total jobs (see **Exhibit M-1**). Inbound air freight user impacts comprise final demand and intermediate demand. Final demand goods are distributed via wholesale or retail outlets, or through direct sales, with economic impacts stemming from the trade margins associated with the transfer of goods from suppliers to end-users. Intermediate commodities supplied via air are used/absorbed by Florida industries in their production processes based on relative commodity absorption patterns.

Freight User Directional Overlap – Impact overlap issues arose between outbound/intra and inbound commodity conversion to economic impacts.⁹⁰ To avoid double-counting impacts, such potential overlaps were identified at an aggregate level and subtracted-out of the analysis to ensure conservative estimates. Such potential overlaps comprise between 4% and 10% of the total unadjusted freight user impacts, depending on the impact measure and type.

Trade-Related Summary – Air freight trade-related activities reflect the extent to which inbound goods via air are absorbed into the existing production processes as intermediates into the final production of saleable goods and services (or sold to end-users), and how outbound/intrastate goods via air are produced by the various existing industries in the region. Impacts are calculated separately according to the direction of trade flow due the different nature of the direction affecting the production of consumption of goods within the Florida economy. Combining all directional air freight users (and removing any potentially double-counting overlap) yields the following combined impacts:

- *Direct* – Air freight users yield a direct impact of 295,180 jobs, earning \$15.2 billion in labor income, producing \$21.1 billion in value-added activity, which equates to \$50.0 billion in economic output; with tax revenues (on direct output) equating to \$1.4 billion.
- *Total* – Including the multipliers, air freight trade-related activity impacts total 598,420 jobs, earning \$29.6 billion in labor income, who produce \$45.5 billion in economic value-added, which equates to a total economic output of \$93.4 billion, and yields a tax impact of \$3.7 billion to the State and Federal governments.

⁹⁰ As an example, when commodities, such as electronic parts, are imported by a manufacturer, the user impacts quantified allocate a share of the inbound electronics to the manufacturing industry and then estimate the industry-associated output. Potential overlap arises when the value-added electronics are subsequently transported outbound by air, since impacts are also estimated for outbound air movements. So in effect, the output associated with the electronics industry would be counted twice: once associated with the inbound movement of parts/components, and second with the outbound movement of value-added manufacturing.

Total Air Freight Impacts

Air freight transport services are essential to Florida’s economy. While the basic provision of air freight services generates a modest 7,920 direct jobs (26,990 including multipliers), air freight trade-related users are associated with 295,180 direct jobs. Impacts to Florida by all air freight activity combined, by impact measure (output, employment, labor income, value-added, and taxes), and by type (direct, indirect, induced, and total) are summarized in the last column of **Exhibit M-1**.

- *Direct* – Combining the air freight-related activities yields a direct impact of 303,110 jobs, earning \$15.9 billion in labor income, producing \$22.3 billion in value-added activity, which equates to \$52.9 billion in economic output, with tax revenues (on direct output) of \$1.7 billion.
- *Total* – Including the multipliers, the various air freight-related activities total 625,410 jobs, earning \$31.2 billion in labor income, who produce \$48.2 billion in economic value-added, which equates to a total economic output of \$98.8 billion, and yields a tax revenue impact of \$4.1 billion.

Impacts as Percentage of Economy – It is important to contextualize the preceding economic impact estimates, as it is difficult to visualize hundreds of thousands of jobs and billions of dollars, etc. As such, the economic impacts are compared with the existing economic composition of Florida in 2014, by the same economic measures as the presented economic impacts, per **Exhibit M-2**.

Exhibit M-2: Florida Economic Measures, 2014

Measure	Value All Florida	Value Air Freight	Air Freight % Of All Florida
Employment	10,791,030	625,410	5.8%
Income *	\$502,534	\$31,192	6.2%
Value Added *	\$833,328	\$48,208	5.8%
Output *	\$1,478,752	\$98,818	6.7%
Tax Revenues *	\$69,224	\$4,063	5.9%

Source: IMPLAN*

* in millions of 2014 dollars

Total economic impacts related to air freight movements in Florida range between 5.8% (employment) to 6.7% (economic output) of the statewide economy, depending on measure, as seen in **Exhibit M-3**. Again, the largest relative contribution to the statewide economy from air freight pertains to the trade-related freight users, with transport services a mere fraction of freight users.

Employment by Industry – **Exhibit M-4** details Florida employment impacts by aggregate industry.⁹¹

Employment includes the direct, indirect and induced impact types for both transport service and trade related activities.

⁹¹ Using the North American Industry Classification System, or NAICS, at the two-digit industry aggregation level.

Exhibit M-3: Impacts as Percentage of Florida Economy

Measure and Type	Transport Services	Trade Related			Service and Trade
		Outbound/Intra	Inbound	Trade Total	
Employment					
Direct	0.1%	0.9%	1.8%	2.7%	2.8%
Indirect	0.1%	0.7%	0.5%	1.2%	1.3%
Induced	0.1%	0.8%	0.8%	1.6%	1.7%
Total	0.3%	2.5%	3.1%	5.5%	5.8%
Income					
Direct	0.1%	1.4%	1.6%	3.0%	3.2%
Indirect	0.1%	0.9%	0.5%	1.4%	1.5%
Induced	0.1%	0.8%	0.7%	1.5%	1.5%
Total	0.3%	3.1%	2.8%	5.9%	6.2%
Value Added					
Direct	0.2%	1.3%	1.3%	2.5%	2.7%
Indirect	0.1%	0.8%	0.6%	1.4%	1.5%
Induced	0.1%	0.8%	0.7%	1.5%	1.6%
Total	0.3%	2.9%	2.6%	5.5%	5.8%
Output					
Direct	0.2%	2.1%	1.3%	3.4%	3.6%
Indirect	0.1%	0.9%	0.6%	1.4%	1.5%
Induced	0.1%	0.8%	0.7%	1.5%	1.6%
Total	0.4%	3.7%	2.6%	6.3%	6.7%
Tax Revenues					
Direct	0.4%	0.7%	1.3%	2.0%	2.4%
Indirect	0.1%	1.0%	0.6%	1.6%	1.6%
Induced	0.1%	0.9%	0.8%	1.7%	1.8%
Total	0.6%	2.6%	2.7%	5.3%	5.9%

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN*

Exhibit M-4: Employment Impacts by Industry and Type

(NAICS) Industry Description	Direct	Indirect	Induced	Total	Percent
Retail Trade	90,023	7,554	24,400	121,976	19.5%
Manufacturing	103,827	6,250	2,069	112,146	17.9%
Health and Social Services	37,970	368	33,521	71,859	11.5%
Administrative and Waste Services	10,959	22,537	11,563	45,059	7.2%
Accommodation and Food Services	8,801	5,543	20,478	34,823	5.6%
Professional- Scientific and Tech Svcs	4,942	21,594	8,019	34,554	5.5%
Other Services	10,635	5,266	16,162	32,063	5.1%
Transportation and Warehousing	9,360	13,888	5,403	28,652	4.6%
Finance and Insurance	641	10,134	14,761	25,537	4.1%
Real Estate and Rental	1,785	7,479	15,628	24,892	4.0%
Wholesale Trade	1,250	12,643	4,663	18,557	3.0%
Government and Non NAICS	3,772	6,267	6,967	17,007	2.7%
Construction	9,280	2,588	1,887	13,756	2.2%
Management of Companies	533	9,042	1,416	10,991	1.8%
Arts- Entertainment and Recreation	1,153	1,752	5,932	8,837	1.4%
Information	1,980	3,462	2,840	8,282	1.3%
Educational Svcs	2,412	193	5,349	7,953	1.3%
Ag, Forestry, Fish and Hunting	3,492	1,840	987	6,319	1.0%
Utilities	39	601	541	1,181	0.2%
Mining	251	490	227	968	0.2%
Total	303,105	139,491	182,815	625,412	100.0%

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN*

Impacts by Airport – Exhibit M-5 details Florida air freight impacts by the five major air freight airports.⁹² Impact totals include the direct, indirect and induced impact types separated by transport service and trade related activities.

Exhibit M-5: Economic Impacts by Airport, Activity, and Measure

Airport/Activity	Employment *	Income **	Value-added **	Output **	Tax Revenues **
Transport Service					
Miami International	21,940	\$1,301	\$2,217	\$4,367	\$324
Orlando International	1,730	\$102	\$175	\$344	\$26
Tampa International	940	\$56	\$95	\$188	\$14
Ft. Lauderdale/Hollywood Int'l	860	\$51	\$87	\$172	\$13
Jacksonville International	700	\$42	\$71	\$140	\$10
Other	810	\$48	\$82	\$161	\$12
Total	26,990	\$1,600	\$2,727	\$5,372	\$399
Trade Related					
Miami International	486,520	\$24,058	\$36,976	\$75,972	\$2,979
Orlando International	38,300	\$1,894	\$2,911	\$5,981	\$235
Tampa International	20,940	\$1,036	\$1,592	\$3,271	\$128
Ft. Lauderdale/Hollywood Int'l	19,150	\$947	\$1,455	\$2,990	\$117
Jacksonville International	15,560	\$769	\$1,182	\$2,430	\$95
Other	17,950	\$888	\$1,364	\$2,803	\$110
Total	598,420	\$29,591	\$45,481	\$93,447	\$3,664
Total					
Miami International	508,460	\$25,359	\$39,193	\$80,340	\$3,304
Orlando International	40,030	\$1,996	\$3,085	\$6,324	\$260
Tampa International	21,890	\$1,092	\$1,687	\$3,459	\$142
Ft. Lauderdale/Hollywood Int'l	20,010	\$998	\$1,543	\$3,162	\$130
Jacksonville International	16,260	\$811	\$1,253	\$2,569	\$106
Other	18,760	\$936	\$1,446	\$2,965	\$122
Total	625,412	\$31,192	\$48,208	\$98,819	\$4,063

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN

* employment rounded to the nearest ten; totals may not sum due to rounding

** in millions of 2014 dollars

⁹²Comprising over 2.5% of tonnage movements.

Additionally, trade-related employment impacts are disaggregated by direction in **Exhibit M-6**, which indicate a larger statewide impact associated with inbound freight (333,040 jobs) versus outbound freight (265,380). This reflects Florida’s service-based economy; air freight flown into Florida is sold at retail outlets, directly consumed, and used as input into value-added production. This directional flow breakdown supports the chart shown previously in **Exhibit 11-4**.

Exhibit M-6: Florida Air Freight Economic Impacts by Airport, Activity, and Measure

Measure/Airport	Transport Service	Trade-Related			Service and Trade
		Outbound	Inbound	Trade Total	
Miami International	21,940	215,750	270,760	486,510	508,450
Orlando International	1,730	16,980	21,310	38,290	40,020
Tampa International	940	9,290	11,660	20,950	21,890
Ft. Lauderdale/Hollywood Int'l	860	8,490	10,660	19,150	20,010
Jacksonville International	700	6,900	8,660	15,560	16,260
Other	<u>810</u>	<u>7,960</u>	<u>9,990</u>	<u>17,950</u>	<u>18,760</u>
Total	26,990	265,380	333,040	598,420	625,410

Source: CDM Smith, FHWA FAF v4.1, and IMPLAN

* employment rounded to the nearest ten; totals may not sum due to rounding