3 AVIATION ACTIVITY FORECAST

3.1 Background

This chapter presents comprehensive forecasts of aviation activity (i.e., demand) at the Austin-Bergstrom International Airport (ABIA). The forecasts were developed as part of the Master Plan presented herein as a basis for determining future facility requirements at ABAI.

The aviation activity forecast includes annual projections for enplaned passengers, air cargo throughput and aircraft operations through 2037 with a base year of 2016. Projections for passengers and aircraft operations were also developed on monthly, daily, and peak hour levels. Additional details of the forecasts are presented for the following key future demand years: 2017, 2019, 2021, 2024, and 2037.

The forecasts presented herein represent market-driven demand for air services. The forecasts are unconstrained, and as such, do not take facility constraints or other limiting factors into consideration. In other words, for the purposes of estimated future demand, the forecasts assume facilities can be provided to meet demand.

All years discussed in the text tables, and exhibits are expressed in calendar years unless otherwise stated.

3.2 Historical Aviation Activity

This section provides a summary of the historical activity levels and the current passenger air service at ABIA. The information in this section provides a context for the forecast. Although the past is not a perfect predictor of the future, an analysis of historical data provides the opportunity to understand factors that have affected traffic and how those factors may influence the forecast in the future.

3.2.1 Passenger Activity

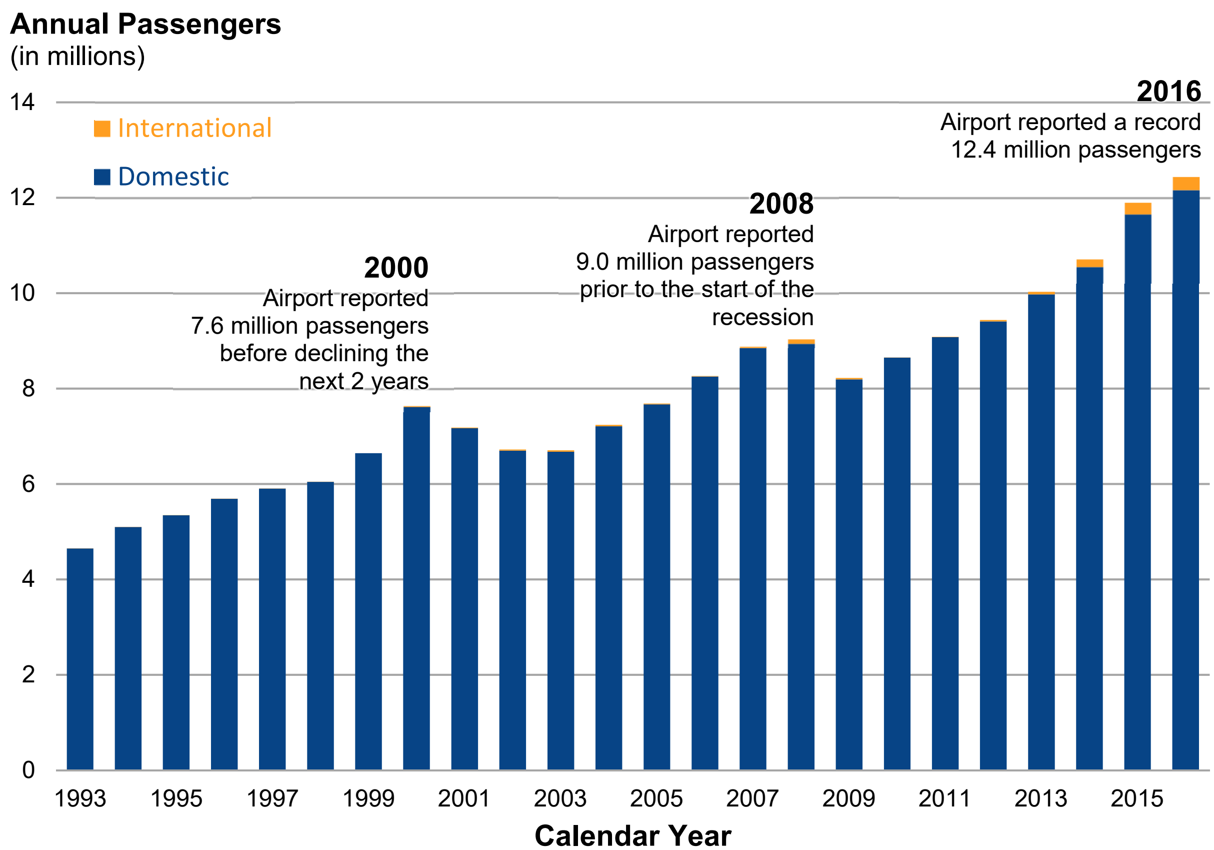
3.2.1.1 Passenger Activity Trends

ABIA is classified by the FAA as a medium-hub airport[1] based on its percentage of nationwide enplaned passengers[2] and is the fifth busiest airport in Texas. Passenger traffic at Austin airports have followed a fairly consistent upward trend with some exceptions as demonstrated in **Exhibit 3.2-1**. **Table 3.2-1** provides the passenger volumes by segment (domestic and international) since 1993. The key factors behind the changes in passenger volumes are discussed below:

- **1993-1998:** Passenger traffic in the City of Austin was handled at the Robert Mueller Municipal Airport (RMMA). During this time, passenger traffic increased at 5.4 percent per annum despite being constrained as a result of its inability to expand due to its centralized location in the City of Austin.
- **1999-2000:** In May 1999, the former Bergstrom Air Force Base[3] was reopened for passenger traffic as ABIA to replace RMMA. The shift of passenger traffic to ABIA had a significant impact as passenger volumes increased by 9.9 percent in 1999 and 15.0 percent in 2000.
- **2001-2003:** The September 11, 2001 terrorist attacks combined with an economic slow-down, particularity within the Austin region, resulted in a decrease in passenger traffic for three sequential years.
- **2004-2008:** The economic health of the region improved over this time which aided in increasing passenger volumes at an average annual growth rate (AAGR) of 7.7 percent.
- **2009:** In 2009, the global economic recession combined with rising fuel prices had a significant impact on operations at most of the airports in the United States. Airlines, determined to retain economic viability, reduced operations on lower performing routes. As a result, passengers at ABIA declined 9.1 percent from 2008 to 2009.
- **2010-2016:** The region was able to recover quickly from the economic recession and has continued to grow in terms of its population and economy. As such, passenger volumes at ABIA have grown at an AAGR of 6.1 percent since 2009. In 2016, ABIA reported a record 12.4 million passengers.

1 Federal Aviation Administration, *Report to Congress: National Plan of Integrated Airport Systems (NPIAS) 2017-2021*, September 30, 2016.
2 To be classified as a medium-hub airport, the airport must have at least 0.25 percent but less than 1 percent of the national annual enplaned passengers.
3 Bergstrom Air Forecast Base was decommissioned in 1993 as part of the military's Base Realignment Closure (BRAC) Commission.

Exhibit 3.2-1: Historical Passenger Volumes



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; City of Austin Financial Services, Comprehensive Annual Financial Reports; Airports Council International, World Airport Report.

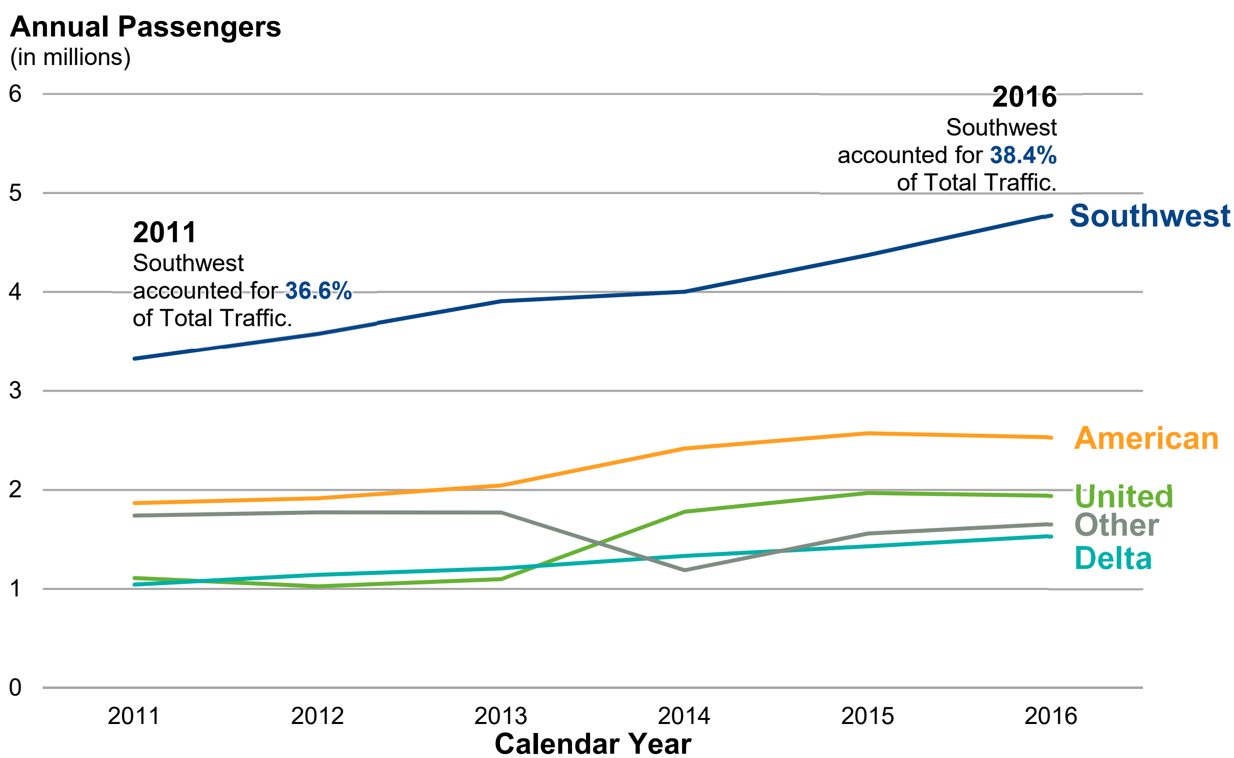
Table 3.2-1: Historical Passenger Volumes

YEAR	DOMESTIC	INTERNATIONAL	TOTAL
1993	4,648,091	374	4,648,465
1994	5,098,677	1,466	5,100,143
1995	5,343,799	888	5,344,687
1996	5,689,797	1,436	5,691,233
1997	5,902,013	2,292	5,904,305
1998	6,043,170	2,008	6,045,178
1999	6,644,482	0	6,644,482
2000	7,621,312	21,029	7,642,341
2001	7,167,264	13,926	7,181,190
2002	6,698,550	22,118	6,720,668
2003	6,673,890	32,495	6,706,385
2004	7,208,690	29,955	7,238,645
2005	7,666,898	16,647	7,683,545
2006	8,253,556	7,754	8,261,310
2007	8,858,289	27,102	8,885,391
2008	8,947,364	91,711	9,039,075
2009	8,190,718	30,180	8,220,898
2010	8,647,378	5,102	8,652,480
2011	9,075,834	9,369	9,085,203
2012	9,407,689	28,508	9,436,197
2013	9,972,420	55,274	10,027,694
2014	10,555,451	163,869	10,719,320
2015	11,658,575	244,299	11,902,874
2016	12,164,494	275,294	12,439,788
RANGE	**AVERAGE ANNUAL GROWTH RATE**		
1993-2016	4.3%	33.2%	4.4%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Financial Services, Comprehensive Annual Financial Reports; Airports Council International, World Airport Report.

Although all the major airlines at ABIA have demonstrated strong positive growth in recent years, Southwest Airlines, ABIA's largest carrier, has continued to increase its market share. In 2016, Southwest Airlines accounted for 38.4 percent of the total passenger traffic compared to 36.6 percent in 2011. American Airlines has been the second largest carrier at ABIA since 2011, averaging more than 20 percent of the total passenger traffic over that span. In 2016, United Airlines and Delta Air Lines were the third and fourth largest carriers, respectively. Combined, the other airlines at ABIA accounted for 13.3 percent of the passenger traffic in 2016, down from 19.2 percent in 2011. **Exhibit 3.2-2** graphically depicts the passenger volumes for each of the major airlines operating at ABIA.

Exhibit 3.2-2: Passenger Airline Market Share

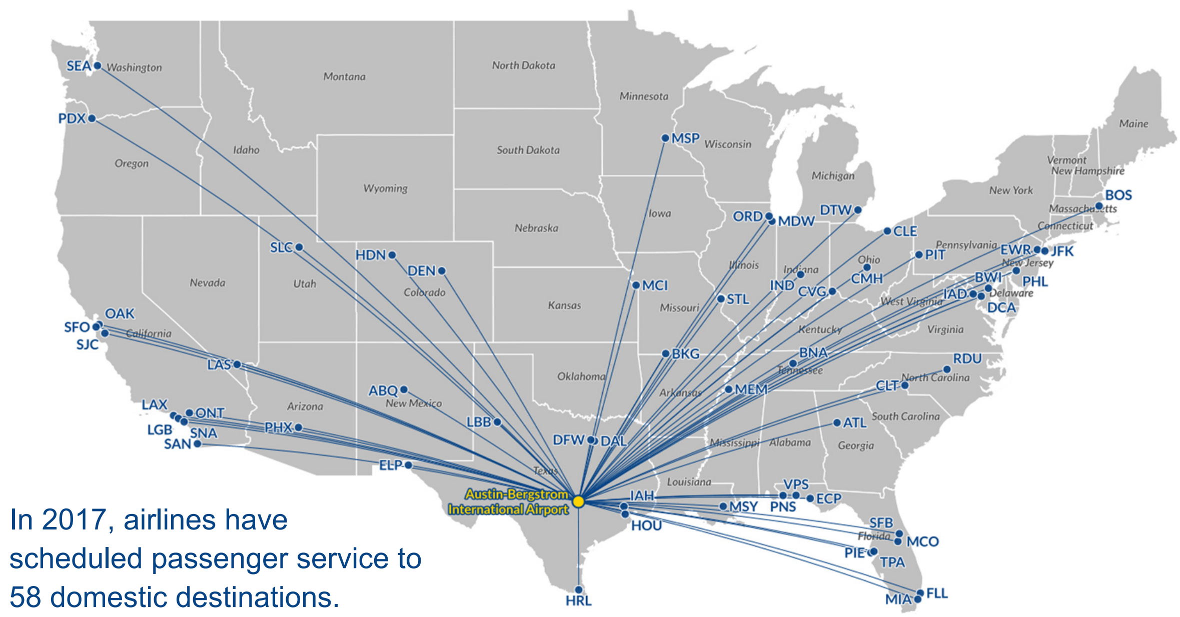


Note: Other airlines include the following: JetBlue Airways, Alaska Airlines, Frontier Airlines, Allegiant Air, and Foreign Flag carriers.
Source: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports.

3.2.1.2 Passenger Air Service

In 2017, airlines have scheduled service to 58 domestic destinations[4], including 28 of the 30 large hub airports in the United States. **Exhibit 3.2-3** provides a map of the nonstop domestic destinations that have scheduled service in 2017.

Exhibit 3.2-3: Map of Nonstop Domestic Destinations

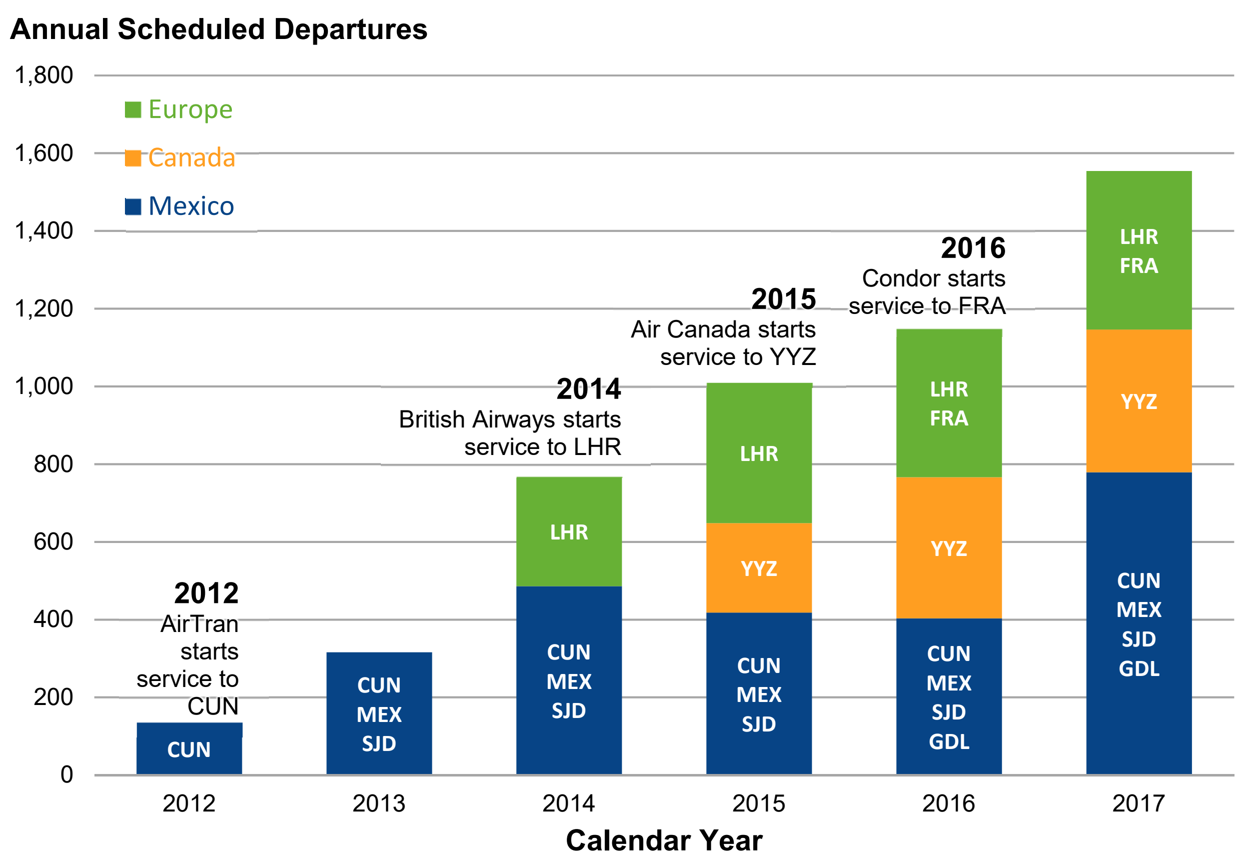


Source: City of Austin Aviation Departure, Nonstop Flights out of ABIA, accessed August 1, 2017.

[4] These destinations include year-round and seasonal service.

In 2012, AirTran Airways began nonstop service from ABIA to the Cancún International Airport (CUN) thus marking the start of a new emphasis on scheduled international travel from ABIA. The following year, the Mexican market continued to grow with new service to the Mexico City International Airport (MEX) and the Los Cabos International Airport (SJD). British Airways began nonstop service to the London Heathrow Airport (LHR) in 2014 and Air Canada began nonstop service to the Toronto Lester B. Pearson International Airport in 2015. Additional European service was added in 2016 with the introduction of the Condor Flugdienst nonstop flight to the Frankfort International Airport (FRA). **Exhibit 3.2-4** provides a graphical representation of the growth in scheduled international service at ABIA since 2012.

Exhibit 3.2-4: Introduction of International Destinations



Source: OAG Aviation Worldwide Ltd, OAG Schedules Analyser.

In 2017, airlines have scheduled service to six international destinations with an additional three destinations currently announced for 2018.[5] **Exhibit 3.2-5** provides a map of the nonstop international destinations that are served by scheduled service in 2017 with the additional service currently announced for 2018.

Exhibit 3.2-5: Map of Nonstop International Destinations

Note: Asterisk (*) indicates new service announced for 2018.
Special service to AMS begins March 8, 2018.
Service to LGW begins March 27, 2018.
Seasonal service to PUJ begins May 28, 2018.
Source: City of Austin Aviation Departure, Nonstop Flights out of ABIA, accessed August 1, 2017.

5 Current as of August 3, 2017.

3.2.1.3 Top Passenger Markets

An overwhelming majority of the passenger traffic at ABIA is origin and destination (O&D), or local, passengers versus connecting passengers. **Table 3.2-2** shows the share of O&D passengers for the top 25 O&D markets for 2016. The top 25 markets accounted for a combined share of 68.9 percent of the O&D passengers at ABIA. The New York / Newark region is the largest O&D market at ABIA with 7.3 percent of the O&D enplanements. All of the top 25 markets have nonstop service from ABIA to at least one airport in the market.

Table 3.2-2: Top 25 O&D Markets

MARKET	AIRPORTS	SHARE OF ABIA O&D ENPLANEMENTS
New York / Newark	JFK / EWR / LGA / ISP / HPN	7.3%
Los Angeles Basin	LAX / BUR / ONT / LGB / SNA	6.5%
San Francisco Bay Area	SFO / OAK / SJC	6.2%
Denver	DEN	4.7%
Chicago	ORD / MDW	4.6%
Washington / Baltimore	DCA / IAD / BWI	3.9%
Las Vegas	LAS	3.6%
Dallas / Ft. Worth	DFW / DAL	3.6%
Atlanta	ATL	2.9%
Orlando / Sanford	MCO / SFB	2.8%
South Florida	FLL / MIA / PBI	2.6%
Boston	BOS	2.6%
Seattle / Tacoma	SEA	2.5%
Phoenix	PHX	2.2%
San Diego	SAN	1.5%
Philadelphia	PHL	1.4%
Minneapolis	MSP	1.3%
Portland	PDX	1.2%
Nashville	BNA	1.1%
El Paso	ELP	1.1%
Detroit	DTW	1.1%
New Orleans	MSY	1.1%
Salt Lake City	SLC	1.0%
St. Louis	STL	1.0%
London	LHR	0.9%
Top 25 Markets		68.9%
Other Markets		31.1%
Total		100.0%

Note: Nonstop service is available to at least one airport in all top 25 O&D markets.
Source: U.S. Department of Transportation, Air Passenger Origin-Destination Survey.

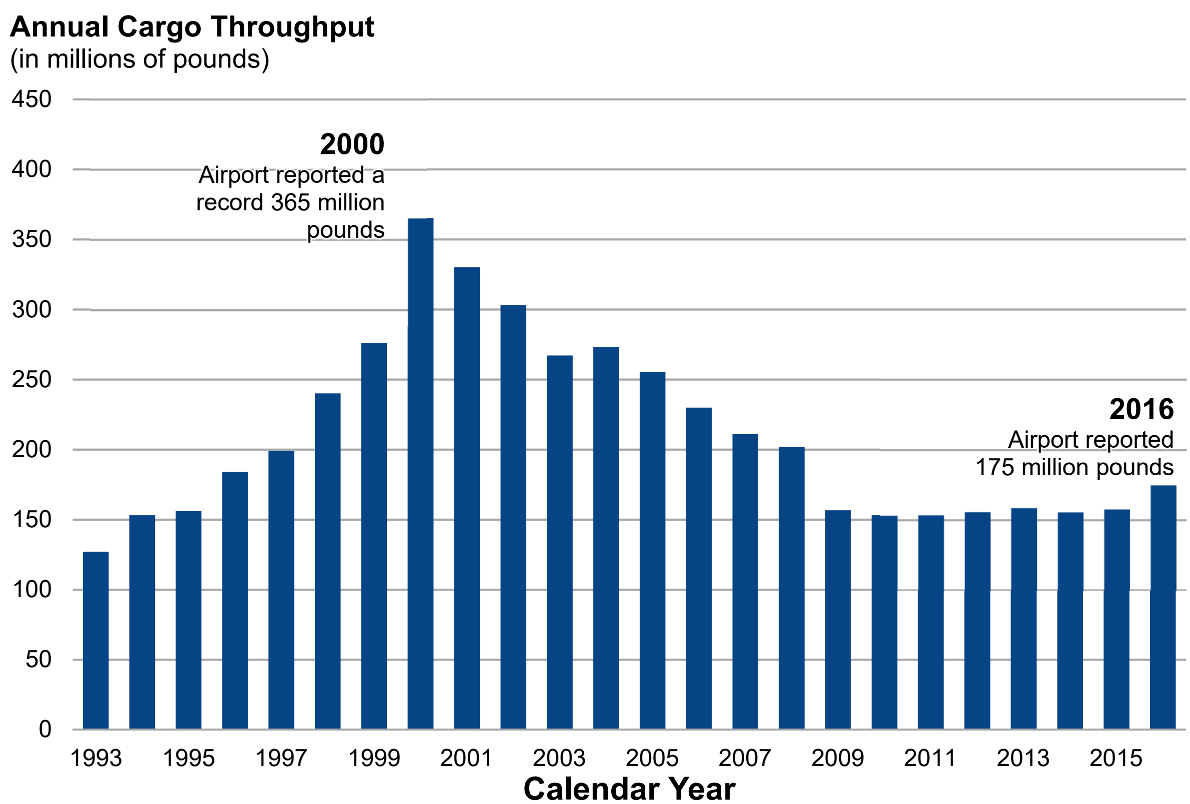
3.2.2 Cargo Activity

3.2.2.1 Air Cargo Throughput

Air cargo at airports is comprised of two segments, air mail and air freight. Air mail refers to parcels that are carried by aircraft as part of a contract with the U.S. Postal Service. Air freight refers to all air cargo that is not mail. Since 2011, only 2.8 percent of the total air cargo processed at ABIA was air mail. Air cargo at ABIA saw significant growth from 1993 through 2000 when it peaked at 365 million pounds. A large portion of this growth was fueled by the increasing demand in the computer manufacturing industry, namely Dell Inc., located in the Austin region.

However, a shift in the location for the production of computers combined with a fundamental shift to trucking for regional shipping and the recent economic recessions led to a decline in air cargo at ABIA at an AAGR of 9.0 percent over the subsequent decade. From 2009 through 2015, air cargo throughput held steady at an average of 156 million pounds. However, in 2016, air cargo throughput increased by 11.0 percent. **Exhibit 3.2-6** provides a graphical representation of the air cargo throughput at ABIA since 1993.

Exhibit 3.2-6: Historical Air Cargo Throughput



Source: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports.

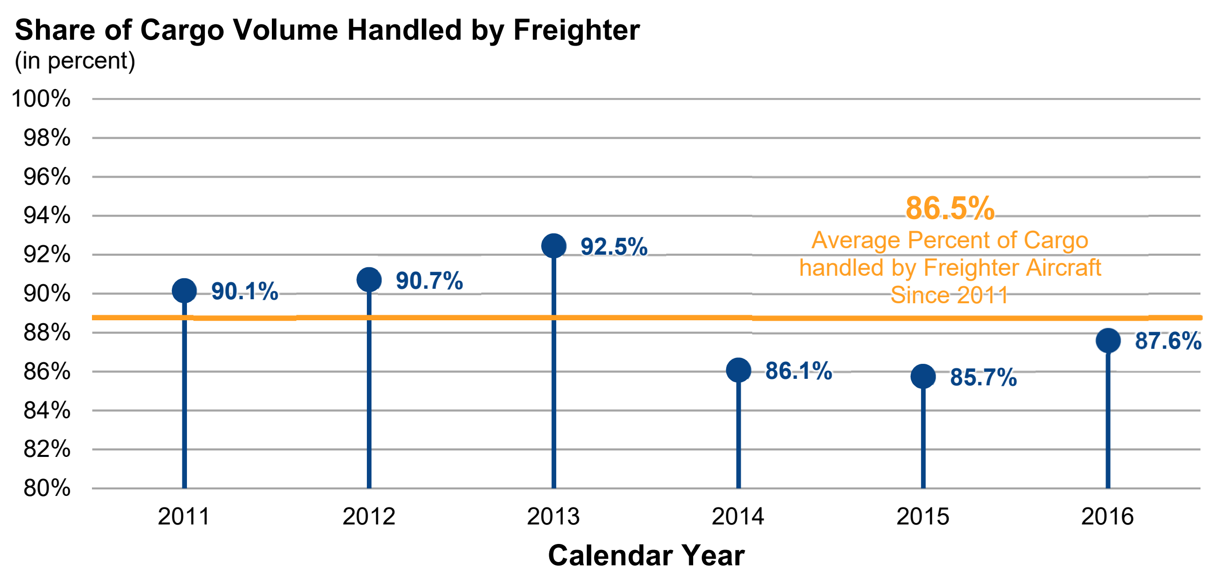
3.2.2.2 Mode of Transportation

There are two shipping methods for transporting air cargo: (1) in the cargo compartment (belly) of commercial passenger aircraft or (2) aboard dedicated all-cargo aircraft (freighters).

Most passenger airlines accommodate air cargo as a byproduct of their primary activity of carrying passengers. Cargo fills belly space in passenger aircraft that would otherwise be empty. The incremental cost of transporting cargo in passenger aircraft is negligible and includes only ground handling expenses and a modest increase in fuel consumption.

A majority of cargo processed at ABIA, 86.5 percent since 2011, has been handled by all-cargo carriers, primarily FedEx. **Exhibit 3.2-7** displays the historical belly cargo/freighter split at ABIA. The decrease in freighter share from 2013 to 2014 is the result of increased belly cargo to international destinations coinciding with the start of the new transoceanic international service to LHR. In 2016, FedEx, including Baron Aviation Services[6], processed more than two-thirds of all the air cargo handled by all-cargo carriers while the UPS, the second largest all-cargo carrier at ABIA, processed 18.5 percent.

Exhibit 3.2-7: Belly Cargo/Freighter Split



Source: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports.

[6] Baron Aviation Services operates as a feeder for FedEx at ABIA.

3.2.3 Aircraft Operations

An aircraft operation consists of either a takeoff or landing. For the purpose of developing the forecasts, aircraft operations were classified into five key categories: (1) passenger; (2) freighter; (3) air taxi; (4) general aviation; and (5) military.

Passenger aircraft operations refers to operations handled by airlines with scheduled service, i.e. certified as a scheduled air carrier by the FAA under Part 121.[7] Unsurprisingly, passenger aircraft operations have closely reflected the changes in passenger activity. This includes a slight decline from 2000 through 2002, steady growth through 2007 before declining due to the recession and steady growth since 2009.

In 2000, all-cargo, or freighter, activity reached 16,196 aircraft operations. However, freighter aircraft operations declined significantly over the subsequent years and by 2012 freighter aircraft operations were nearly a third of the number of aircraft operations in 2000. Since 2012, freighter aircraft operations have remained relatively steady.

Air taxi represents chartered aircraft operated by companies that operate under Part 91[8] (i.e., not certificated as a scheduled air carrier by the FAA and not covered under Part 121). Business charters at ABIA, such as NetJets, provide ad-hoc service utilizing mostly business jet aircraft. These airlines account for a majority of the air taxi service at ABIA. Air taxi traffic at ABIA steadily increased through 2005, but in 2006 there was a sharp decline in traffic. Air taxi aircraft operations recovered quickly over the next two years before declining 39.1 percent in 2009 as a result of the global recession. ABIA has yet to recover the air taxi activity experienced prior to the recession.

General Aviation (GA) aircraft operations represent all civil operations not classified as commercial, i.e. passenger, freighter, or air taxi. GA aircraft operations can be further classified as either local or itinerant.[9] From 1993 through 2002, GA averaged nearly 95,000 aircraft operations at ABIA despite a significant decline in 1999 coinciding with the opening of the new airport. GA traffic at ABIA has declined at a steady pace since 2002. The decline is representative of most of the GA traffic at commercial airports throughout the United States.

Military aircraft operations represent operations conducted by military or government aircraft. Military operations can be further classified as either local or itinerant. For most of the past decade, military aircraft operations have been relatively steady. However, in each year over the past three years, military aircraft operations have increased at double-digit rates. This growth in military operations was the direct result of the opening of the Armed Forces Reserve Center located on the south side of ABIA.

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7 14 Code of Federal Regulations Part 121

8 14 Code of Federal Regulations Part 91

9 Local operations include aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport. Itinerant operations are those not classified as local, i.e. operations of aircraft going from one airport to another.

A summary of the aircraft operations by classification is provided in **Table 3.2-3**.

3.2.4 Aircraft Fleet Mix

3.2.4.1 Passenger Aircraft Operations

Airlines providing scheduled passenger air service at ABIA deploy a predominately narrow-body fleet, particularly utilizing variants of the Boeing 737 aircraft. In 2016, 79.2 percent of all scheduled passenger service utilized narrow-body aircraft compared to 20.1 percent regional aircraft and 0.7 percent wide-body aircraft. **Exhibit 3.2-8** graphically depicts the number of scheduled passenger aircraft operations by aircraft type for 2016.

For domestic flights in 2016, 80.3 percent of the scheduled flights utilized narrow-body aircraft, half of which were variants of the Boeing 737 aircraft. This is unsurprising considering the Boeing 737-700 is the most common aircraft in Southwest Airlines' fleet, ABIA's largest airline, and significant portions of American Airlines' and United Airlines' fleets include variants of the aircraft. Nearly all of the small regional aircraft have been phased out at ABIA as the major airlines have opted for using the large regional aircraft because these aircraft are more cost-efficient. Texas Sky, a regional charter brand of Public Charters, Inc., utilizes the British Aerospace Jetstream 32 and 41 aircraft for their intrastate service and accounted for three-fourths of the small regional aircraft operations in 2016.

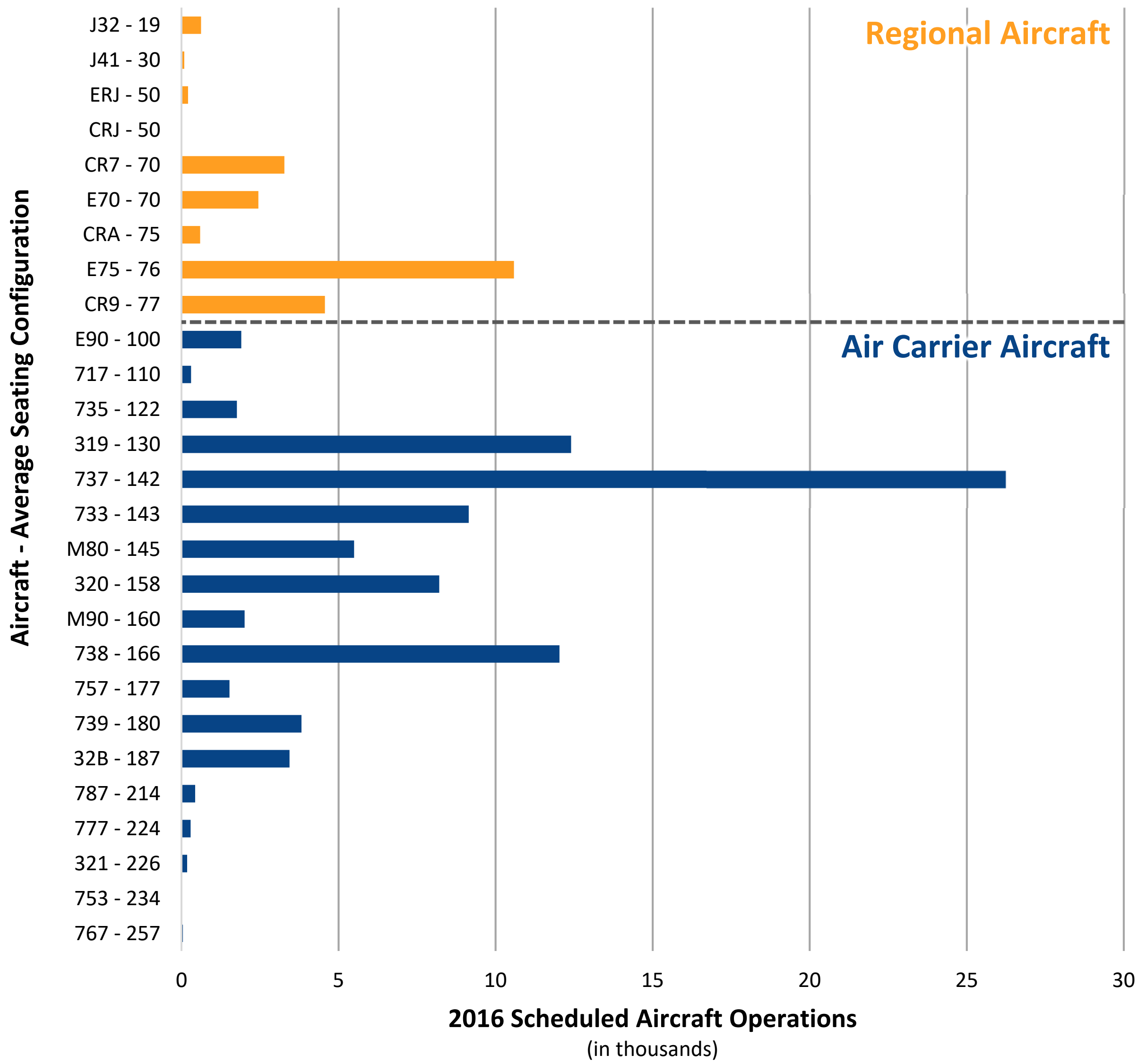
Wide-body aircraft, like variants of the Boeing 787 and the Boeing 777 aircraft, are exclusively used for transoceanic international travel which accounted for 31.6 percent of scheduled international flights in 2016. Flights to and from Canada almost exclusively use large regional aircraft such as the Embraer 175. Latin American service, including Mexico, utilizes a mix of large regional and narrow-body aircraft.

Table 3.2-3: Historical Aircraft Operations

YEAR	PASSENGER	ALL-CARGO	AIR TAXI	GENERAL AVIATION	MILITARY	GRAND TOTAL
2000	91,032	16,196	10,802	89,130	5,475	212,635
2001	88,452	15,360	11,656	96,653	8,318	220,439
2002	84,634	14,794	12,147	97,559	8,225	217,359
2003	89,270	14,290	12,455	90,418	15,667	222,100
2004	93,304	14,740	14,406	84,916	14,484	221,850
2005	95,174	13,262	15,478	79,252	9,844	213,010
2006	98,822	10,232	12,318	77,372	6,697	205,441
2007	107,760	10,350	14,556	74,052	5,522	212,240
2008	106,192	8,834	16,619	71,359	4,709	207,713
2009	92,884	6,634	10,120	58,410	6,466	174,514
2010	94,360	6,510	10,118	59,002	6,924	176,914
2011	96,472	6,540	10,099	56,470	6,750	176,331
2012	97,862	5,666	10,463	51,905	6,352	172,248
2013	102,032	5,752	11,460	51,334	6,069	176,647
2014	104,926	5,770	11,500	53,211	7,061	182,468
2015	112,304	5,772	11,350	53,017	8,750	191,193
2016	112,286	5,854	11,609	51,929	10,354	192,032
RANGE	**AVERAGE ANNUAL GROWTH RATES**					
2000-2016	1.3%	-6.2%	0.5%	-3.3%	4.1%	-0.6%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports.

Exhibit 3.2-8: Scheduled Passenger Aircraft Operations by Aircraft Type



Source: OAG Aviation Worldwide Ltd, OAG Schedules Analyser.

3.3 Prior Forecast

In 1993, an Airport Master Plan was completed to guide the process of converting the Bergstrom Air Force Base into a replacement of the RMMA. However, actual traffic levels grew at a rate significantly higher than originally forecasted for the new airport. As a result, an update to the ABIA Master Plan was completed in October 2003 by P&D Aviation.

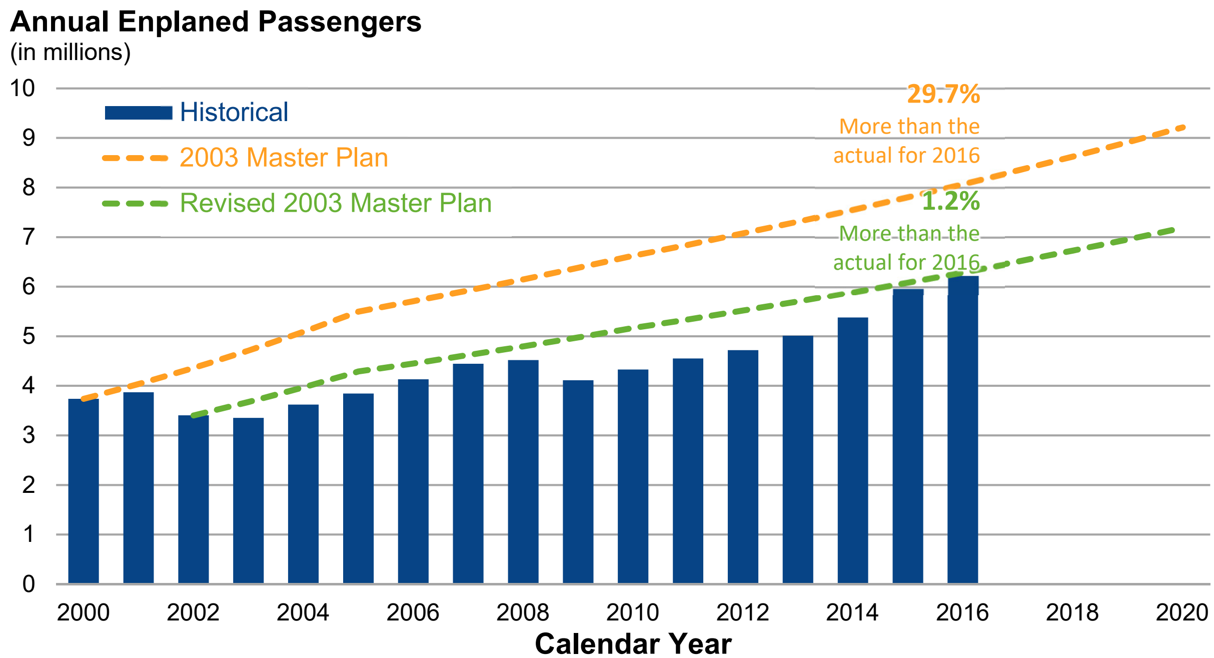
The ABIA Master Plan Update (2003 Master Plan) included an updated forecast of aviation demand. The forecast focused heavily on the demand for air passenger service provided by the passenger airlines and the demand for air cargo service but also included activity for non-commercial operations. The forecast included annual volumes for passengers, air cargo, based GA aircraft, aircraft operations, and surface transportation.

The 2003 Master Plan forecast used 2000 as the base year and projected the demand levels for the years 2005, 2010, and 2020. A range of forecasts was developed to account for the uncertainty associated with a twenty-year planning horizon: High, Medium, and Low Growth forecasts. The High Growth forecast was selected as the basis for determining future facility requirements. As such, comparisons made in this document will reflect the High Growth forecast unless otherwise noted.

The enplaned passengers forecast in the 2003 Master Plan was developed utilizing a multivariate linear regression model. The model used the Austin region’s population, per capita personal income (PCPI), and the average cost of air travel as measured in yield (revenue per revenue passenger mile). The forecast estimated that enplaned passengers at ABIA would increase from 3.7 million in 2000 to 9.2 million by 2020, representing an AAGR of 4.6 percent. Using linear interpolation, it was determined that the forecast would have estimated approximately 8.1 million enplaned passengers in 2016. The actual number of enplaned passengers at ABIA in 2016 was 6.2 million, 29.7 percent lower than the forecast. The large reason for this discrepancy was the forecast did not foresee the decline in passenger volume in 2002 resulting from the September 11, 2001 terrorist attacks combined with the economic slow-down.

In 2003, a financial feasibility analysis was prepared for the Master Plan. The analysis included an updated enplaned passenger forecast with a base year of fiscal year (FY) 2002 to account for the decline in passengers over the previous two years. The updated forecast applied the growth rates from the High Growth forecast to project the enplaned passengers. The update estimated enplaned passengers would increase from 3.4 million in FY2002 to 6.3 million in FY2016, 1.2 percent more than the actual for calendar year 2016. **Exhibit 3.3-1** provides a comparison of actual enplaned passengers to the forecast provided in the 2003 Master Plan and the subsequent financial feasibility analysis.

Exhibit 3.3-1: 2003 Master Plan Enplaned Passenger Forecast Comparison

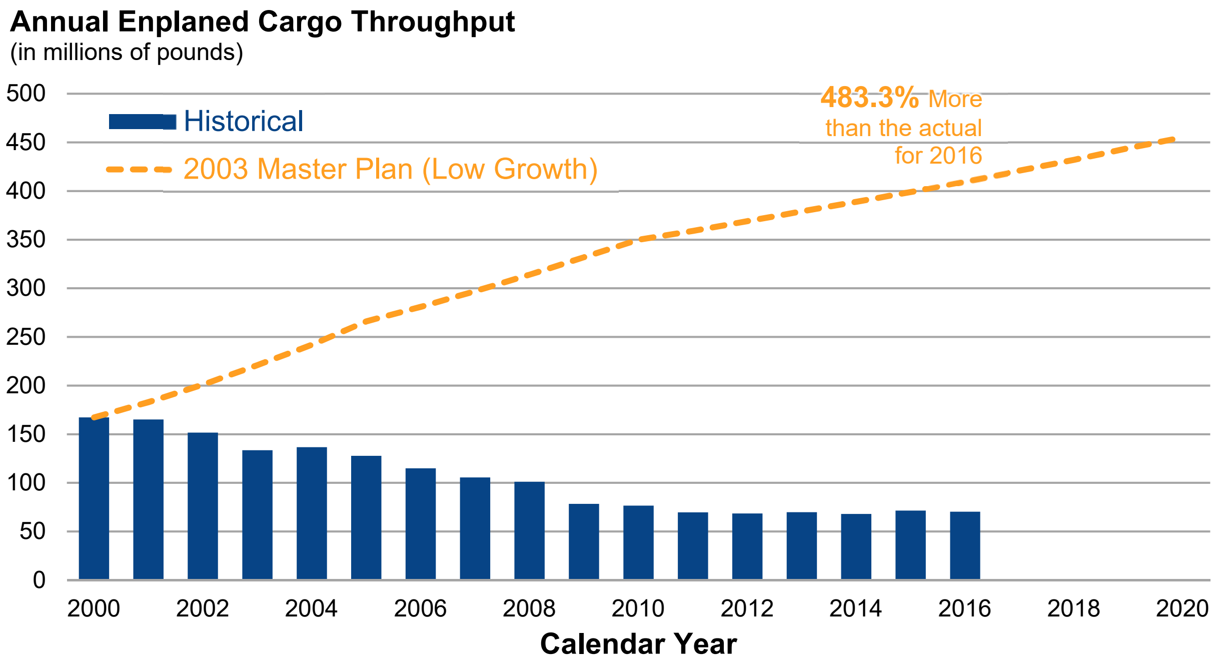


Note: Revised forecast is provided in fiscal year not calendar.
Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. P&D Aviation; Austin-Bergstrom International Airport Master Plan Update, October 2003.

The 2003 Master Plan estimated that enplaned air cargo throughput would increase from 167 million pounds in 2000 to 645 million pounds in 2020, representing an AAGR of 7.0 percent. Using linear interpolation, it was determined that the forecast would have estimated approximately 538 million pounds in 2016. In 2016, there were only 70 million pounds of enplaned air cargo at ABIA, 87.0 percent lower than the forecast. Even under the Low Growth forecast, air cargo was forecasted to be 5.8 times higher than the actual throughput. **Exhibit 3.3-2** provides a comparison of actual enplaned air cargo to the Low Growth forecast provided in the 2003 Master Plan.

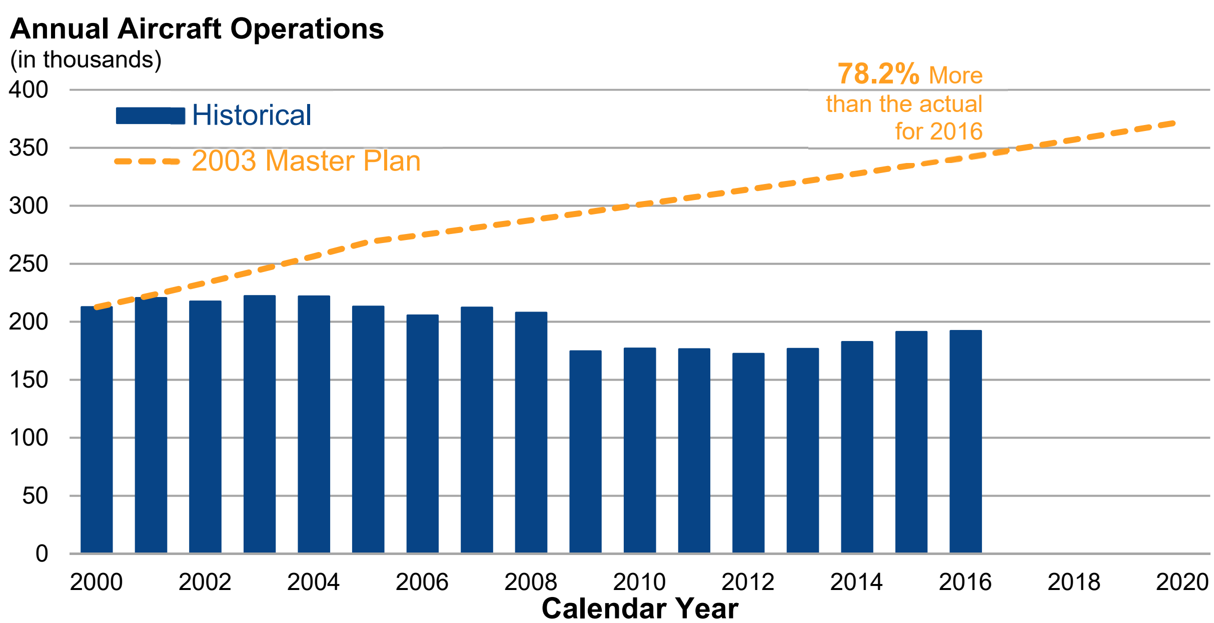
The 2003 Master Plan estimated that aircraft operations would increase from 212,620 in 2000 to 372,670 in 2020, representing an AAGR of 2.8 percent. Using linear interpolation, it was determined that the forecast would have estimated approximately 342,149 aircraft operations in 2016. In 2016, there were only 192,032 aircraft operations at ABIA, 44.0 percent lower than the forecast. **Exhibit 3.3-3** provides a comparison of actual aircraft operations to the forecast provided in the 2003 Master Plan.

Exhibit 3.3-2: 2003 Master Plan Enplaned Air Cargo Forecast Comparison



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. P&D Aviation; Austin-Bergstrom International Airport Master Plan Update, October 2003.

Exhibit 3.3-3: 2003 Master Plan Aircraft Operations Forecast Comparison



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. P&D Aviation; Austin-Bergstrom International Airport Master Plan Update, October 2003.

3.4 Drivers of Air Traffic

The intrinsic link between the level of aviation activity and socio-economic growth are well documented. Simply put, growth in population, employment, income, and tourism activity typically lead to increased demand for air travel both for business and leisure purposes. An individual's demand for air travel is often referred to as "underlying demand" in that it cannot be realized without the presence of air service at a price that results in the decision to fly. This section discusses the socio-economic factors as well as changes to the strategies of airlines that affect aviation demand at ABIA.

All socio-economic data provided in this section were provided by Woods & Poole Economic, Inc. unless indicated otherwise. Woods & Poole is an independent vendor and nationally recognized firm that provides expert economic and demographic analysis.

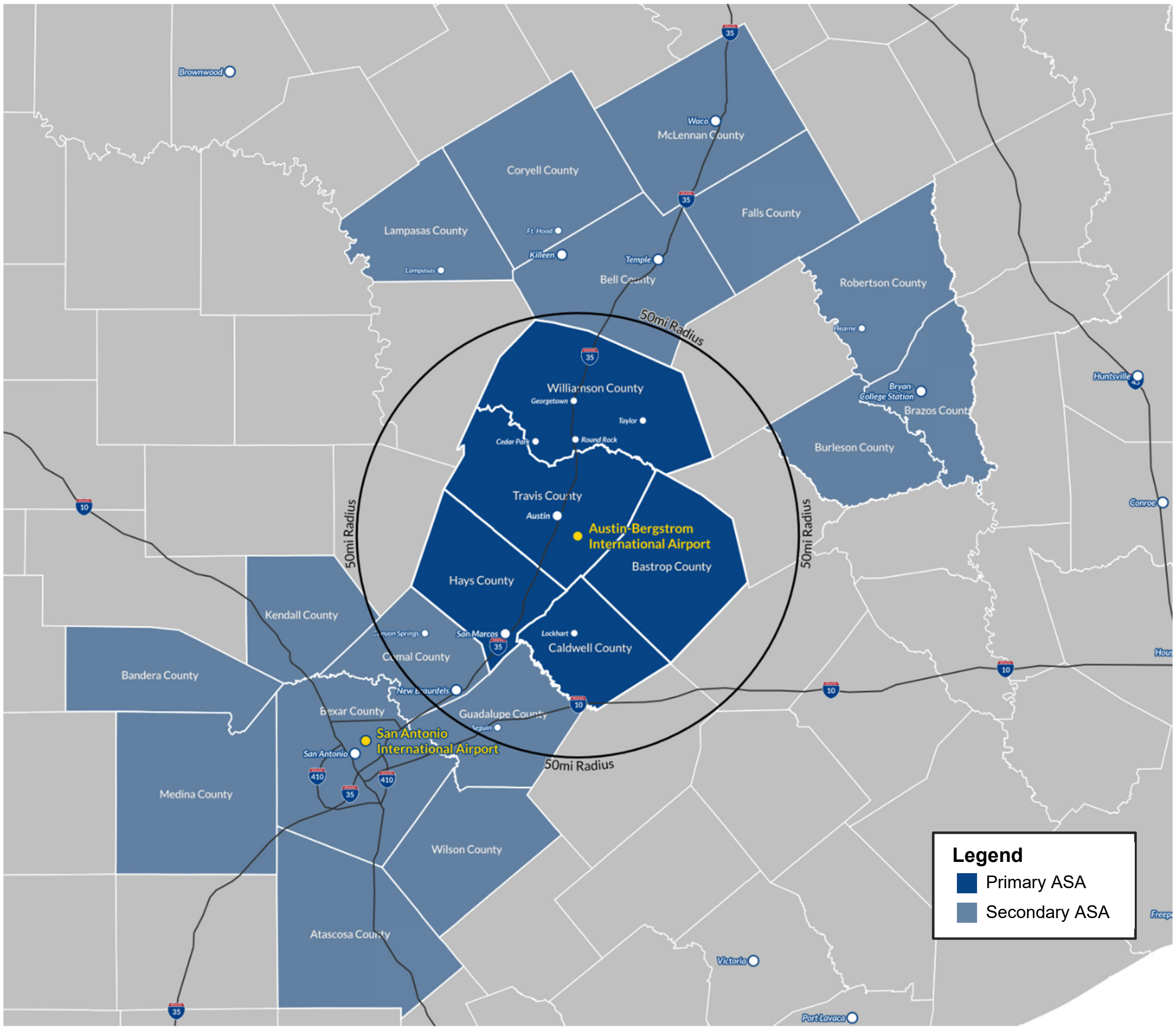
3.4.1 Air Service Area

The City of Austin is located within the Texas Triangle, also referred to as the "Golden Triangle," which includes the area between Houston, Dallas-Fort Worth, and San Antonio. This area accounts for approximately 80 percent of Texas' population. In terms of population, Austin is the smallest of the four main cities that comprises the Texas Triangle but according to the U.S. Census Bureau it has been the fastest growing over the past decade.

The area served by ABIA includes two defined regions, the primary air service area (ASA) and the secondary ASA. The primary ASA, where most of ABIA's passenger base is located, is comprised of the Austin-Round Rock, TX Metropolitan Statistical Area (MSA) (Austin MSA), and a five-county region that includes Bastrop, Caldwell, Hay, Travis, and Williamson Counties.[10] Additional passenger demand, particularly for international service, is provided by the secondary ASA which includes the following: San Antonio-New Braunfels MSA to the Southwest; the Killeen-Temple-Fort Hood MSA and Waco MSA to the North; and the Bryan-College Station MSA to the East. The four MSAs included in the secondary ASA are comprised of 16 counties. **Exhibit 3.4-1** provides a map that includes the primary ASA and secondary ASA.

[10] U.S. Office of Management and Budget, Revised Delineations of Metropolitan Statistical Areas, Micropolitan Statistical Areas, and Combined Statistical Areas, and Guidance on Uses of the Delineations of These Areas.

Exhibit 3.4-1: Air Service Area Map



Note: ASA = Air Service Area
The primary ASA includes Bastrop, Caldwell, Hay, Travis, and Williamson Counties.
The secondary ASA includes the San Antonio-New Braunfels MSA, the Killeen-Temple-Fort Hood MSA, Waco MSA, and the Bryan-College Station MSA.

Source: Landrum & Brown analysis

3.4.2 Economic Base for Air Travel

3.4.2.1 United States Economy

Historically, the United States economy, as measured by Gross Domestic Production, has grown at a relatively steady rate, averaging 3.1 percent per annum between 1960 and 2016. The rate of growth has been remarkably stable reflecting both the size and maturity of the United States economy. Individual years have fluctuated around the long-term trend for a variety of reasons including pure macro-economic factors, fuel shocks, war, and terrorist attacks.

There have been two official economic recessions in the U.S. thus far in the 21st century. The first occurred between March and November of 2001 and was compounded by the September 11, 2001 terrorist attacks. The negative impact of these events on the airline industry is well documented. The recession itself was short-lived by historical standards and the economy returned to positive growth rates quickly, fueled in part by a gradual but prolonged reduction in interest rates.

The second recession, often referred to as the ‘Great Recession’, occurred between December 2007 and June 2009.[11] This was the worst financial crisis to affect the United States since the Great Depression and it was the longest recession since the airline industry was deregulated[12] in 1978. The nation’s unemployment rate rose from 5.0 percent in December of 2007, to a high of 10.0 percent in October 2009.[13]

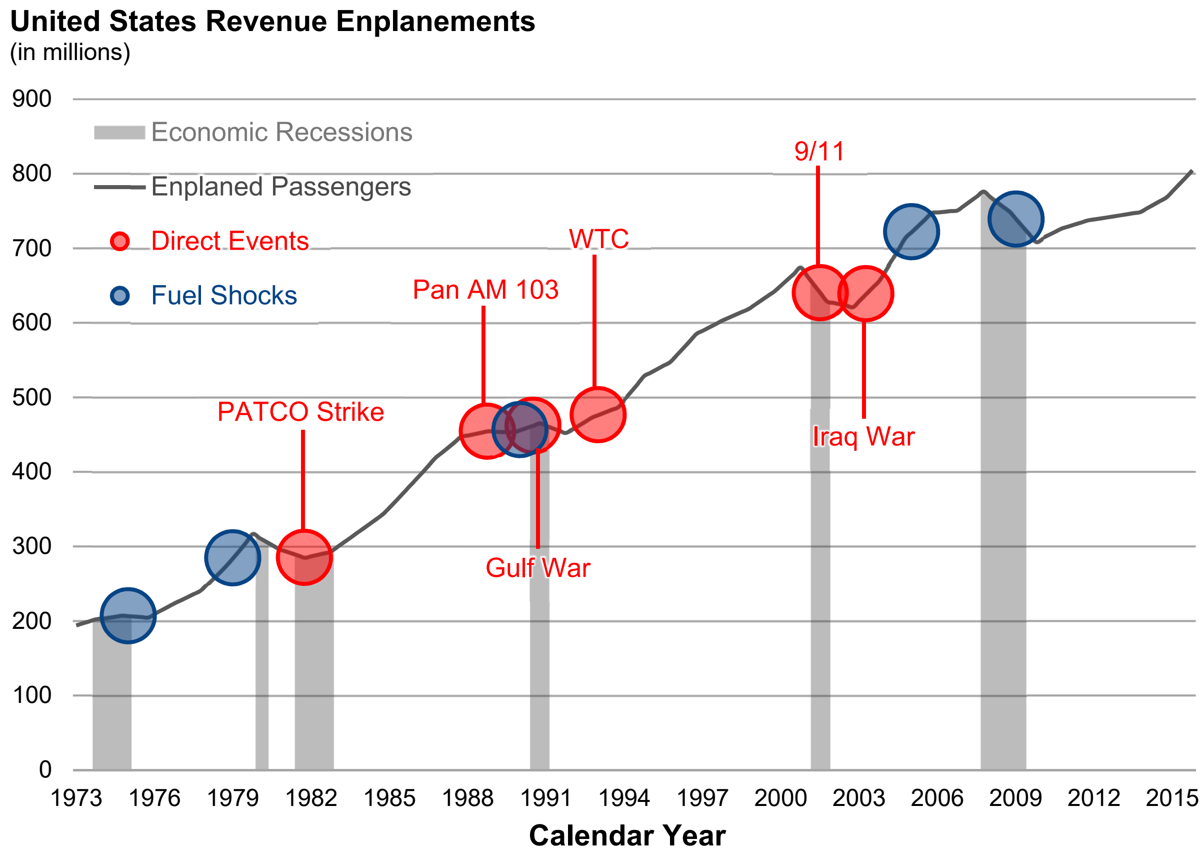
Exhibit 3.4-2 shows how strongly passenger traffic in the United States has historically been correlated with the nation’s economy. During economic contractions, there is a notable decline in passenger volumes while during the subsequent economic expansions there is significant growth in passenger volumes. Additionally, it is clear that shocks such as terrorist attacks have a short but significant impact to the passenger volumes.

11 *National Bureau of Economic Research, U.S. Business Cycle Expansions and Contractions*, September 20, 2010.

12 Deregulation refers to the Airline Deregulations Act of 1978, which reduced government control over the commercial aviation industry.

13 *National Bureau of Economic Research, U.S. Business Cycle Expansions and Contractions*, September 20, 2010.

Exhibit 3.4-2: United States Aviation System Shocks & Recoveries

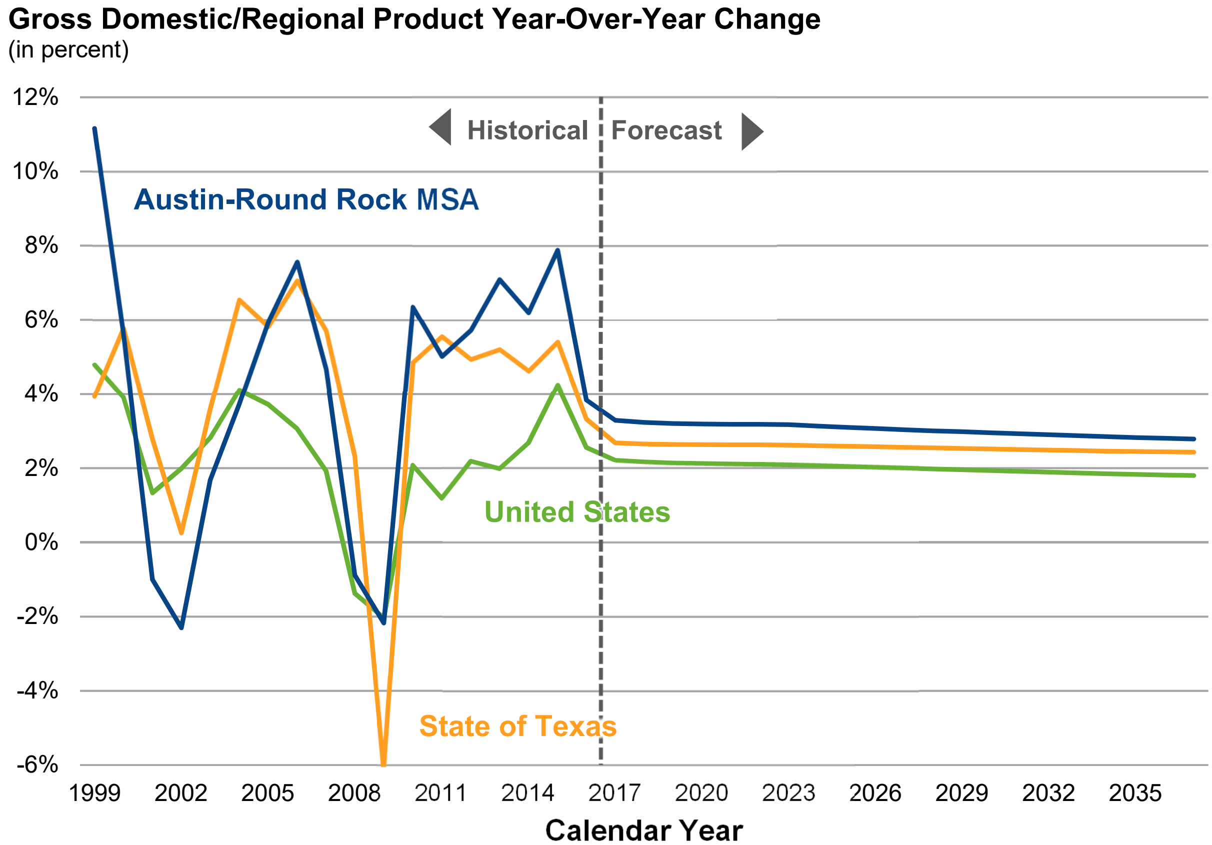


Sources: U.S. Department of Transportation, Air Carrier Statistics database (T100); U.S. Bureau of Economic Analysis, Domestic Product and Income.

3.4.2.2 Regional Economy

Gross Regional Product (GRP) is a measure of the value of goods and services produced in a state or region. Since 2001, Austin MSA's economy has followed the general trends of the economy of the state of Texas and the United States as a whole. In 2001 and 2002, there was a significant decline in the MSA's GRP as a result of the economic slowdown, but the economy quickly recovered. However, this recovery was short-lived as the Great Recession impacted the local economy in 2008 and 2009. The economy of the state of Texas and the MSA recovered from the great recession faster than the rest of the United States. Since 2009, the MSA's GRP has increased at an AAGR of 6.0 percent, compared to 4.8 percent by the state of Texas and 2.4 percent by the United States as a whole. This is partially attributed to the maturity of the state and United States economy but also to the adaptable nature of the region's economy. Through 2037, Austin MSA's GRP is forecast to increase at an AAGR of 3.0 percent, which is above the national average of 2.0 percent and the 2.6 percent growth for the state of Texas. **Exhibit 3.4-3** graphically depicts the historical and forecast year-over-year growth of the nation's Gross Domestic Product (GDP), the GRP of the state of Texas, and the GRP of the Austin MSA.

Exhibit 3.4-3: Historical and Forecast Gross Domestic/Regional Product



Source: Woods & Poole, The Complete Economic and Demographic Data Source (CEDDS) 2017.

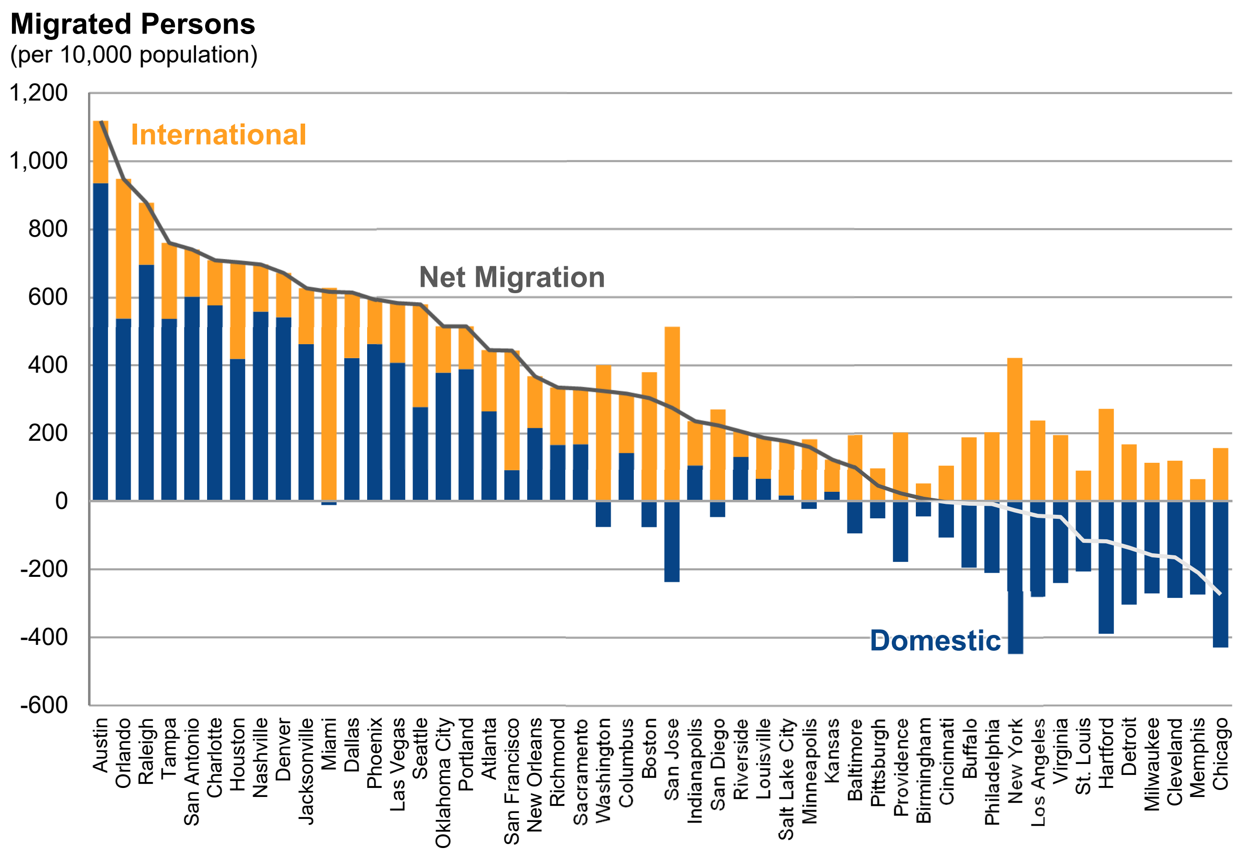
3.4.3 Population Growth

According the U.S. Census Bureau, the Austin MSA was ranked as the 33rd most populated of the 382 MSAs in the United States in 2016 and has been the fastest growing MSA in the top 100 since 2010.[14] Since 1998, the population in the Austin MSA has increased at an AAGR of 3.2 percent which is three and a half times more than the United States and more than one and half times more than the state of Texas over that time span.

The Austin MSA is one of the most attractive destinations for migrating talent. Therefore, a majority of the population growth in recent years is due to migration. Since 2010, more than two-thirds of the population growth was the result of migration. According to the U.S. Census Bureau, the Austin MSA ranks first in net migration among the 50 largest MSAs. **Exhibit 3.4-4** provides a graphical representation of the net migration for the 50 largest MSAs.

[14] U.S. Census Bureau, American FactFinder – Annual Estimates of Resident Population, accessed online on June 8, 2017.

Exhibit 3.4-4: Net Migration for 50 Largest MSAs



Sources: U.S. Census Bureau, American FactFinder – Annual Estimates of Resident Population; U.S. Census Bureau, American FactFinder – Estimates of the Components of Resident Population Change.

The population of the Austin MSA is expected to continue to increase at a rate faster than the nation and the state of Texas through the forecast period, although not quite at the same degree of significance.

The Texas Demographic Center (TDC) provides estimates for the future population for each of the counties in the state through 2050. The most recent forecast used 2010 as the base year and included three scenarios: (1) no migration, (2) half migration rate of 2000 through 2010, and (3) migration rate of 2000 through 2010. The TDC's population estimate for the Austin MSA for 2016 was below the actual for the region. In order to make comparisons between the population forecast provided by the TDC and Woods & Poole, the growth rates for future years from the TDC were applied to the actual population for 2016. **Table 3.4-1** provides the population forecast for the MSA as provided by Woods & Poole compared to the forecast based on the growth rates provided by the TDC.

Table 3.4-1: Austin MSA Population Forecasts

YEAR	WOODS & POOLE	TEXAS DEMOGRAPHIC CENTER	
		HALF MIGRATION RATE	FULL MIGRATION RATE
2016	2,040,566	2,040,566	2,040,566
2020	2,213,546	2,196,560	2,295,436
2025	2,449,012	2,387,568	2,640,477
2030	2,705,004	2,580,874	3,020,518
2035	2,975,702	2,780,986	3,449,109
2040	3,259,004	2,991,421	3,940,710
RANGE	AVERAGE ANNUAL GROWTH RATE		
2016-2040	1.6%	2.0%	2.8%

Note: Migration rate refers to the rate of migration experienced in the Austin MSA from 2000 through 2010.
Sources: Woods & Poole, The Complete Economic and Demographic Data Source 2017. Texas Demographic Center, 2014 Texas Population Projections by Migration Scenario.

3.4.4 Employment

Growth in employment is an important indicator of the overall health of the local economy. Changes in population and employment tend to be closely correlated as people migrate in and out of areas largely depending on their ability to find work.

3.4.4.1 Major Employers

Austin includes one of the most educated talent pools in the country. According to the U.S. Census Bureau, 42.6 percent of the population in the Austin MSA have a bachelor's degree or higher, compared to 30.6 percent nationally, and 14.8 percent of the population have a graduate degree, compared to 11.6 percent nationally. This young and highly educated workforce has been a catalyst for attracting large corporations to the region, particularly in the tech industry. **Table 3.4-2** provides a list of the largest companies in the region.

Table 3.4-2: Austin Largest Employers

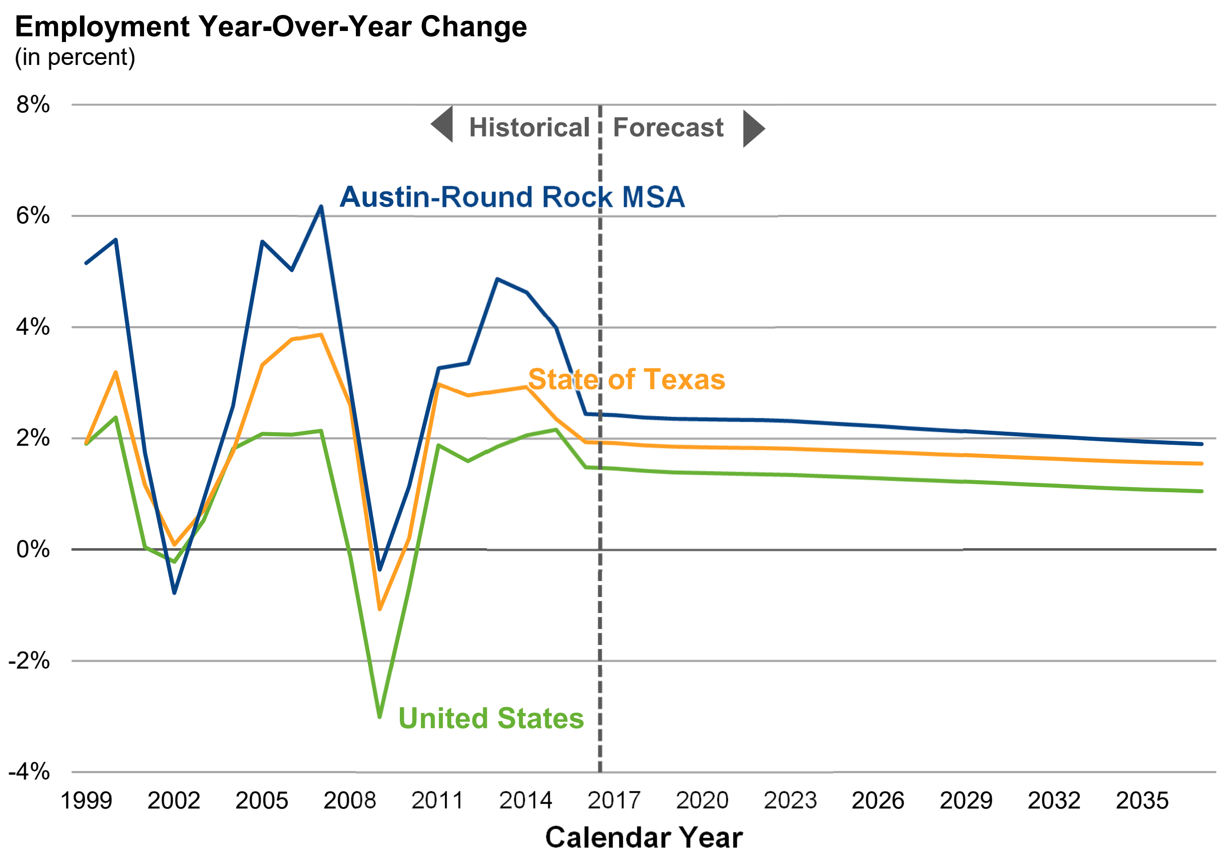
COMPANY	DESCRIPTION
Employing 6,000 & Over	
Apple	Computer chip engineering and support center
Austin Independent School District	Public education
City of Austin	Government
Dell Technologies *	Computer technology solutions
Federal Government	Government
IBM Corp.	Computer systems
Samsung Austin Semiconductor *	Semiconductor chip manufacturing
Seton Healthcare Family *	Healthcare
St. David's Healthcare Partnership *	Healthcare
State of Texas	Government
University of Texas at Austin	Higher education, public
Employing 2,000 - 5,999	
Accenture	Management consulting & software development
Amazon	Retailer’s digital product development
Applied Materials	Semiconductor production equipment
AT&T	Telecommunications
Austin Community College	Higher education, public
Flextronics	Contract electronics
Hays Consolidated School District	Public education
Keller Williams Realty *	Residential real estate
Kindred Healthcare	Healthcare
Leander Independent School District	Public education
National Instruments *	Virtual instrumentation software
NXP Semiconductors *	Semiconductor chip design
Pflugerville Independent School District	Public education
Round Rock Independent School District	Public education
Texas State University-San Marcos*	Higher education, public
Travis County	Government
U.S. Internal Revenue Service	Government
Whole Foods Market *	Grocery retailer

Note: Asterisk (*) indicates the company is headquartered in Austin region.
Source: The Austin Chamber, 2017 Greater Austin Economic Development Guide.

3.4.4.2 Employment Growth

Since 1999, employment in the Austin MSA has increased at a faster rate than the state of Texas and the United States as a whole. Although there were declines in employment in the Austin MSA in 2002 and 2009, the region has experienced a 3.2 percent AAGR in employment since 1999. In comparison, employment in the state of Texas increased 2.1 percent per year and the nation as a whole increased 1.1 percent per year over that time span. Growth in employment within the Austin MSA is expected to continue to outpace the state and the national average in the future. Through 2037, employment is forecast to increase at an AAGR of 2.2 percent compared to 1.7 percent for the state and 1.3 percent for the United States. **Exhibit 3.4-15** graphically depicts the historical and forecast year-over-year growth in employment of the nation, the state of Texas, and the Austin MSA.

Exhibit 3.4-5: Historical and Forecast Employment

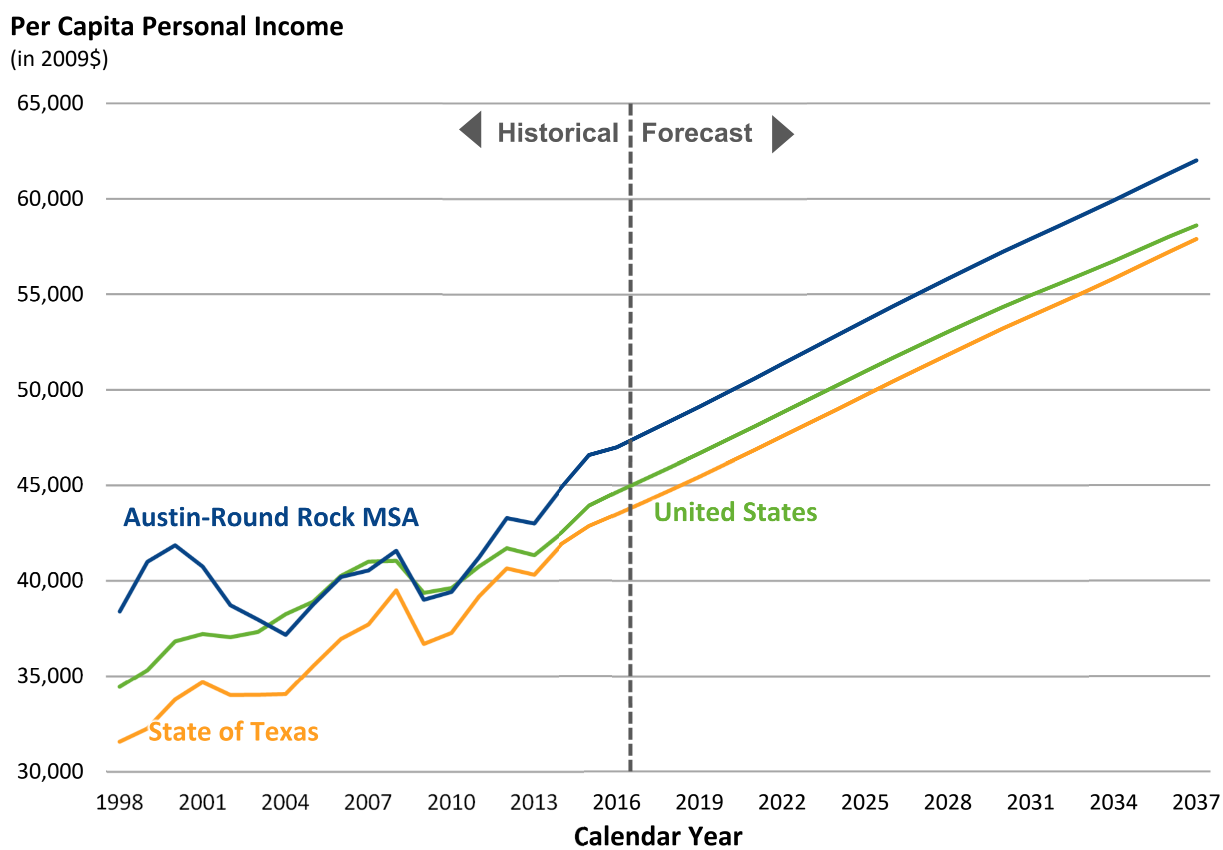


Source: Woods & Poole, The Complete Economic and Demographic Data Source 2017.

3.4.5 Personal Income

Income statistics are broad indicators of the relative earning power and wealth of an area and inferences can be made relative to an individual's or community's ability to purchase air travel. PCPI corresponds to the income per inhabitant (total income divided by total population). In 2000, the Austin MSA had a PCPI of $41,167 which ranked 28th in the country among all MSAs. However, the economic downturn in the region that occurred in the early 2000s had a significant impact to the average income. PCPI in the Austin region declined to a low of $37,175 in 2004 which was lower than the national average, $38,255, at the time. Over the next seven years, PCPI in the Austin MSA maintained a value nearly identical to the national average, which was well above the state as a whole. However, over the past five years PCPI in the Austin MSA has averaged over $2,000 more than the United States average. According to Woods & Poole, PCPI for Austin is expected to continue to be well above the national and state average. **Exhibit 3.4-6** graphically depicts the historical and forecast PCPI of the nation, the state of Texas, and the Austin MSA.

Exhibit 3.4-6: Historical and Forecast Per Capita Personal Income



Source: Woods & Poole, The Complete Economic and Demographic Data Source 2017.

3.4.6 Household Income

To better understand the economic landscape of the region, households within the Austin MSA were segmented into two categories: (1) Higher-income households (those earning $100,000 or more per year); and (2) Lower-income households (those earning less than $100,000 per year). There were approximately 766,200 households in Austin in 2016, of which 24.8 percent were higher-income and the remaining 75.2 percent were lower-income. From 2016 through 2037, the number of higher-income households is expected to increase at a rate of 3.6 percent per annum, while lower-income households will increase at a rate of 1.1 percent per annum. Based on these growth rates, it is expected that by 2037 the percentage of higher-income households in Austin will be 35.5 percent, while 64.5 percent will be lower-income.

3.4.7 Regional Socio-Economic Comparisons

The data presented thus far has focused on the primary ASA, the Austin MSA. However, comparisons to the MSAs located in the secondary ASA can be made in order to determine the effect these areas may have on aviation demand at ABIA.

In 2016, the Austin MSA had the highest GRP of any of the MSAs in the region followed closely by the San Antonio-New Braunfels MSA. The other three MSAs (College Station-Bryan, Killeen-Temple, and Waco) had a combined GRP that was less than a third of the Austin MSA. Since 2007, the Austin MSA has had the fastest growing economy in terms of GRP of the region and this trend is forecast to continue through the forecast period.

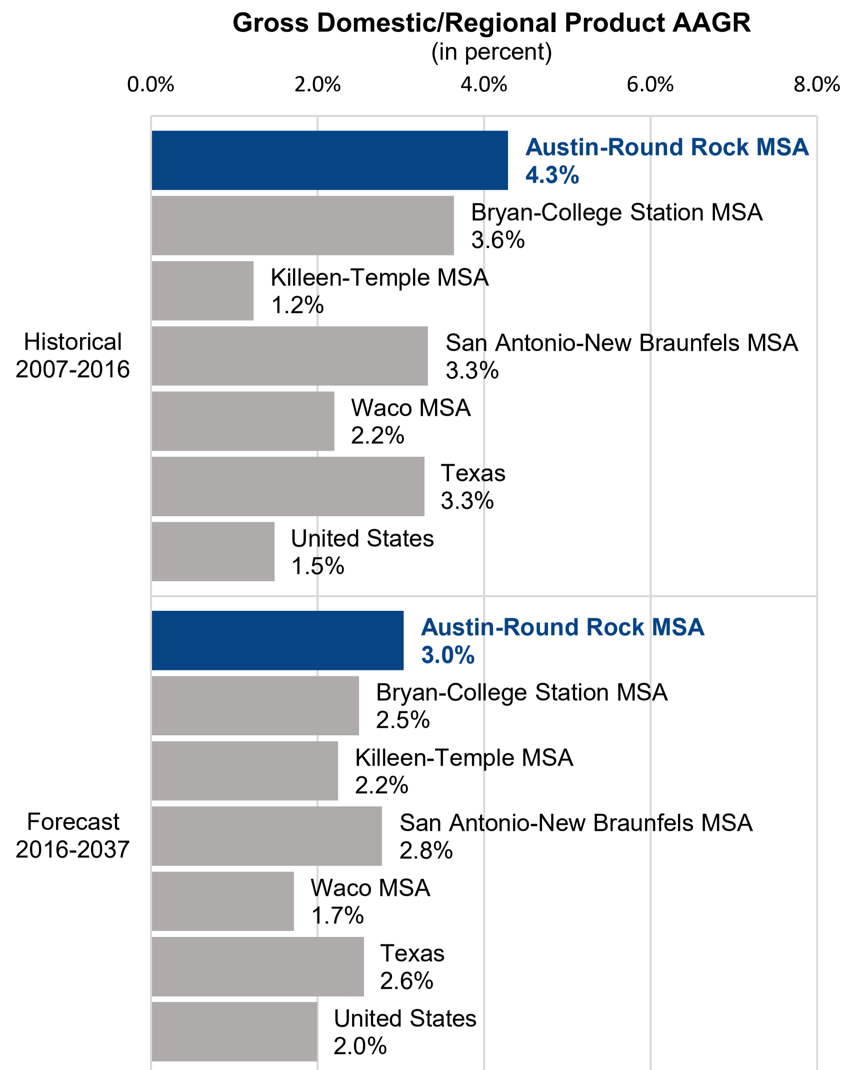
The San Antonio-New Braunfels MSA is the most populated MSA in the region with 2.4 million people compared to the 2.0 million people in the Austin MSA. However, the population in the Austin MSA has been the fastest growing since 2007, a trend expected to continue in the future. The remaining MSAs have a combined population of less than 1.0 million people.

In 2016, the PCPI within the Austin MSA was more than $7,000 more than the PCPI within the San Antonio-New Braunfels MSA and more than $10,000 more than the PCPI within each of the other MSAs in the region. The PCPI within the Bryan-College Station MSA has been the fastest growing since 2007 but the PCPI within the San Antonio-New Braunfels MSA is forecasted to increase at a faster rate than any of the MSAs in the region in the future.

Employment is closely related to population. Therefore, it is unsurprising that the employment for the Austin MSA is higher than the other MSAs in the region and that it is expected to increase at a faster rate than any of the other MSAs.

Exhibit 3.4-7 provides the AAGR for each of the socio-economic categories detailed above for the individual MSAs in the region as well as that of the state of Texas and the United States as a whole.

Exhibit 3.4-7: Regional Socio-Economic Comparisons



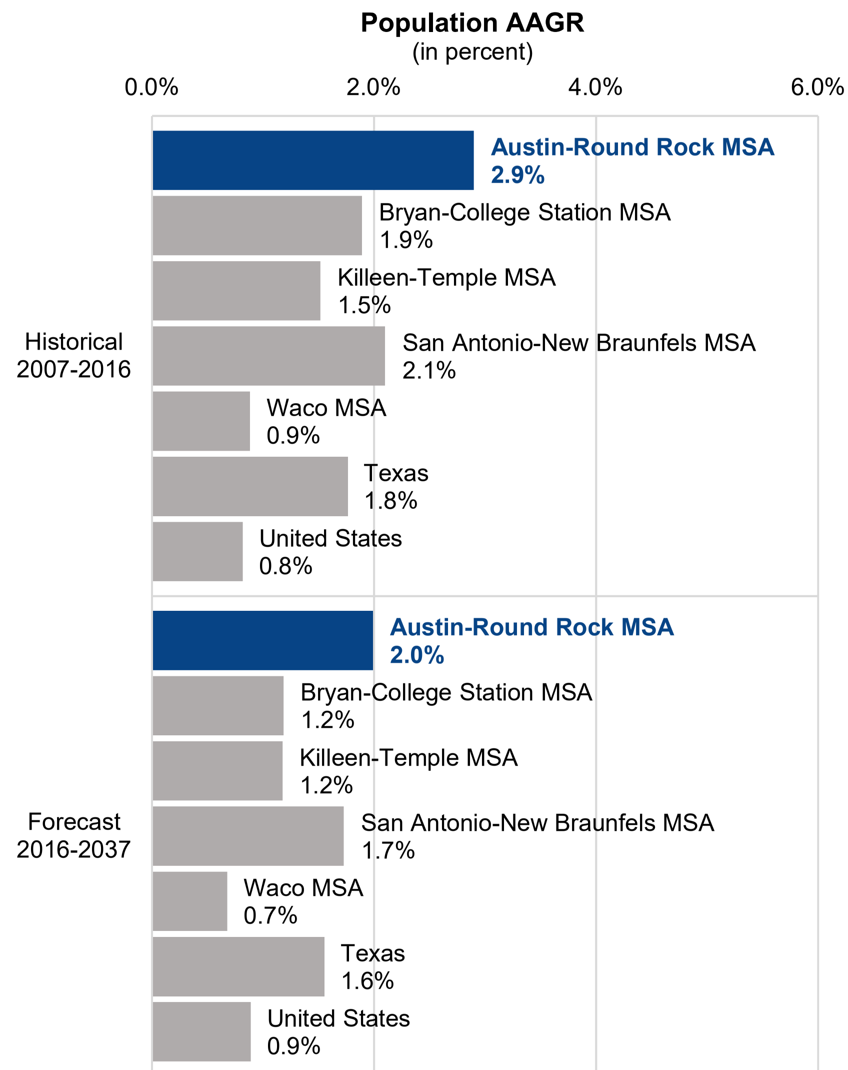
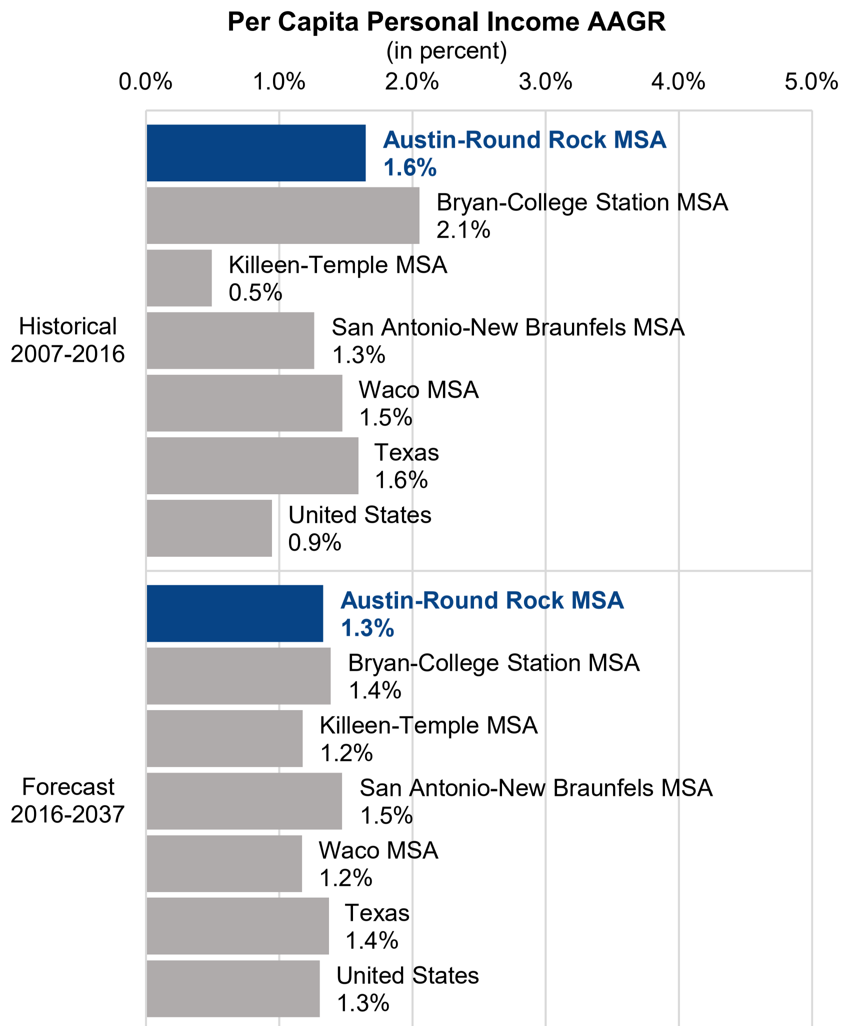
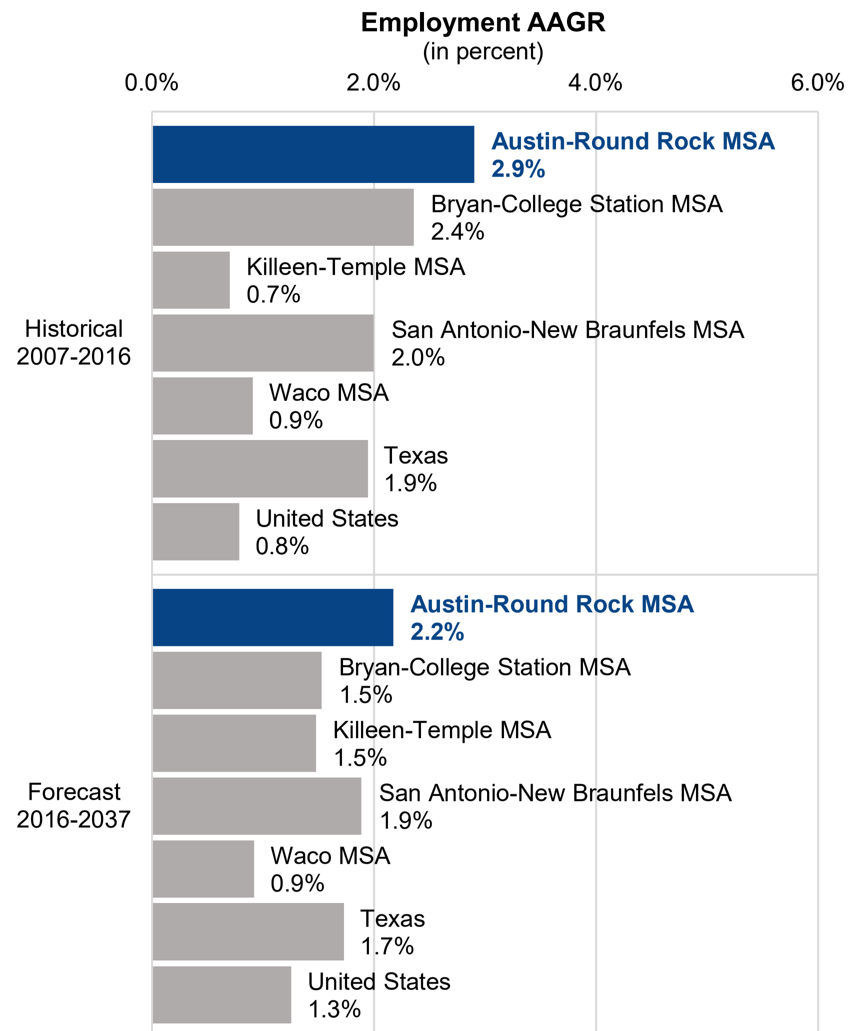


Exhibit 3.4-7: Regional Socio-Economic Comparisons (continued 2 of 2)





Note: AAGR is average annual growth rate.
Source: Woods & Poole, The Complete Economic and Demographic Data Source (CEDDS) 2017.

3.4.8 Cost of Living

Although personal income is a vital statistic, it is only a portion of determining whether a passenger has the means to afford to travel by air. If the cost of living is too high, then the passenger will not have the disposable income necessary to purchase a ticket. The Council for Community and Economic Research (C2ER) provides indices which reflect the average cost of living in a particular city or region in relation to the rest of the country. A cost of living index measures regional differences in the cost of consumer goods and service, excluding taxes and non-consumer expenditures. A composite index is given to a region based on six components: housing, utilities, grocery items, transportation, health care, and miscellaneous goods and services. The index can be used in determining how much personal income will be dedicated to these components compared the rest of the United States. For example, a composite score of 100 would indicate that, on average, the cost for goods in the region is equal to the average of the rest of the nation.

In 2016, the City of Austin had a composite index of 96.7 which indicates that the average cost of living in the City of Austin is approximately 3.3 percent less than the rest of the nation. This index is lower than many of major business centers in the United States. **Exhibit 3.4-8** provides the index for some comparable cites and how they have changed since 2007.

Exhibit 3.4-8: Cost of Living Index

Source: The Council for Community & Economic Research, Cost of Living Index.

3.4.9 Tourism

Tourism is a major industry in the Austin region. In 2016, there were 24.1 million visitors to the region generating over seven billion dollars in revenue. Austin has a number of attractions that bring visitors to the City. However, the main draw for visitors to the region are the conferences and festivals combined with unique sporting events.

Held in February, the Austin Marathon draws 20,000 people from around the world to participate. SXSW, which is held in March, combines film, music, and tech industries into one experience. In 2016, SXSW had an economic impact of $325.5 million to the City of Austin. On July 17, 2017 Delta Air Lines announced special service to Amsterdam Schiphol Airport (AMS) utilizing the 225-seat Boeing 767-300 to coincide with SXSW. The Circuit of the Americas is a world-class racing facility purposely built for Formula 1 racing. The Circuit is the home of the Formula 1 United States Grand Prix. The Grand Prix is a large international event held in October which drew 269,889 people in 2016. In the fall, there are a number of music and movie festivals including Fun Fun Fun, the Sound On Sound Fest, Fantastic Fest, the Austin Film Festival, and most notably the Austin City Limits Music Festival which is held in October and welcomes 70,000 fans per day.

3.4.10 Price of Air Travel

The demand for air travel is inversely proportional to the price. As airfares increase, fewer people can afford to travel for leisure. Alternatively, as airfares decrease, more people are able to afford to travel and do so more frequently. Prior to the Great Recession, airfares did not typically have a significant impact on the air travel demand for business passengers. However, the economic climate prompted businesses to seek measures in order to save cost, part of which included shrinking travel budgets. Now many companies are substituting air travel with telecommunications, such as video calls, when the cost of travel becomes too great.

Yield is the aviation industry's measure for average ticket prices. Yield is the average fare paid by customers to fly one mile, i.e. passenger revenue divided by revenue passenger miles. From 2011 through 2014 yields at ABIA remained steady at an average of 14.22 cents, after adjusting for inflation. However, over the past two years, there has been a notable decline in yields which is fairly consistent with the trend of yields in the airline industry as a whole. In 2016, yields at ABIA were only 13.09 cents.

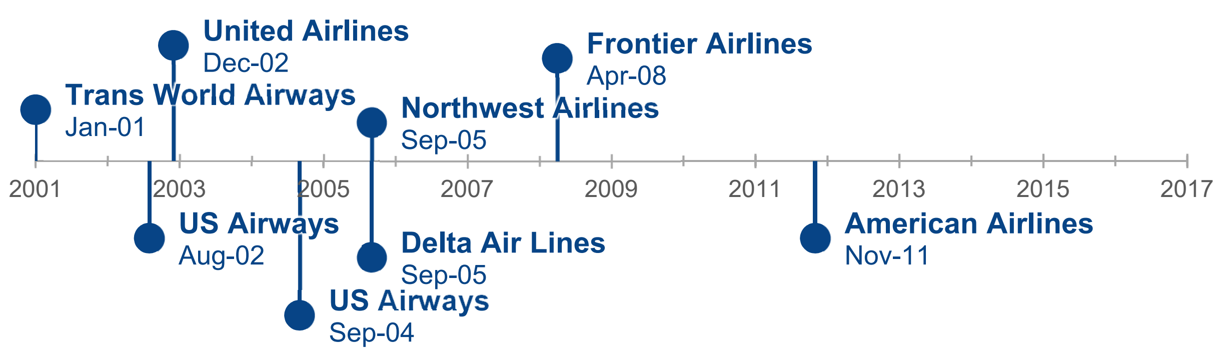
3.4.11 Airline Industry Strategy

The financial health of the airlines will play a major role in the determination of future forecasts for ABIA. The section contains a summary of the airline industry factors that were considered in developing the ABIA forecast.

3.4.11.1 Airline Bankruptcies

There have been dramatic changes to the financial health of the airline industry in the 21st century. Numerous airlines have declared Chapter 11 bankruptcy at least once. There was a rash of bankruptcies between 2001 and 2005, and another round in 2008 as a result of the recent economic recession. The most recent airline to declare bankruptcy was American Airlines, which entered bankruptcy protection in November 2011. As shown in **Table 3.4-3**, nine airlines that have operated at ABIA have declared bankruptcy this century. Southwest Airlines, the largest carrier at ABIA, has never declared bankruptcy.

Table 3.4-3: Airline Bankruptcy Status



AIRLINE	BANKRUPTCY STATUS
Trans World Airways	Filed Chapter 11 in January 2001 as part of acquisition by American.
US Airways	Filed Chapter 11 in August 2002 and again in September 2004; emerged in September 2005 in conjunction with acquisition by America West. Acquired by American Airlines in 2013.
United Airlines	Filed Chapter 11 in December 2002; emerged in February 2006.
Northwest Airlines	Filed Chapter 11 in September 2005; emerged in May 2007. Acquired by Delta in 2008.
Delta Air Lines	Filed Chapter 11 in September 2005; emerged in April 2007. Wholly owned subsidiary Comair Airlines taken into bankruptcy with Delta Airlines
Frontier Airlines	Filed Chapter 11 in April 2008; emerged in October 2009.
American Airlines	Filed Chapter 11 in November 2011. Wholly owned subsidiary American Eagle Airlines taken into bankruptcy with American Airlines. Emerged in December 2013.

Sources: Airlines for American, U.S. Airline Bankruptcies.

3.4.11.2 Airline Mergers

Many airlines have merged or been acquired since the turn of the 21st century, including American/TWA in 2001, US Airways/America West in 2005, Delta/Northwest in 2008, Southwest/AirTran in 2010, United/Continental in 2010-2012, American/US Airways in 2013, and most recently Alaska/Virgin in 2016.

These mergers have resulted in significant consolidation and economic control of passenger ridership. In 2000, 12 domestic airlines accounted for 93.4 percent of the domestic passengers in the United States. In 2016, the five combined airlines resulting from these mergers accounted for 87.1 percent of the domestic passengers.

3.4.12 Domestic Capacity

After five years of negative earnings, the United States airline industry collectively returned to profitability in 2006 after savings from labor cuts, salary concessions, and removal of many flight perquisites were realized. The success of restructuring has produced an industry that is already relatively streamlined with very little fat left to trim. The surge in oil prices in 2008 and the ensuing economic crisis pushed airlines to start raising fares and cutting capacity. To survive and be profitable, the airlines have had to reduce domestic capacity (the number of scheduled seats that are offered) to avoid losing money on unprofitable routes and excessive frequencies that were not supported with sufficient demand. This capacity cut was evident at ABIA in 2009 when airlines cut 8.9 percent of their seating capacity. However, all of the airlines were quick to return the loss in capacity at ABIA and have added new capacity despite reductions at other airports within the United States.

3.4.13 New Scheduled Service

International traffic at ABIA has historically been virtually nonexistent throughout ABIA's history. In 2012, AirTran Airways began scheduled service to CUN and in 2016 there were a total of six international markets at ABIA. While a majority of the growth in domestic traffic will be the result of natural or organic growth, the demand in the international segment is currently underserved. Therefore, new international markets have the potential to stimulate passenger traffic at ABIA. Within the next few years, it is anticipated that there could be new service to five new markets with two in Europe and one each in Canada, Latin American, and Asia-Pacific.

3.4.14 Price of Fuel

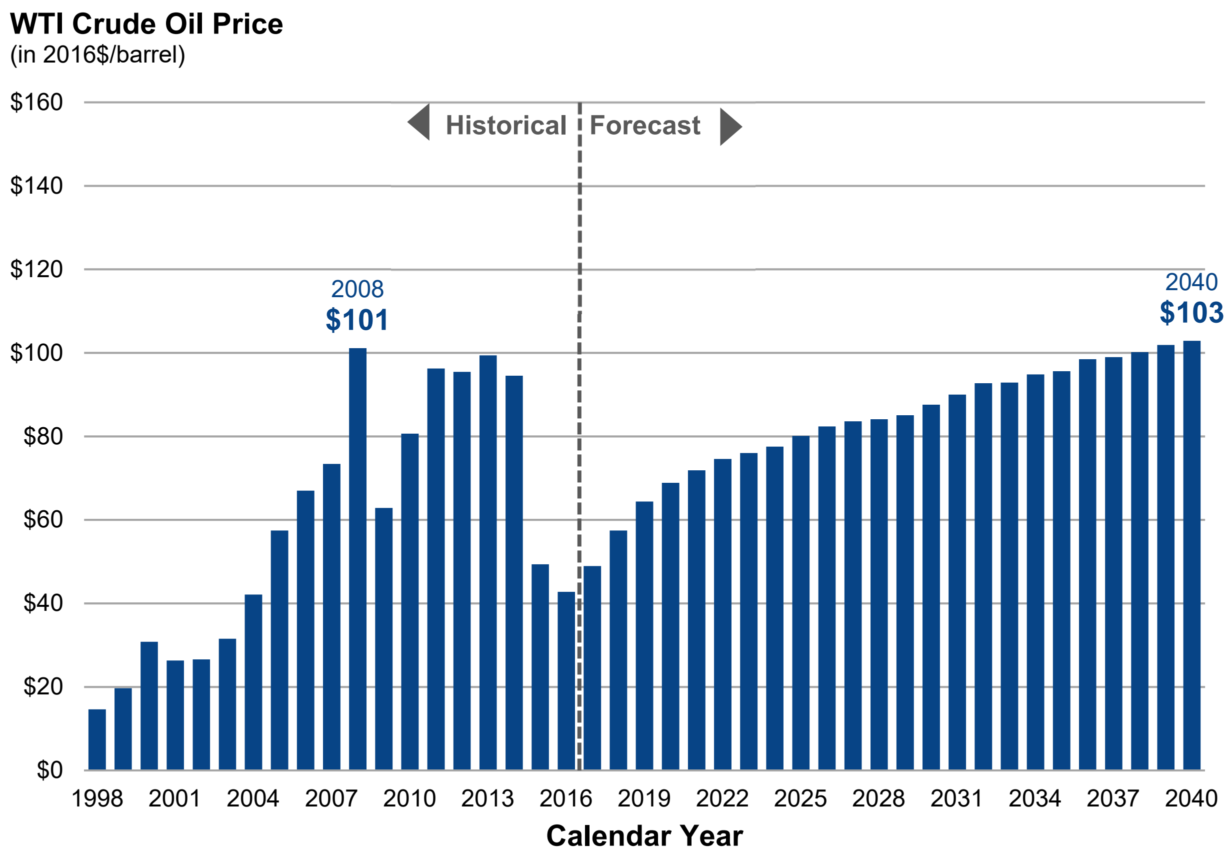
The price of oil and the associated cost of jet fuel is the largest single cost affecting the airline industry. The price of West Texas Intermediate (WTI) crude oil increased dramatically, posting a 290 percent increase in June 2008 when compared to January 2004. After averaging between $20 to $30 per barrel between 2000 and 2003, spot crude oil prices surged to about $140 per barrel in June and July of 2008. Several factors drove the increase such as strong global demand, particularly in China and India, a weak United States dollar, commodity speculation, political unrest, and a reluctance to materially increase supply.

The price of oil subsequently declined sharply to $61 per barrel in 2009 due to reduced demand resulting from the global financial crisis and resulting economic recession. However, as the economic climate improved and political unrest continued in the Middle East, oil prices increased in the subsequent three years. In 2012, oil prices averaged $94 per barrel. The increase in the price of jet fuel put upward pressure on airlines' operating costs. As a result, airlines were faced with cutting capacity or increasing fares, and sometimes both. An additional impact of higher fuel prices has been a sharp increase in load factors as airlines look to make better use of their aircraft assets by constraining capacity.

The average price of oil dropped significantly in 2015 to $49 per barrel, the lowest since 2004 and dropped again in 2016 to $43 per barrel. The drop alleviated the pressure on airlines' operating costs however the airlines are slow to make changes as fuel prices are expected to increase in the future.

The U.S. Energy Information Administration (EIA) provides forecasts of the price of crude oil in a report entitled the Annual Energy Outlook (EIO). In the 2017 EIO, the EIA projects that the price of oil will increase at 3.7 percent per annum through 2040, reaching $103 per barrel in 2040. **Exhibit 3.4-9** provides the historical price for crude oil and EIA's forecast of those prices.

Exhibit 3.4-9: Crude Oil Prices



Note: WTI stands for West Texas Intermediate.
Source: U.S. Energy Information Administration, Annual Energy Outlook 2017.

3.4.15 Aircraft Trends

Variable fuel costs, aircraft type, and aircraft age have an impact on which aircraft the airlines choose to fly. The next-generation Boeing 737s and Airbus 320/321s have among the best fuel economy in the industry. The airlines have designated certain aircraft for retirement that have poor fuel economy compared to newer models. Many of the MD-80/90, DC-9, and B737-300,-400,-500s have all been marked for reduction of use or retirement by many domestic airlines. The MD-80 series, MD-90 series, and DC-9 aircraft are expected to be retired by the end of 2017 while the older variants of the B737 are expected to be retired by 2020. These aircraft are expected to be replaced with the B737-700, B737-800 and B737 MAX aircraft with similar or higher seat capacities. Small regional jets like the EMB-135/140 and the CRJ-100/200 are also under much scrutiny and going through reductions. At ABIA, a majority of the small regional aircraft have already been eliminated from routes.

3.4.16 The Rise in E-Commerce Cargo

There is a fundamental shift ongoing in the air cargo industry. Historically, air cargo has been used as a supply chain for time-sensitive or high value product. Manufacturing has been a significant driver in air cargo and companies, such as Dell Inc., has provided the demand for air cargo. These companies have relocated a number of their manufacturing facilities to other parts of the world which has led to a shift to other modes of transportation such as cargo ships. Additionally, rising fuel costs, resulting in higher shipping costs, combined with the Global Recession led companies to reevaluate the necessity of shipping their products by air. As such, companies began to rely on an increased use of trucks and ships to deliver their product. The result is that traditional air cargo has been stagnant at many airports across the United States, including ABIA.

The increased use of e-commerce is expected to result in changes in the air cargo industry. The U.S. Census Bureau has projected that 8.5 percent of retail sales were e-commerce in the first quarter of 2017 compared to 7.8 percent in 2016.[15] Most of the current forecasts for e-commerce indicate double-digit growth in the market over the next five years. In e-commerce, venders are required to ship orders to their costumers fast, such as two-day shipping, which may require the use of air cargo despite the increased cost. Therefore, the growth in e-commerce is expected to have a significant impact on air cargo throughput.

It is believed that air cargo for e-commerce is expected to follow a similar spoke and hub model to the mainline passenger airlines. Centralized distribution centers, or hubs, will store a majority of the product then distribute the product to other airports, or spokes, on an as needed basis. As such, air cargo throughput at distribution hubs will be dependent on the needs at the spokes. The air cargo throughput at the spoke airports will be dependent on the needs of the population within ABIA's catchment area.

3.4.17 General Aviation Industry

3.4.17.1 National Activity

The civil aviation industry in the United States has experienced major changes over the past several decades. GA activity levels were at its highest in the late 1970s through 1981. GA activity levels and new aircraft production reached all-time lows in the early 1990s due to a number of factors including increasing fuel prices, increased product liability stemming from litigation concerns, and the resulting higher cost of new aircraft. The passage of the 1994 General Aviation Revitalization Act (GARA) combined with reduced new aircraft prices, lower fuel prices, resumed production of single-engine aircraft, continued strength in the production and sale of business jets, and a recovering economy led to growth in the GA industry in the latter half of the 1990s.

[15] U.S. Census Bureau, Quarterly Retail E-Commerce Sales 1st Quarter 2017, May 16, 2017.

The rebound in the United States GA industry that began with GARA started to subside by 2000. GA traffic at airports with air traffic control service slowed considerably in 2001 due largely to the United States economic recession, and to some extent, the terrorist attacks of September 11, 2001. GA traffic at airports with air traffic control service continued to decline through 2006 as spikes in fuel costs occurred and the economy grew at a relatively even pace. For the first time since 1999, GA traffic at airports with air traffic control service increased in 2007, but just slightly. In the following year however, GA aircraft operations declined by 4.7 percent. The decline in GA traffic continued due to the recent economic downturn and increased fuel prices. GA aircraft operations decreased 11.3 percent in 2009 and have continued to decline in the subsequent years.

3.4.17.2 Business Aviation

Companies and individuals use aircraft as a tool to improve their business's efficiency and productivity. The terms business and corporate aircraft are often used interchangeably, as they both refer to aircraft used to support a business enterprise. The FAA defines corporate transportation as "any use of an aircraft by a corporation, company or other organization (not for compensation or hire) for the purposes of transporting its employees and/or property and employing professional pilots for the operation of the aircraft."

After growing rapidly for most of the past decade, the demand for business jet aircraft has decelerated over the past few years. While new products, including very light jets, and increasing foreign demand helped to spur this growth in the early 2000s, the past few years have seen the dramatic impact of the recession on the business jet market. Issues such as reduced corporate profits, bankruptcies, mergers, and an intense scrutiny on business aviation as a result of corporate collapses have resulted in a slow-down in the growth of business aviation.

Increased personnel productivity has been stated as one of the most important benefits of using business aircraft. Companies flying business jets have more control of their travel. Itineraries can be changed as needed, and the aircraft can fly into destinations not served by scheduled airlines. Business aircraft usage provides:

- Employee time savings
- Increased enroute productivity
- Minimized time away from home
- Enhanced industrial security
- Enhanced personal safety
- Management control over scheduling

Business aviation aircraft ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. These aircraft allow employers to transport personnel and air cargo efficiently. Businesses often use the aircraft to link multiple office locations and reach existing and potential customers. Business aircraft used by smaller companies has escalated as various chartering, leasing, time-sharing, interchange agreements, partnerships, and management contracts have emerged. Businesses and corporations have increasingly employed business aircraft in their operations.

3.4.17.3 FAA Aerospace Forecast

The FAA develops a set of assumptions and forecasts based on the current tends of the U.S. aviation industry. These forecasts, entitled the FAA Aerospace Forecast, are published annually and are considered to be one the most complete forecasts available for aviation activity in the U.S. The FAA Aerospace Forecast provides forecasts for passenger, cargo, and general aviation activity on a national level.

The FAA Aerospace Forecasts[16] project the following trends in the United States GA and air taxi industry from 2016 to 2037:

- The number of active GA aircraft is forecast to increase by 0.1 percent annually.
- Piston hours flown are forecast to decline at 0.8 percent per annum.
- Turbo prop hours flown are forecast to increase at 1.6 percent per annum.
- Turbo jet hours flown are forecast to increase at 3.0 percent per annum.

3.5 Passenger Activity Forecasts

This section presents the forecast of enplaned passengers for ABIA through the forecast period as well as a discussion of the methodology used to develop this forecast. The enplaned passenger forecast reflects the historical airline activity trends, the economic base for air travel demand, and other factors that may affect the demand for air travel over the forecast period.

3.5.1 2017 Estimate

Through June of 2017, passenger enplanements have increased significantly when compared to the same time period from 2016.

Domestic enplaned passengers have increased 9.6 percent over the six-month span coinciding with an increase in the scheduled seating capacity of 11.1 percent. According to OAG, domestic seating capacity is scheduled to increase 12.5 percent for the entire year of 2017. This increase is partially attributed to a 6.5 percent increase in the frequency in scheduled aircraft operations. Additionally, many of the airlines at ABIA are increasing the average number of seats per aircraft operation. In particular, United Airlines and Delta Air Lines are scheduled to use narrow-body aircraft for flights that have historically utilized regional aircraft with fewer seats per aircraft operation. It is assumed that the dramatic increase in seating capacity will likely have a small

16 Federal Aviation Administration, FAA Aerospace Forecast, Fiscal Years 2017-2037.

negative impact on load factors in the short-term. Therefore, it was assumed that domestic enplaned passengers will increase 10.1 percent over the course of the entire year.
International enplaned passengers have increased 29.2 percent through June of 2017. This increase has coincided with an increase of 31.2 percent in scheduled international seats. According to OAG, international seating capacity is scheduled to increase 23.5 percent in 2017 mostly attributed to an entire year of Aeroméxico's service to MEX and Condor Flugdienst's service to FRA. It was assumed that international enplaned passengers will increase 22.0 percent over the course of the entire year.

3.5.2 Domestic Passenger Methodology

In an effort to develop the domestic enplaned passenger forecast at ABIA, historical traffic was divided into two segments: (1) O&D passengers and (2) connecting passengers. A forecast for each segment was created and the results were aggregated to provide a total domestic enplaned passenger forecast.

A number of standard industry forecasting techniques were considered in order to forecast domestic O&D enplaned passengers such as econometric regression modeling, trend analysis, market share, and time series. It was determined that an econometric regression model was most appropriate to forecast domestic O&D enplaned passengers at ABIA. Econometric regression modeling quantifies the relationship between enplaned passengers and socio-economic variables. This methodology recognizes that the key independent variables will change over time but assumes that their fundamental relationships to the dependent variables will remain.

The first step in developing the appropriate model was to test the independent, or explanatory, variables against the dependent variable, pure domestic O&D enplaned passengers. In order for an econometric model to be considered appropriate, the following has to be true:

- Adequate test statistics (i.e. high coefficient of determination (R^2) values and low p-value statistics), which indicate that the independent variables are good predictors of ABIA traffic.
- Doesn't result in theoretical contradictions (e.g., the model indicates that GDP growth is negatively correlated with traffic growth).
- The results are not overly aggressive or conservative that are incompatible with historical averages.

Through the testing of multiple sets of independent variables, a multivariate linear model using the MSA's GDP and PCPI was selected to forecast domestic O&D enplaned passengers. The model exhibits strong regression statistics when compared to models with other combinations of independent variables. The model formula and relevant test statistics are as follows:

Model:

Enplaned Passengers = $35.67 * GRP_{MSA} + 37.45 * PCPI_{MSA} - 774,128$

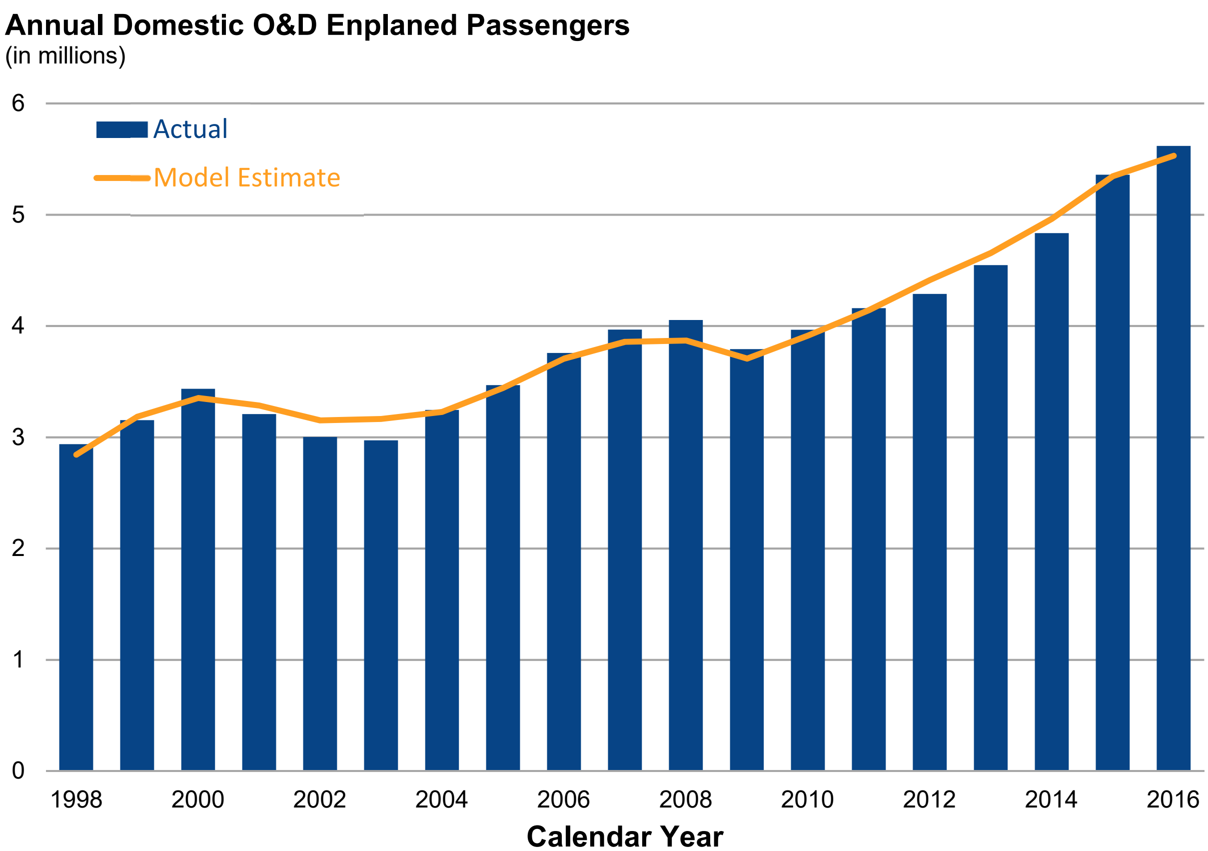
Where: GRP_{MSA} = Austin MSA GRP
$PCPI_{MSA}$ = Austin MSA PCPI

Test Statistics:
R^2 = 98.3 percent
DF = 18
P-Value = 0.00

Independent Variables P-Values:
Intercept = 0.20
GRP_{MSA} = 0.00
$PCPI_{MSA}$ = 0.06

The R^2 indicates that 98.3 percent of the variation in the domestic O&D enplaned passengers at ABIA can be explained by the model. **Exhibit 3.5-1** illustrates the model fit when plotted against the actual domestic O&D enplaned passengers.

Exhibit 3.5-1: Domestic O&D Enplaned Passenger Regression Model



Sources: Woods & Poole, The Complete Economic and Demographic Data Source (CEDDS) 2017. U.S. Department of Transportation, Air Passenger Origin-Destination Survey. Landrum & Brown analysis, 2017.

The domestic connecting enplaned passenger forecast was derived in part from the domestic O&D enplaned passenger forecast. Since 1998, only five percent of the domestic enplaned passengers at ABIA were connecting. It was assumed that as additional domestic markets are added at ABIA, the percent of connecting passengers will increase accordingly. As such, it was assumed that the share of domestic connecting enplaned passengers will increase from 4.5 percent in 2016 to 6.0 percent in 2037.

3.5.3 International Passenger Methodology

Typically, passenger activity forecasts are developed using a demand-side approach, such as the approach used for domestic O&D enplaned passengers. This approach forecasts the underlying demand, the number of passengers, and then derives the number of operations based on the forecasted number of passengers. However, given the short existence of consistent international service at ABIA, it is not possible to accurately estimate the future demand based on historical trends. Therefore, a supply-side, or bottom-up, approach was utilized to determine the international enplaned passenger forecast in the near-term. This approach examines potential new service based on empirical knowledge of the markets served and current demand as indicated by information provided by the Marketing Information Data Tapes (MIDT). MIDT includes booking transactions generated by travel agents. These bookings provide insight as what international demand is not being met by the current nonstop service. Based on the information gathered, the following flights were assumed to begin service within the next five years[17]:

- **Norwegian**
  Destination: London Gatwick Airport (LGW)
  Aircraft: Boeing 787-900
  Seating Configuration: 344
  Weekly Departures: 3
  Starting Date: Early 2018
- **Air Canada**
  Destination: Vancouver International Airport (YVR)
  Aircraft: Embraer 175
  Seating Configuration: 73
  Weekly Departures: 7
  Starting Date: Late 2018
- **Air France**
  Destination: Charles de Gaulle Airport (CDG)
  Aircraft: Boeing 787-900
  Seating Configuration: 294
  Weekly Departures: 1
  Starting Date: Late 2019

[17] Norwegian service to LGW has already been announced to begin in March 2018.

- **Korean Air**
  Destination: Incheon International Airport
  Aircraft: Boeing 777-300
  Seating Configuration: 277
  Weekly Departures: 1
  Starting Date: Early 2020
- **United Airlines**
  Destination: Juan Santamaría International Airport
  Aircraft: Boeing 737-800
  Seating Configuration: 166
  Weekly Departures: 4
  Starting Date: Late 2020

Load factors for the assumed flights were applied to the seating configuration for these assumed flights and then annualized to determine the forecasted international enplaned passengers through 2021.

Growth in international enplaned passengers after 2021 was assumed to occur naturally. As such, the growth is likely to occur at a rate similar to that at other airports in the United States over that time. The FAA Aerospace Forecast[18] estimates that international revenue passenger miles will increase at an average of 3.2 percent per annum from 2021 through 2037. This rate was applied to the results of the short-term international enplaned passenger forecast to determine the long-term forecast.

3.5.4 Forecast Summary

Based on the model used, domestic O&D enplaned passengers at ABIA are forecast to increase from a 5.8 million in 2016 to 12.1 million in 2037, representing an AAGR of 3.5 percent. The domestic connecting enplaned passenger forecast was derived from the domestic O&D enplaned passenger forecast. Based on the assumptions used, domestic connecting enplaned passengers will increase from 261,812 in 2016 to 769,000 in 2037, representing an AAGR of 5.3 percent. The result of the bottom-up approach combined with the application of the FAA Aerospace Forecast growth rates is that international passenger enplanements are forecast to increase from 133,829 in 2016 to 512,600 in 2037, representing an AAGR of 6.6 percent. The aggregation of the domestic O&D, domestic connecting, and the international enplaned passenger forecast results in the total enplaned passenger forecast. Overall, total enplaned passengers at ABIA are forecast to increase from 6.2 million in 2016 to 13.3 million in 2037, representing an AAGR of 3.7 percent. **Table 3.5-1** provides a summary of the enplaned passenger forecast by segment.

18 Federal Aviation Administration, FAA Aerospace Forecast, Fiscal Years 2017-2037.

Table 3.5-1: Enplaned Passenger Forecast Results

YEAR		DOMESTIC		INTERNATIONAL	TOTAL
		O&D	CONNECTING		
Historical	1998	2,937,884	88,216	1,054	3,027,154
	1999	3,218,722	131,218	0	3,349,940
	2000	3,757,224	162,110	11,148	3,930,482
	2001	3,493,188	181,261	7,333	3,681,782
	2002	3,259,799	168,191	11,312	3,439,302
	2003	3,250,158	170,098	16,311	3,436,567
	2004	3,522,545	170,441	14,878	3,707,864
	2005	3,759,971	154,297	7,935	3,922,203
	2006	4,034,880	172,367	4,062	4,211,309
	2007	4,369,839	169,248	13,394	4,552,481
	2008	4,399,494	174,409	45,727	4,619,630
	2009	3,911,388	187,525	14,631	4,113,544
	2010	4,129,383	202,290	2,527	4,334,200
	2011	4,313,562	235,395	4,580	4,553,537
	2012	4,443,704	267,758	14,049	4,725,511
	2013	4,701,107	292,924	26,370	5,020,401
	2014	5,000,536	295,025	81,943	5,377,504
	2015	5,565,977	283,715	121,320	5,971,012
	2016	5,833,300	261,812	133,829	6,228,941
Estimate	2017	6,508,841	289,300	169,400	6,967,541
Forecast	2019	7,263,030	334,970	261,100	7,859,100
	2021	7,717,000	369,000	307,800	8,393,800
	2024	8,443,000	426,000	342,200	9,211,200
	2037	12,047,000	769,000	512,600	13,328,600

RANGE	AVERAGE ANNUAL GROWTH RATE			
1998-2008	4.1%	7.1%	45.8%	4.3%
2008-2016	3.6%	5.2%	14.4%	3.8%
1998-2016	3.9%	6.2%	30.9%	4.1%
2016-2024	4.7%	6.3%	12.5%	5.0%
2024-2037	2.8%	4.6%	3.2%	2.9%
2016-2037	3.5%	5.3%	6.6%	3.7%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Woods & Poole, The Complete Economic and Demographic Data Source 2017. U.S. Department of Transportation, Air Passenger Origin-Destination Survey. Landrum & Brown analysis 2017.

3.5.5 Forecast Scenarios

In addition to the baseline enplaned passenger forecast presented thus far, high and low scenarios were developed to account for the uncertainty associated with a long-term forecast. The alternative scenarios are described in the following sections.

3.5.5.1 High Case Scenario

Under the baseline forecast, the MSA's GRP is forecast to increase at an AAGR of 3.0 percent through 2037. However, in recent years the GRP for the region has increased at a rate twice the forecasted growth. Therefore, the high case scenario assumes higher economic growth for the Austin region. Under the high case scenario, the MSA's GRP is assumed to increase at an AAGR of 4.0 through 2037. The higher economic growth results in an increase in domestic enplaned passengers of 2.2 million by 2037 when compared to the baseline. The high case also assumes that the international service at ABIA is more successful than estimated. The baseline forecast assumed that after 2021 enplaned international passengers would increase at the same rate as the national average. However, under the high case it is assumed that international enplaned passengers at ABIA would increase at a rate that is on average 1.5 percentage points higher than the year-over-year national average. The result is an increase in international enplaned passengers of 132,600 by 2037 when compared to the baseline.

3.5.5.2 Low Case Scenario

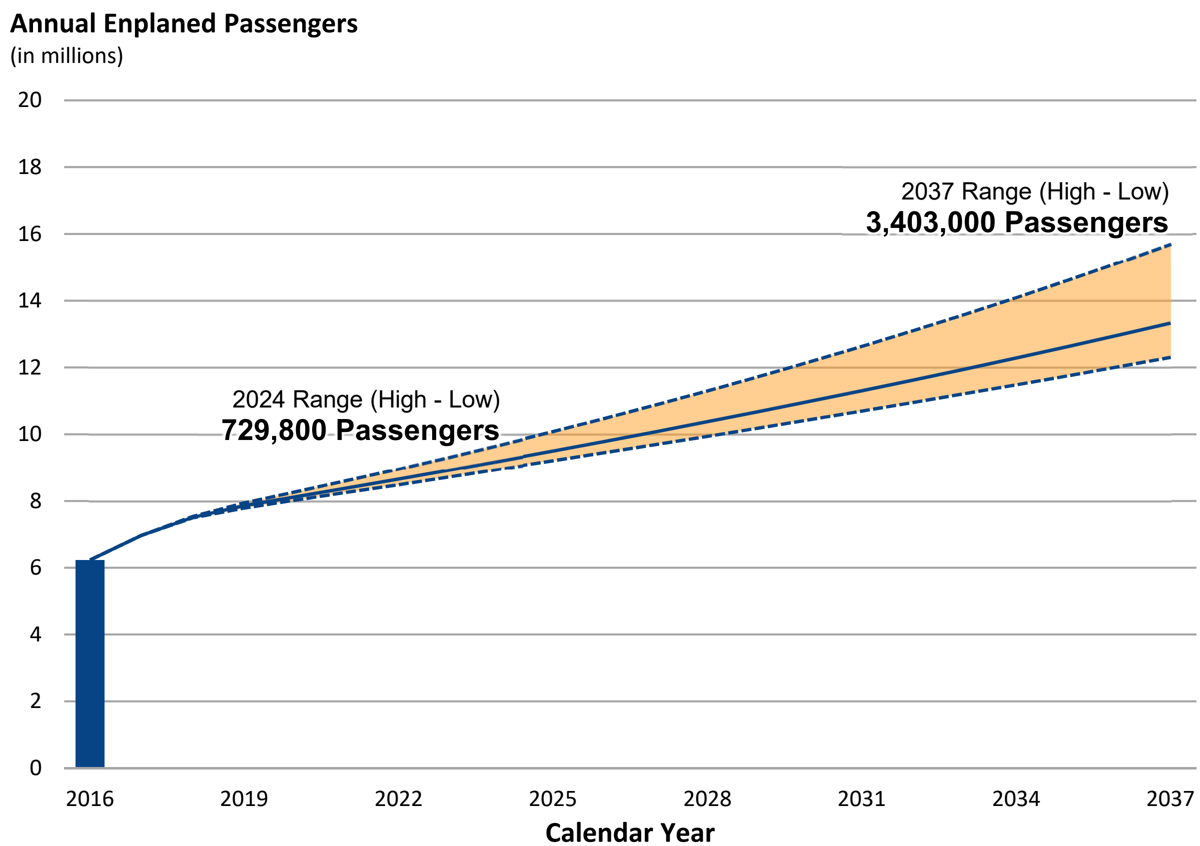
The low case scenario assumes the Austin region will not meet the current GRP forecast. Under the low case scenario, the MSA's GRP is assumed to increase at an AAGR of 2.5 percent through 2037. The lower economic growth results in a decrease in domestic enplaned passengers of 1.0 million by 2037 when compared to the baseline.

The low case assumes that the roll-out of the new international service proposed in this document will be prolonged and the flights will occur over the next seven years rather than five. Additionally, the low case also assumes that the international service at ABIA is less successful than estimated. Under the low case, it is assumed that international enplaned passengers at ABIA would increase at a rate that is on average 0.25 percent lower than the year-over-year national average. The result is a decrease in international enplaned passengers of 46,000 by 2037 when compared to the baseline.

3.5.5.3 Summary of Scenario Forecasts

The enplaned passenger forecast scenarios provide a range of 12.3 million to 15.7 million. **Exhibit 3.5-2** provides a comparison of the forecast scenarios and a more detailed overview of the scenarios is provided in **Table 3.5-2**.

Exhibit 3.5-2: Comparison of Enplaned Passenger Forecast Scenarios



Sources: Woods & Poole, The Complete Economic and Demographic Data Source 2017. U.S. Department of Transportation, Air Passenger Origin-Destination Survey. Landrum & Brown analysis, 2017.

Table 3.5-2: Summary of Enplaned Passenger Forecast Scenarios

YEAR		DOMESTIC			INTERNATIONAL			TOTAL		
		LOW	BASE	HIGH	LOW	BASE	HIGH	LOW	BASE	HIGH
Historical	2016	6,095,112	6,095,112	6,095,112	133,829	133,829	133,829	6,228,941	6,228,941	6,228,941
Estimate	2017	6,798,141	6,798,141	6,798,141	169,400	169,400	169,400	6,967,541	6,967,541	6,967,541
Forecast	2019	7,556,000	7,598,000	7,682,000	234,000	261,100	261,100	7,790,000	7,859,100	7,943,100
	2021	7,977,000	8,086,000	8,308,000	283,800	307,800	307,800	8,260,800	8,393,800	8,615,800
	2024	8,644,000	8,869,000	9,338,000	321,400	342,200	357,200	8,965,400	9,211,200	9,695,200
	2037	11,836,000	12,816,000	15,060,000	466,200	512,600	645,200	12,302,200	13,328,600	15,705,200
RANGE		AVERAGE ANNUAL GROWTH RATE								
2016-2024		4.5%	4.8%	5.5%	11.6%	12.5%	13.1%	4.7%	5.0%	5.7%
2024-2037		2.4%	2.9%	3.7%	2.9%	3.2%	4.7%	2.5%	2.9%	3.8%
2016-2037		3.2%	3.6%	4.4%	6.1%	6.6%	7.8%	3.3%	3.7%	4.5%

Sources: Woods & Poole, The Complete Economic and Demographic Data Source 2017. U.S. Department of Transportation, Air Passenger Origin-Destination Survey. Landrum & Brown analysis, 2017.

3.6 Air Cargo Throughput Forecasts

This section presents the forecast of air cargo throughput for ABIA through the forecast period as well as a discussion of the methodology used to develop this forecast. In a similar fashion to the enplaned passenger forecast, the air cargo throughput forecast provides the basis for the all-cargo, or freighter, aircraft operations forecast.

3.6.1 Methodology

A variety of methods were explored to forecast air cargo throughput at ABIA including econometric modeling. However, none of the potential socio-economic indicators explored produced reasonable test results or realistic forecasts nor did they accurately depict the changes anticipated due to e-commerce.

It is assumed that growth in air cargo at ABIA will be heavily dependent on the growth of e-commerce. Amazon.com, the largest online retailer in the U.S., is expected to be at the forefront of the growth in e-commerce.

Studies have shown that a majority of the members of Amazon Prime, a paid subscription service which provides free two-day delivery, shop at Amazon.com at least two to three times a month. Currently, 70 percent of higher-income households, those that earn $100,000 or more annually, have an Amazon Prime membership compared to 50 percent of lower-income households.

In the Austin MSA, higher-income households are expected to increase 3.6 percent per annum through 2037. During the same timeframe, it is assumed that the adoption rate of Prime membership for these households will increase to 80 percent. Lower-income households are expected to increase only 1.1 percent per annum through 2037. Walmart, Target, and other retailers are expected to provide services similar to Prime in the near-term which is expected to increase adoption rate of e-commerce in lower-income households. As such, with using Prime membership as a proxy, adoption rates for lower-income households are expected to increase from 50 percent in 2016 to 65 percent in 2037. Total e-commerce adoption in the Austin MSA was determined by multiplying each household segment by their respective adoption rates and aggregating the results. Based on this analysis, it was determined that household e-commerce adoption will increase in the Austin MSA by 3.1 percent per annum through the forecast period.

The year-over-year growth rates for e-commerce adoption was applied to the historical cargo throughput ABIA.

3.6.2 Forecast Summary

Air cargo throughput at ABIA is forecast to increase from 175 million pounds in 2016 to 355 million pounds in 2037, representing an AAGR of 3.4 percent. **Table 3.6-1** provides a summary of the air cargo throughput forecast.

Table 3.6-1: Air Cargo Throughput Forecast Results (Millions of Pounds)

YEAR		DOMESTIC	INTERNATIONAL	TOTAL
Historical	1998	213	27	240
	1999	245	31	276
	2000	324	41	365
	2001	293	37	330
	2002	269	34	303
	2003	237	30	267
	2004	253	20	273
	2005	239	16	255
	2006	226	4	230
	2007	206	5	211
	2008	198	4	202
	2009	153	4	157
	2010	145	8	153
	2011	143	11	153
	2012	145	10	156
	2013	146	13	159
	2014	135	20	155
	2015	138	20	157
	2016	156	19	175
Estimate	2017	171	23	194
Forecast	2019	195	27	222
	2021	212	29	241
	2024	232	32	264
	2037	312	43	355
RANGE		AVERAGE ANNUAL GROWTH RATE		
1998-2016		-1.7%	-1.9%	-1.7%
2016-2037		3.4%	4.0%	3.4%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Landrum & Brown analysis 2017.

3.6.3 Forecast Scenarios

In addition to the baseline cargo throughput forecast presented thus far, high and low scenarios were developed to account for the uncertainty associated with a long-term forecast. The alternative scenarios are described in the following sections.

3.6.3.1 High Case Scenario

The high case scenario assumes that an e-commerce distribution center will be developed at ABIA. Assumptions regarding this scenario were made based on empirical knowledge of the industry. It was assumed that the distribution hub will begin service in 2027 with more than 25,500 annual operations primarily utilizing the Boeing 767-300 aircraft. Within the first five years, aircraft operations are expected to nearly triple adding a number of narrow-body aircraft for short-haul flights. In 2037, 91,250 aircraft operations are forecast to occur as a result of the e-commerce distribution center. The max payload for the fleet was multiplied by an assumed occupancy factor of 35.0 percent. The development of the distribution center results in an increase in cargo throughput of 3,060 million pounds by 2037 when compared to the baseline.

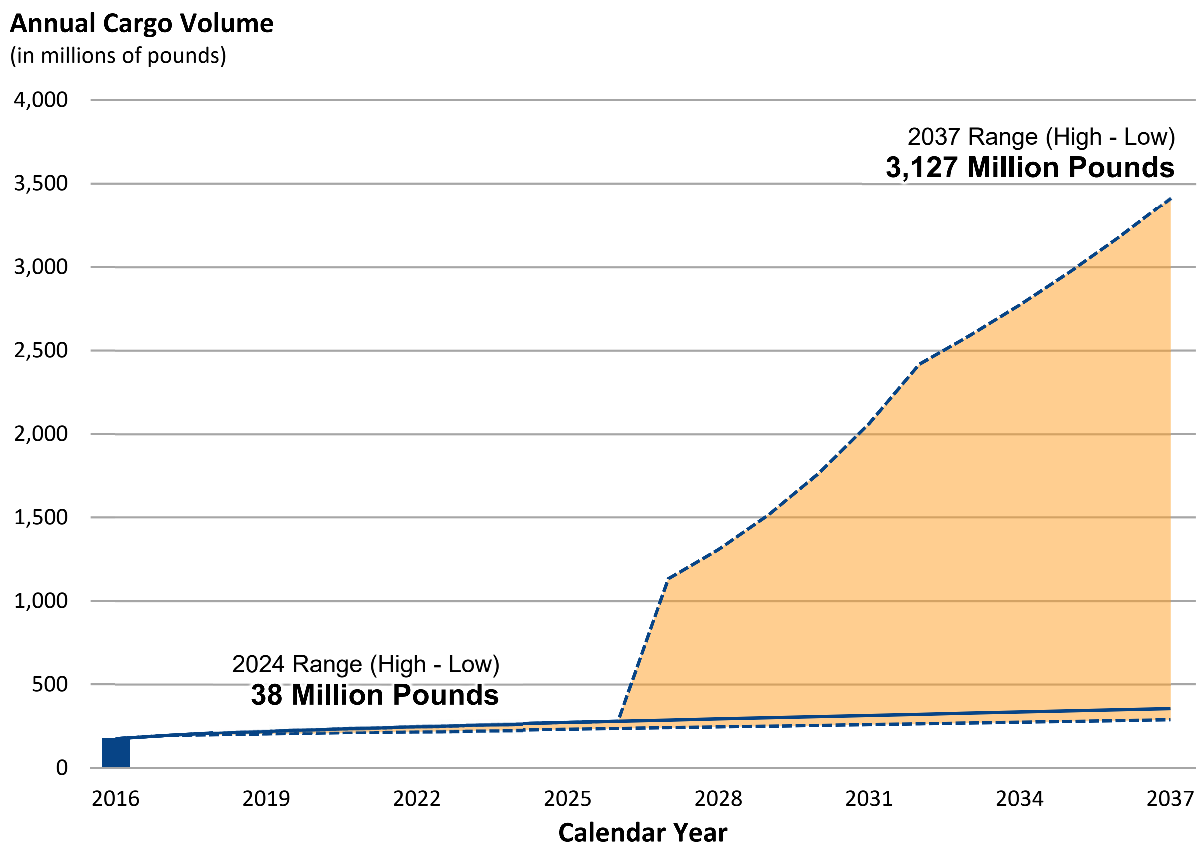
3.6.3.2 Low Case Scenario

The low case scenario assumes adoption rates for e-commerce will remain at 2016 level through the forecast period. The lower adoption rates for e-commerce results in a decrease in cargo throughput of 67 million pounds by 2037 when compared to the baseline.

3.6.3.3 Summary of Scenario Forecasts

The cargo throughput forecast scenarios provide a range of 288 million to 3,415 million pounds. **Exhibit 3.6-1** provides a comparison of the forecast scenarios and a more detailed overview of the scenarios is provided in **Table 3.6-2**.

Exhibit 3.6-1: Comparison of Cargo Throughput Forecast Scenarios



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Landrum & Brown analysis, 2017.

Table 3.6-2: Summary of Cargo Throughput Forecast Scenarios

YEAR		DOMESTIC			INTERNATIONAL			TOTAL		
		LOW	BASE	HIGH	LOW	BASE	HIGH	LOW	BASE	HIGH
Historical	2016	156	156	156	19	19	19	175	175	175
Estimate	2017	171	171	171	23	23	23	194	194	194
Forecast	2019	178	195	195	25	27	27	203	222	222
	2021	187	212	212	26	29	29	213	241	241
	2024	200	232	232	27	32	32	227	264	264
	2037	253	312	3,003	35	43	412	288	355	3,415
RANGE		AVERAGE ANNUAL GROWTH RATE								
2016-2024		3.1%	5.1%	5.1%	4.5%	6.8%	6.8%	3.3%	5.3%	5.3%
2024-2037		1.8%	2.3%	21.8%	2.0%	2.3%	21.7%	1.9%	2.3%	21.7%
2016-2037		2.3%	3.4%	15.1%	3.0%	4.0%	15.8%	2.4%	3.4%	15.2%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Landrum & Brown analysis, 2017.

3.7 Aircraft Operations Forecast

This section describes the methodology and the results of the aircraft operations forecast at ABIA. Aircraft operations, defined as Janaircraft arrivals plus departures, were forecast separately for five major categories: (1) passenger; (2) all-cargo; (3) air taxi; (4) general aviation; and (5) military. These components are then aggregated to derive a total aircraft operations forecast for ABIA.

3.7.1 Passenger Aircraft Operations

3.7.1.1 Methodology

The number of passenger aircraft operations at an airport depends on three factors: (1) total passengers; (2) average aircraft size; and (3) average load factor (percent of seats occupied). The relationship is shown in the following equation:

$$\text{Passenger Aircraft Operations} = \frac{\text{Total Passengers}}{\text{Average Load Factor} * \text{Average Aircraft Size}}$$

This relationship permits an infinite set of load factors, average aircraft size, and operations to accommodate a given number of passengers. The domestic enplaned passenger forecast was used to derive the domestic passenger aircraft operations. The enplaned passenger forecast was used as the numerator in the formula above with assumed values for the load factors and average aircraft size to determine passenger aircraft departures. To calculate total operations, the total number of departures was multiplied by a factor of two. Through 2021, the international passenger aircraft operations forecast was developed by including the assumed flights to be added as part of the international enplaned passenger forecast. Beyond 2021, the international passenger aircraft operations forecast used the same methodology as the domestic passenger aircraft operations forecast.

In order to develop reasonable load factor and average number of seats per aircraft assumptions, enplaned passengers and passenger aircraft departures were disaggregated into categories of activity (i.e. air carrier and regional activity for both domestic and international service). Load factors and the average aircraft size, or average seats per departure (ASPD), at every airport is inherently different due to differences in how airlines choose to serve the demand for air travel to, from, and over each airport. These differences may result from a strategic focus on unit revenue versus unit costs or an emphasis on a hub and spoke system versus a point-to-point operation.

A number of sources were used to develop the historical passenger aircraft operations, load factors, and the ASPD for ABIA. The Official Airline Guide (OAG); FAA, Operations Network (OPSNET); and USDOT, Air Carrier Statistics database (T-100) were used to develop total departures and seats for each segment. ASPD for each of the major groups of passenger activity was calculated from total departures and total departing seats. Aircraft load factors were calculated for each group of passenger aircraft operations by dividing total enplaned passengers by total departing seats.

3.7.1.2 Passengers Per Operation

The average number of seats per aircraft for each category of activity is directly related to the type of aircraft being utilized at ABIA. A majority of the domestic passenger traffic at ABIA is handled by four mainline carriers. Therefore, in order to estimate the future average number of seats per aircraft, the fleet plans for these carriers were examined. The following is a description of the current fleet plans for each of the mainline carriers with a focus on potential changes at ABIA:

- **Southwest Airlines:** The Southwest Airlines' Boeing 737-700 aircraft is the most used aircraft at ABIA. The aircraft accounted for almost a third of the total scheduled passenger operations in 2016. The Boeing 737-300 in Southwest Airlines' fleet are to be retired by the end of 2017. It is expected that the airline will fill the demand with their current fleet of Boeing 737-800 and Boeing 737-700 aircraft. Currently, Southwest Airlines has a number of Boeing 737 Max8 and Boeing 737 Max7 aircraft on order. It is expected these aircraft will handle some of the service at ABIA as soon as deliveries are made which are expected to begin in 2017 for the Boeing 737 Max8 and 2019 for the Boeing 737 Max7.
- **American Airlines:** Currently, American Airlines utilizes a mix of the Boeing MD-80, Boeing 737-800, Airbus A319, and Airbus A321 aircraft at ABIA. The Boeing MD-80 aircraft are expected to be retired by the end of 2018. These aircraft will initially be replaced with American Airlines' existing Boeing 737-800 and Airbus A319 aircraft. American Airlines has 100 orders for the Boeing 737 Max8 aircraft with deliveries set to begin in 2017. The aircraft will likely be utilized interchangeably with the Boeing 737-800 aircraft.
- **United Airlines:** United Airlines deploys an even mix of the Airbus A319, Airbus A320, Boeing 737-800, and Boeing 737-900 aircraft at ABIA. United Airlines has orders for the Boeing 737 Max9 aircraft which will be utilized at ABIA as the aircraft are delivered. It is anticipated that as demand on particular routes, such as Newark Liberty International Airport and San Francisco International Airport, approach the upper limits of capacity afforded by narrow-body aircraft, United Airlines will begin to deploy wide-body aircraft, such as the Boeing 777-200ER.
- **Delta Air Lines:** Delta Air Lines uses a mix of the Airbus A319, Boeing 757, and Boeing MD-90 at ABIA. The Boeing MD-90 is expected to be replaced beginning in the summer of 2017. The older Boeing 757 aircraft are expected to be retired during the forecast period and the Airbus A321-200 will act as its replacement. The airline will also begin utilizing the Bombardier CS100 where applicable.

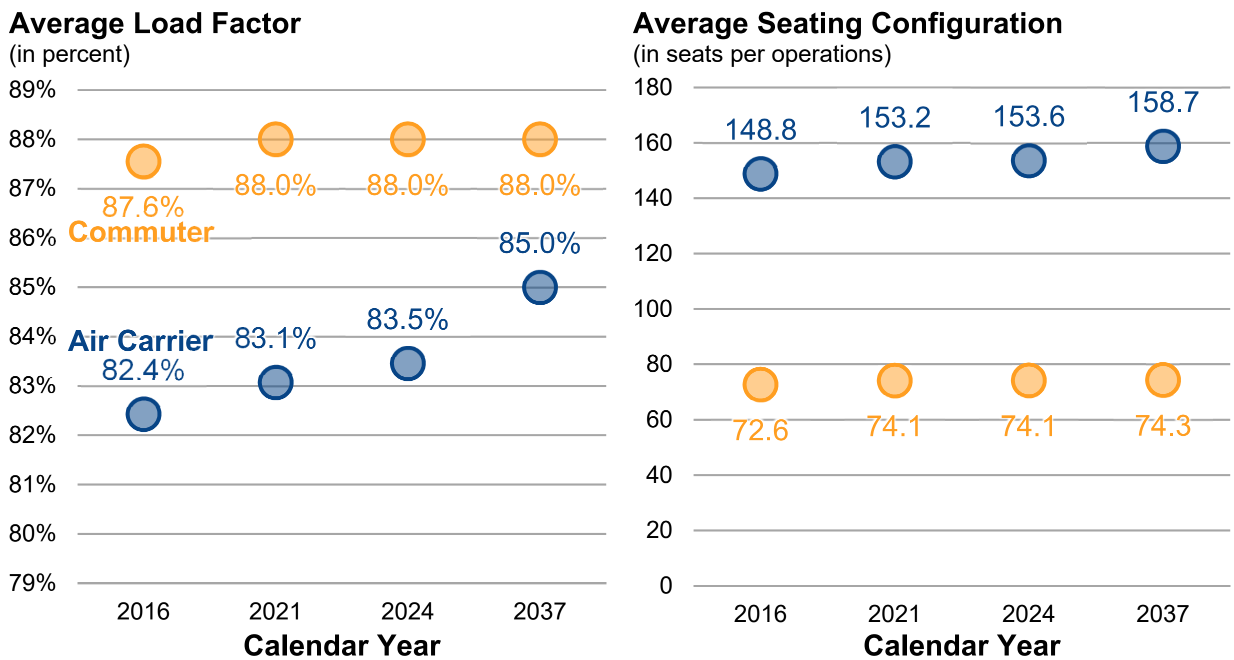
Small regional jets are being retired at an accelerated rate as the airlines believe these aircraft are too expensive to fly. A majority of the small regional aircraft have already been eliminated from routes at ABIA. It is expected that all of the regional partners of the mainline carriers will completely replace all remaining small regional aircraft at ABIA within the next five years. However, Texas Sky, a regional charter brand of Public Charters, Inc., utilizes the British Aerospace Jetstream 32 and 41 aircraft for their intrastate service and ViaAir, which provides service to the Branson Airport, utilizes the Embraer ERJ145 aircraft. These airlines will continue utilize the small regional jets for operations at ABIA for the foreseeable future.

In 2016, domestic air carrier aircraft operations had an ASPD of 148.8 and an average load factor of 82.4 percent. Based on the fleet plans for the airlines providing domestic service at ABIA, the ASPD for domestic air carrier flights is projected to increase to 158.5 in 2037. Meanwhile, load factors for domestic air carrier flights are expected to increase to an average of 85.0 percent by 2037.

Considering that the domestic commuter fleet operating at ABIA is already primarily comprised of large regional aircraft, the ASPD for domestic commuter aircraft operations is not expected to change materially over the forecast period. It is assumed that ASPD for domestic commuter aircraft operations will increase from 72.6 in 2016 to 74.3 in 2037. Domestic commuter aircraft operating at ABIA had an annual load factor of 87.6 percent in 2016. This is a load factor that is difficult to maintain over the course of an entire year given seasonality. Therefore, it is unlikely that the load factors will change materially over the course of the forecast period. It was assumed that load factors will increase to 88.0 percent by 2037.

Exhibit 3.7-1 provides ASPD and load factors used to calculate domestic aircraft operations by air carrier and commuter airlines.

Exhibit 3.7-1: Domestic Passengers Per Operation Assumptions



Sources: U.S. Department of Transportation, Air Carrier Statistics database. OAG Aviation Worldwide Ltd, OAG Schedules Analyser. Landrum & Brown analysis, 2017.

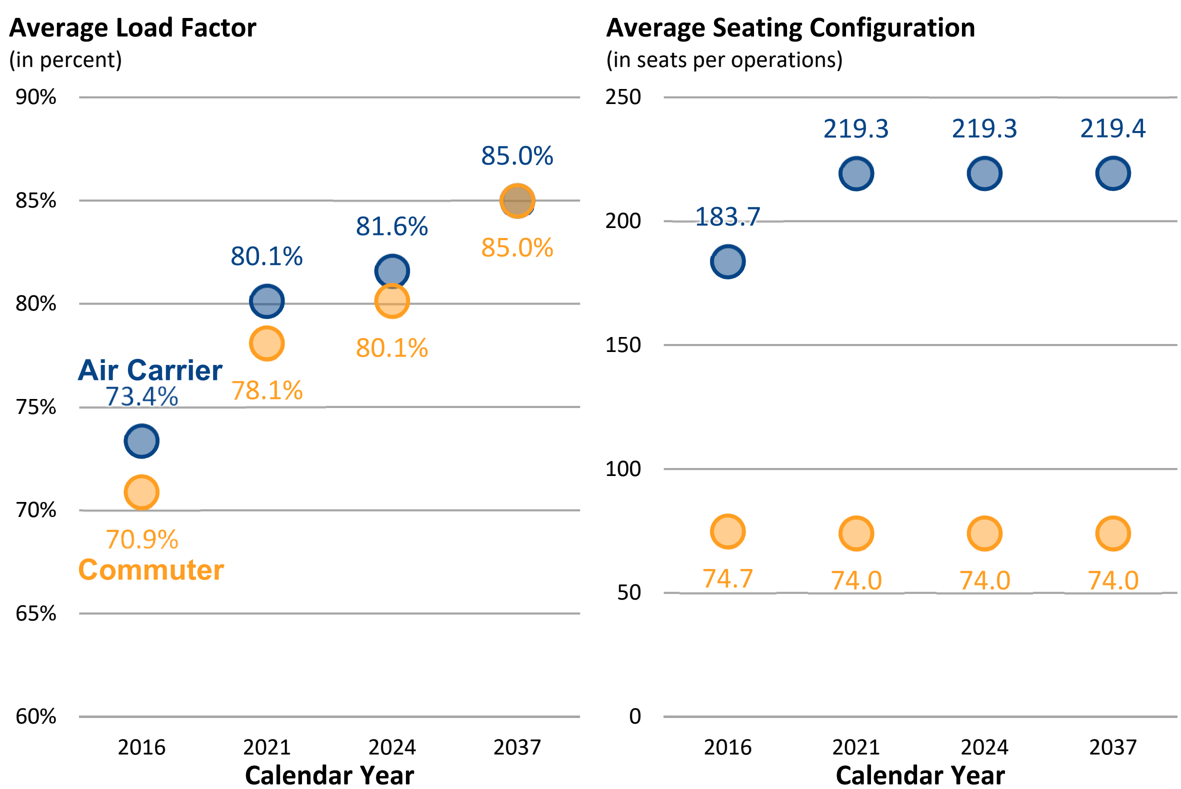
Internationally, the wide-body aircraft such as variants of the Boeing 787 and the Boeing 777 aircraft will continue to be used exclusively for transoceanic international travel. Flights to and from Canada will almost exclusively use large regional aircraft like the Embraer 175. Latin American service, including Mexico, will continue to utilize a mix of large regional and narrow-body aircraft.

Based on the assumed new flights over the next five years, particularly with the new transoceanic flights, the ASPD for international air carrier aircraft operations is expected to increase significantly from 183.7 in 2016 to 219.4 in 2021 and remain at this average configuration through the remainder of the forecast period. In 2016, international air carrier aircraft operations had an average load factor of 73.4 percent. This is assumed to increase to 85.0 percent by 2037.

It is assumed that ASPD for international commuter aircraft operations will decrease from 74.7 in 2016 to 74.0 in 2037. This decline is the result of Air Canada opting to use the 73-seat Embraer 175 over the 75-seat Canadair CRJ Series 705 for their operations at ABIA, including their assumed service to Vancouver. International commuter aircraft operating at ABIA had an annual load factor of 70.9 percent in 2016. This load factor is expected to increase significantly as the current service and projected new service is given time to mature. Therefore, it is assumed that the load factors will increase to 85.0 percent by 2037.

Exhibit 3.7-2 provides ASPD and load factors used to calculate international aircraft operations by air carrier and commuter airlines.

Exhibit 3.7-2: International Passengers Per Operation Assumptions



Sources: U.S. Department of Transportation, Air Carrier Statistics database. OAG Aviation Worldwide Ltd, OAG Schedules Analyser. Landrum & Brown analysis, 2017.

3.7.1.3 Forecast Summary

Based on the foregoing assumptions regarding load factors and ASPD, domestic air carrier aircraft operations will increase from 88,178 in 2016 to 174,940 in 2037, representing an AAGR of 3.3 percent. Domestic commuter aircraft operations are forecast to increase 1.7 percent per annum, from 21,656 in 2016 to 31,020 in 2037. International air carrier aircraft operations are forecast to more than double though the forecast period from 1,684 in 2016 to 4,378 in 2037. The higher frequency of flights to and from Canada and Mexico when compared to transoceanic flights results in a faster growth in international commuter aircraft operations which are forecast to increase from 768 in 2016 to 3,320 in 2037. **Table 3.7-1** displays the results of the domestic and international passenger aircraft operations forecast by segment.

Table 3.7-1: Passenger Aircraft Operations by Segment

YEAR		DOMESTIC			INTERNATIONAL			Grand Total
		AIR CARRIER	COMMUTER	TOTAL	AIR CARRIER	COMMUTER	TOTAL	
Historical	2016	88,178	21,656	109,834	1,684	768	2,452	112,286
Estimate	2017	100,256	16,264	116,520	1,702	1,436	3,138	119,658
Forecast	2019	111,000	18,320	129,320	2,244	2,170	4,414	133,734
	2021	117,040	19,640	136,680	2,790	2,170	4,960	141,640
	2024	127,440	21,520	148,960	3,046	2,350	5,396	154,356
	2037	174,940	31,020	205,960	4,378	3,320	7,698	213,658
RANGE		Average Annual Growth Rates						
2016-2037		3.3%	1.7%	3.0%	4.7%	7.2%	5.6%	3.1%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports.

3.7.1.4 Fleet Mix

The fleet mix forecasts were developed to match the ASPD assumptions for each segment. The fleet mix forecasts also allowed for the calibration of the ASPD and load factor assumptions and, where appropriate, modifications were made prior to finalizing the average number of ASPD and load factor assumptions. The allocation of passenger operations by aircraft type is shown in **Table 3.7-2** for domestic operations and in **Table 3.7-3** for international activity.

Table 3.7-2: Domestic Passenger Fleet Mix

AIRCRAFT		ASPD	DEPARTURES					
			2016	2017	2019	2021	2024	2037
AIR CARRIER			44,089	50,128	55,500	58,520	63,720	87,470
Wide-body			*1*	*0*	*0*	*0*	*108*	*148*
772	Boeing 777-200ER	269	0	0	0	0	108	148
764	Boeing 767-400	242	1	0	0	0	0	0
Narrow-body			*44,088*	*50,128*	*55,500*	*58,520*	*63,612*	*87,322*
737M9	Boeing 737 Max9	191	0	0	36	154	173	987
321	Airbus A321	190	1,825	3,923	4,822	5,334	5,808	8,109
757	Boeing 757-200, -300	171	782	331	367	225	245	94
737M8	Boeing 737 Max8	184	0	55	349	628	926	9,455
320ne	Airbus A320neo	185	0	0	253	819	905	1,858
739	Boeing 737-900	180	1,907	2,846	3,114	3,249	3,529	4,153
738	Boeing 737-800	167	6,064	7,555	9,152	9,678	10,536	16,538
M90	Boeing (Douglas) MD-90	160	1,011	558	154	0	0	0
320	Airbus A320	159	4,057	6,121	6,671	6,520	7,085	9,210
319ne	Airbus A319neo	156	0	0	43	77	84	230
737M7	Boeing 737 Max7	155	0	0	62	260	283	1,164
M80	Boeing (Douglas) MD-	147	2,779	1,508	22	0	0	0
733	Boeing 737-300	143	4,582	3,619	0	0	0	0
737	Boeing 737-700	143	12,858	15,516	21,257	21,933	23,882	22,949
319	Airbus A319	129	6,243	6,476	7,284	7,585	7,915	9,498
735	Boeing 737-500	122	884	0	0	0	0	0
712	Boeing 717-200	110	154	798	884	932	1,014	1,392
CS1	Bombardier CS100	108	0	0	120	167	182	250
E90	Embraer 190	99	942	822	910	959	1,045	1,435
COMMUTER			10,828	8,132	8,770	9,820	10,760	15,510
Large Regional			*10,357*	*7,941*	*8,588*	*9,664*	*10,599*	*15,323*
CR9	Canadair Regional Jet	78	2,283	1,681	1,814	2,030	2,223	3,204
MJ9	Mitsubishi MRJ90	76	0	0	0	50	83	120
E75	Embraer 175	76	5,231	4,574	4,936	5,536	6,073	8,783
CR7	Canadair Regional Jet	70	1,639	967	1,061	1,176	1,263	1,829
E70	Embraer 170	70	1,204	719	777	872	957	1,387
Small Regional			*471*	*191*	*182*	*156*	*161*	*187*
CR2	Canadair Regional Jet	45	14	3	2	0	0	0
E45	Embraer RJ	47	105	85	77	53	58	84
B41	BAe Jetstream 41	30	48	0	0	0	0	0
B32	BAe Jetstream 32	19	304	103	103	103	103	103
GRAND TOTAL			54,917	58,260	64,270	68,340	74,480	102,98

Note: ASPD stands for average seats per departure.
Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Landrum & Brown analysis 2017.

Table 3.7-3: International Passenger Fleet Mix

AIRCRAFT		ASPD	DEPARTURES					
			2016	2017	2019	2021	2024	2037
AIR CARRIER			842	851	1,122	1,395	1,523	2,189
Wide-body			*388*	*415*	*688*	*779*	*851*	*1,219*
763	Boeing 767-300ER	259	18	46	46	46	50	74
777	Boeing 777	256	152	7	7	59	64	90
789	Boeing 787-900	255	218	362	635	674	737	1,055
Narrow-body			*454*	*436*	*434*	*616*	*672*	*970*
320	Airbus A320	179	61	107	107	107	116	166
321	Airbus A321	187	3	3	3	3	3	3
737	Boeing 737-700	153	292	293	293	293	321	466
738	Boeing 737-800	166	39	14	14	196	213	303
739	Boeing 737-900	179	45	17	17	17	19	32
E90	Embraer 190	99	14	2	0	0	0	0
COMMUTER			384	718	1,085	1,085	1,175	1,660
Large Regional			*384*	*718*	*1,085*	*1,085*	*1,175*	*1,660*
CR7	Canadair Regional Jet	75	300	0	0	0	0	0
E70	Embraer 170	76	21	351	353	353	382	540
E75	Embraer 175	73	63	367	732	732	793	1,120
GRAND TOTAL			1,226	1,569	2,207	2,480	2,698	3,849

Note: ASPD stands for average seats per departure.
Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Landrum & Brown analysis 2017.

3.7.2 All-Cargo Aircraft Operations

3.7.2.1 Methodology

The all-cargo aircraft operations forecast was derived from the air cargo throughput forecast in a similar fashion as passenger aircraft operations are derived from the passenger forecast. The all-cargo aircraft operations are a product of the all-cargo throughput forecast and assumed average air cargo tons per operation.

The air cargo throughput forecast must be segmented by mode of transportation in order to develop the all-cargo operations forecast. A majority of cargo processed at ABIA, 86.5 percent since 2011, has been handled by all-cargo carriers, primarily FedEx. The remaining share of air cargo throughput is handled by passenger airlines. This split of air cargo throughput between belly and all-cargo is expected to remain constant through the forecast period.

3.7.2.2 Tons Per Operation

Half of the all-cargo aircraft operations, 50.2 percent in 2016, were conducted by Baron Aviation Services. Baron Aviation Services, which operates as a feeder for FedEx at ABIA, utilizes a fleet of Cessna 208 aircraft which has an available payload just over 3,000 pounds. The size of the aircraft limits the airline's capacity. Baron Aviation Services is not expected to change their fleet over the forecast period.

FedEx, the largest air cargo operator at ABIA, only conducted 20.7 percent of the all-cargo aircraft operations despite handling 65.0 percent of the air cargo throughput in 2016. FedEx utilizes a fleet predominately comprised of variants of the McDonnel Douglas MD-10 and the McDonnel Douglas MD-11 aircraft, both offering available payloads in excess of 120,000 pounds. FedEx has 69 Boeing 767-300F aircraft on order which is slated to replace their McDonnel Douglas MD-10 and the McDonnel Douglas MD-11 aircraft. The Boeing 767-300F has a maximum payload of 116,200 pounds.

A majority of the remaining all-cargo aircraft operations are conducted by UPS and Kalitta Air. UPS almost exclusively utilizes the Airbus A300-600 aircraft at ABIA and currently does not have a suitable replacement on order for the aircraft. Kalitta Air utilizes the Boeing 737-400 aircraft for their flights at ABIA.

Currently, the commuter aircraft are averaging 1,200 pounds per operation or slightly less than half of the total payload capacity of the Cessna 208 aircraft. It is not expected that commuter aircraft will be able to average more than 1,200 for an entire year. However, air carrier aircraft are handling less than half of their maximum payload, averaging 51,585 pounds in 2016. Therefore, is expected that the average pounds per operation will increase slightly over the forecast period.

3.7.2.3 Forecast Summary

All-cargo aircraft operations are forecast to increase from 5,854 in 2016 to 11,440 in 2037 representing an AAGR of 3.2 percent.

3.7.2.4 Fleet Mix

As mentioned above, FedEx is expected to replace their current fleet of McDonnel MD-10 and MD-11 aircraft with the Boeing 767-300F. However, the fleet of aircraft for the other all-cargo airlines at ABIA are not expected to change materially over the forecast period. The allocation of all-cargo aircraft operations by aircraft type is shown in **Table 3.7-4**.

Table 3.7-4: All-Cargo Fleet Mix

AIRCRAFT		DEPARTURES					
		2016	2017	2019	2021	2024	2037
AIR CARRIER		1,450	1,605	1,825	1,970	2,140	2,755
306	Airbus A300-600	481	530	593	643	697	895
310	Airbus A310	4	4	5	5	6	8
722	Boeing 727-200	19	0	0	0	0	0
734	Boeing 737-400	240	287	326	352	382	492
747	Boeing 747-300, -400, -800	43	47	54	58	63	83
752	Boeing 757-200	53	58	67	72	78	101
767	Boeing 767-200, -300	38	250	521	668	914	1,176
M10	Boeing (Douglas) MD-10	377	283	171	114	0	0
M11	Boeing (Douglas) MD-11	195	146	88	58	0	0
COMMUTER		1,477	1,620	1,850	2,010	2,010	2,965
C208	Cessna 208 Caravan	1,469	1,612	1,839	1,999	2,199	2,949
Other Commuter		8	8	11	11	11	16
GRAND TOTAL		2,927	3,225	3,765	3,980	4,350	5,720

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports; Landrum & Brown analysis 2017.

3.7.3 Other Aircraft Operations

3.7.3.1 Air Taxi

In 2009, there was a 39.1 percent decline in air taxi aircraft operations. Since then, growth in air taxi aircraft operations have averaged 2.0 percent but that growth has been inconsistent with a majority of the growth occurring in 2013. It was assumed that growth in air taxi aircraft operations in the long-term would resemble the average growth experienced since 2009. The result is that air taxi operations would increase from 11,609 in 2016 to 17,280 in 2037, representing a CAGR of 1.9 percent. **Table 3.7-5** provides the air taxi forecast by aircraft type.

Table 3.7-5: Air Taxi Fleet Mix

AIRCRAFT		DEPARTURES					
		2016	2017	2019	2021	2024	2037
C56X	Cessna 560X Citation Excel	767	785	821	856	910	1,142
C750	Cessna 750 Citation X	452	463	484	505	536	673
CL30	Bombardier Challenger 300	432	442	462	482	512	643
E55P	Embraer Phenom 300	429	439	459	479	509	639
CL60	Canadair Challenger 600	292	299	312	326	346	435
H25B	Hawker 800	286	293	306	319	339	426
LJ45	Learjet 45	251	257	269	280	298	374
F2TH	Dassault Falcon 2000	235	240	251	262	279	350
C680	Cessna Citation Sovereign	228	233	244	255	270	339
E50P	Embraer Phenom 100	217	222	232	242	257	323
BE40	Beechcraft 40 Beechjet	213	218	228	238	253	317
C560	Cessna 560 Citation V	192	196	205	214	228	286
Other Air Taxi Aircraft		1,811	1,853	1,937	2,021	2,148	2,695
GRAND TOTAL		5,805	5,940	6,210	6,480	6,885	8,640

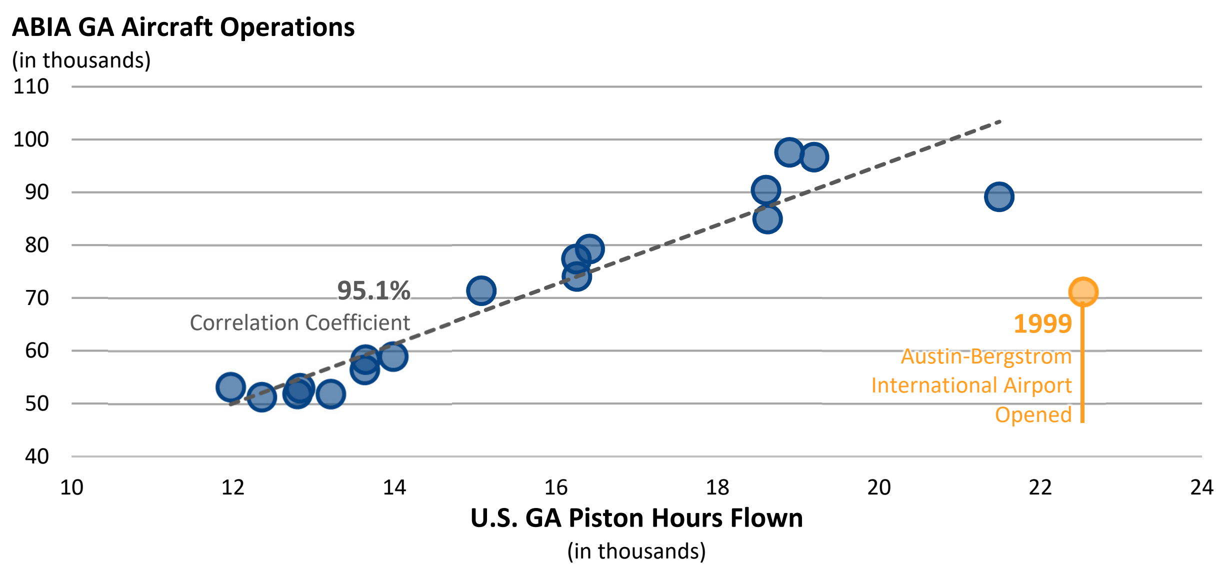
Sources: Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis 2017.

3.7.3.2 General Aviation

There are a number of approaches to developing GA operations forecasts ranging from econometric, trend or time series, and market share forecasts. During the forecast development, no reasonable fit of the GA aircraft operations to time or socio-economic variables was found.

Since ABIA opened, the number of GA aircraft operations has been closely correlated with the piston hours flown nationally. **Exhibit 3.7-3** illustrates the relationship of GA aircraft operations at ABIA with the United States GA piston hours flown.

Exhibit 3.7-3: Relationship of GA Operations at ABIA to U.S. Piston Hours Flown



Note: Correlation coefficient excludes 1999.
Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Federal Aviation Administration, FAA Aerospace Forecast, Fiscal Years 2017-2037. Landrum & Brown analysis, 2017.

Due to the relationship, the year-over-year growth rates provided in the FAA Aerospace Forecast were applied to the historical number of GA aircraft operations at ABIA. The result is that GA aircraft operations are forecast to decrease from 51,929 in 2016 to 43,650 in 2037, representing a 0.8 percent rate of decline per annum. However, this rate of decline is not constant among aircraft types. It is anticipated that piston aircraft are expected to decline as fewer people purchase aircraft for private use and more based piston aircraft relocate from ABIA to the Austin Executive Airport.[19] Meanwhile, jets, turboprops, and helicopters for GA use are expected to remain relatively steady through the forecast period. **Table 3.7-6** provides the GA forecast by aircraft type.

[19] The Austin Executive Airport is a privately owned, public-use airport located 12 miles northeast of Austin which opened in 2011. It was designed to act as a reliever airport which has not been available in the area since 1999 when the Austin Executive Airpark closed.

Table 3.7-6: General Aviation Fleet Mix

AIRCRAFT		DEPARTURES					
		2016	2017	2019	2021	2024	2037
JETS		9,265	9,274	9,292	9,310	9,337	9,454
C560	Cessna 560 Citation V	679	680	682	684	687	700
C525	Cessna 525 CitationJet	577	578	580	582	585	598
C56X	Cessna 560X Citation Excel	572	573	575	577	580	593
H25B	Hawker 800	517	518	520	522	525	538
Other Jets		6,920	6,925	6,935	6,945	6,960	7,025
TURBOPROPS		5,333	5,335	5,339	5,343	5,349	5,375
B350	Beech 350 Super King Air	1,454	1,455	1,457	1,459	1,462	1,475
BE20	Beech 200 Super King Air	1,310	1,310	1,310	1,310	1,310	1,310
PC12	Pilatus PC-12	742	742	742	742	742	742
BE9L	Beech 90 King Air	443	443	443	443	443	443
Other Turboprops		1,384	1,385	1,387	1,389	1,392	1,405
PISTON		8,428	8,031	7,104	6,487	5,397	4,056
C172	Cessna 172 Skyhawk	2,819	2,686	2,376	2,169	1,946	1,357
SR22	Cirrus SR22	774	738	653	596	535	371
BE36	Beechcraft 36 Bonanza	454	433	383	349	313	217
C421	Cessna 421 Golden Eagle	432	412	364	332	297	208
PA28	Piper PA-28 Cherokee	414	394	348	318	286	200
Other Pistons		3,535	3,368	2,980	2,723	2,442	1,703
HELICOPTERS		2,939	2,940	2,940	2,940	2,940	2,940
GRAND TOTAL		25,965	25,580	24,675	24,080	23,445	21,825

Sources: Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis, 2017.

3.7.3.3 Military

Military operations are aircraft operations performed by military and other governmental units. In 2014, the Armed Forces Reserve Center was opened as part of the 2005 realignment and closure process. The Reserve Center includes an apron area to park a number of Boeing CH-47 Chinook and Sikorsky UH-60 Black Hawk helicopters. The new facility spurred growth in military aircraft operations over the subsequent years after maintaining years of steady traffic. Military operations were held flat over the forecast period, equal to the 2016 aircraft operations.

3.7.4 Total Aircraft Operations

The total aircraft operations forecast is the aggregation of the passenger, all-cargo, air taxi, GA, and military aircraft operations forecasts. Total aircraft operations are forecast to increase from 192,032 in 2016 to 296,428 in 2037, representing an AAGR of 2.1 percent. **Table 3.7-7** provides the aircraft operations by segment through the forecast period.

Table 3.7-7: Total Aircraft Operations Forecast

YEAR		PASSENGER		CARGO	AIR TAXI	GENERAL AVIATION	MILITARY	GRAND TOTAL
		DOMESTIC	INTERNATIONAL					
Historical	2009	92,220	664	6,634	10,120	58,410	6,466	174,514
	2010	94,314	46	6,510	10,118	59,002	6,924	176,914
	2011	96,352	120	6,540	10,099	56,470	6,750	176,331
	2012	97,482	380	5,666	10,463	51,905	6,352	172,248
	2013	101,304	728	5,752	11,460	51,334	6,069	176,647
	2014	103,236	1,690	5,770	11,500	53,211	7,061	182,468
	2015	110,174	2,130	5,772	11,350	53,017	8,750	191,193
	2016	109,834	2,452	5,854	11,609	51,929	10,354	192,032
Estimate	2017	116,520	3,138	6,450	11,880	51,160	10,400	199,548
Forecast	2019	129,320	4,414	7,350	12,420	49,350	10,400	213,254
	2021	136,680	4,960	7,960	12,960	48,160	10,400	221,120
	2024	148,960	5,396	8,700	13,770	46,890	10,400	234,116
	2037	205,960	7,698	11,440	17,280	43,650	10,400	296,428
RANGE		AVERAGE ANNUAL GROWTH RATES						
2009-2016		2.5%	20.5%	-1.8%	2.0%	-1.7%	7.0%	1.4%
2016-2037		3.0%	5.6%	3.2%	1.9%	-0.8%	0.0%	2.1%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports.

3.7.5 Forecast Scenarios

The results of the enplaned passenger and cargo throughput scenarios were used to develop high and low scenarios for the aircraft operations forecast. The alternative scenarios are described in the following sections.

3.7.5.1 High Case Scenario

The high case scenarios for the enplaned passenger and cargo throughput forecasts were used to develop the high case aircraft operations forecast. No changes were made to the assumptions regarding ASPD or load factor. The cargo operations assumed in the high case cargo forecast based on the development of the e-commerce distribution center were added to the baseline cargo aircraft operations forecast. The result is that there will be an additional 129,844 aircraft operations by 2037 when compared to the baseline.

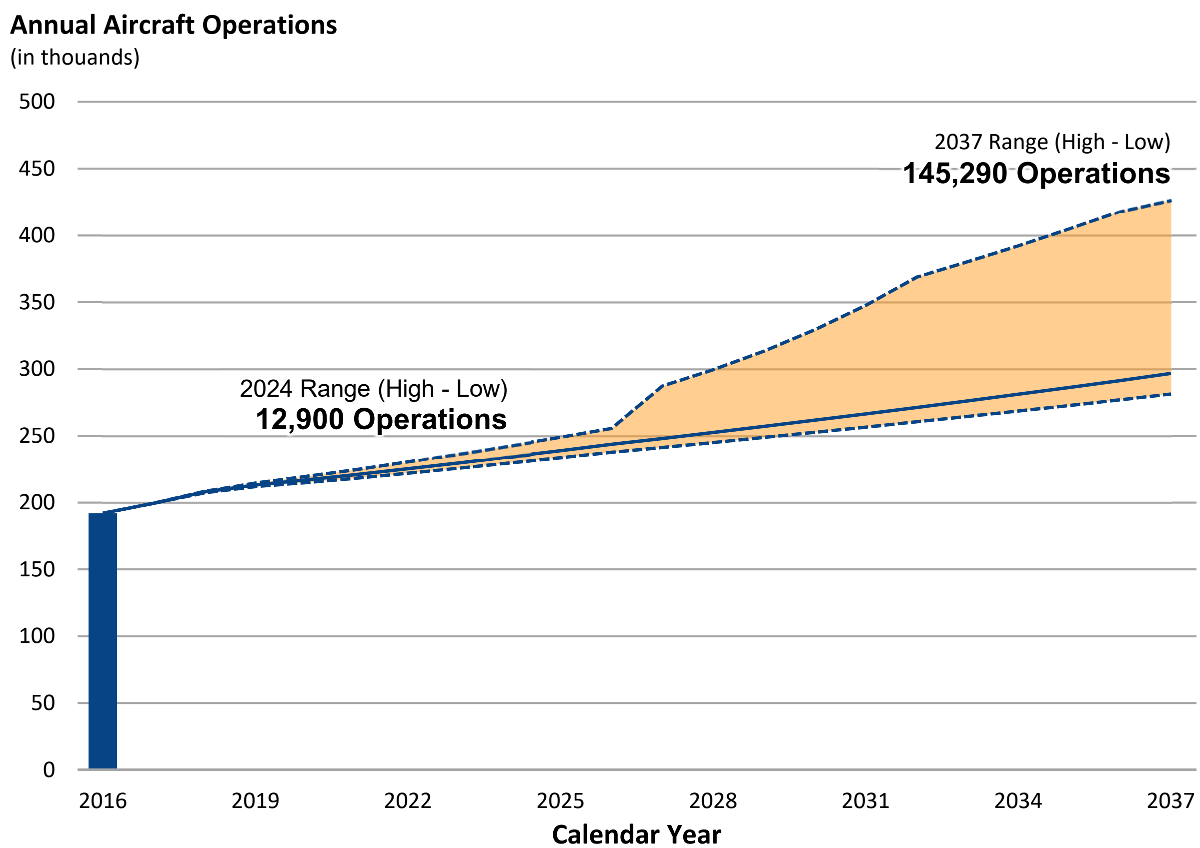
3.7.5.2 Low Case Scenario

The low case scenarios for the enplaned passenger and cargo throughput forecasts were used to develop the low case aircraft operations forecast. No changes were made to the assumptions regarding ASPD, load factor, or cargo per operations. The result is that there will be a 15,446 fewer aircraft operations by 2037 when compared to the baseline.

3.7.5.3 Summary of Scenario Forecasts

The aircraft operations forecast scenarios provide a range of 281,262 to 426,552. **Exhibit 3.7-4** provides a comparison of the forecast scenarios and a more detailed overview of the scenarios is provided in **Table 3.7-8**.

Exhibit 3.7-4: Comparison of Aircraft Operations Forecast Scenarios



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports; Landrum & Brown analysis, 2017.

Table 3.7-8: Summary of Aircraft Operations Forecast Scenarios

YEAR		PASSENGER			CARGO			OTHER			TOTAL		
		LOW	BASE	HIGH	LOW	BASE	HIGH	LOW	BASE	HIGH	LOW	BASE	HIGH
Historical	2016	112,286	112,286	112,286	5,854	5,854	5,854	73,892	73,892	73,892	192,032	192,032	192,032
Estimate	2017	119,658	119,658	119,658	6,450	6,450	6,450	73,440	73,440	73,440	199,548	199,548	199,548
Forecast	2019	133,034	133,734	135,174	6,740	7,350	7,350	72,170	72,170	72,170	211,944	213,254	214,694
	2021	139,800	141,640	145,380	7,040	7,960	7,960	71,520	71,520	71,520	218,360	221,120	224,860
	2024	151,184	154,556	162,844	7,460	8,700	8,700	71,060	71,060	71,060	229,704	234,316	242,604
	2037	200,652	213,938	252,532	9,280	11,440	102,960	71,330	71,330	71,330	281,262	296,708	426,552
RANGE		AVERAGE ANNUAL GROWTH RATE											
2016-2024		3.8%	4.1%	4.8%	3.1%	5.1%	5.1%	-0.5%	-0.5%	-0.5%	2.3%	2.5%	3.0%
2024-2037		2.2%	2.5%	3.4%	1.7%	2.1%	20.9%	0.0%	0.0%	0.0%	1.6%	1.8%	4.4%
2016-2037		2.8%	3.1%	3.9%	2.2%	3.2%	14.6%	-0.2%	-0.2%	-0.2%	1.8%	2.1%	3.9%

Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports. City of Austin Aviation Department, Landing Reports; Landrum & Brown analysis, 2017.

3.8 Peak Period Forecasts

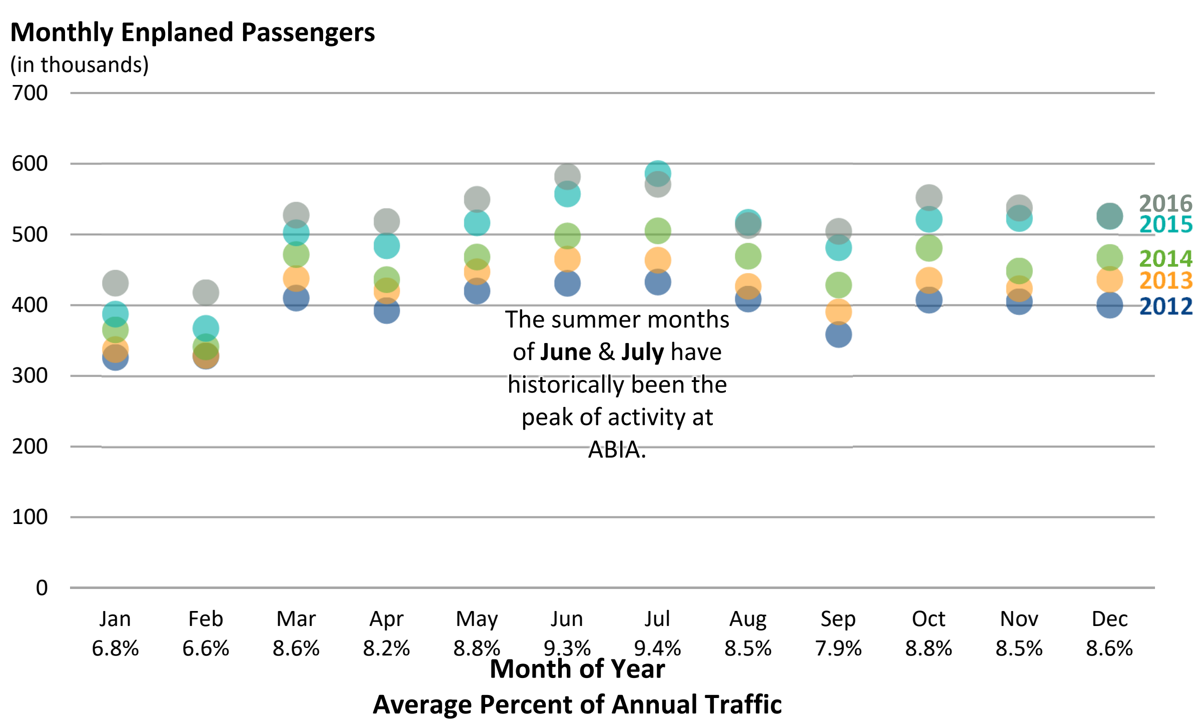
The traffic demand patterns imposed upon an airport are subject to seasonal, monthly, daily, and hourly variations. Peaking characteristics are critical in the assessment of existing facilities and airfield components to determine their ability to accommodate forecast increases in passenger and operational activity throughout the forecast period.

The annual passenger and aircraft operations forecasts for ABIA were converted into month, daily, and peak hour equivalents. The peak period aircraft operations forecasts were developed for passenger, all-cargo, air taxi, general aviation, military, and total aircraft operations.

3.8.1 Monthly Seasonality

Monthly enplaned passenger data from ABIA was used to determine the peak month for enplaned passengers. ABIA's busy period for enplaned passengers occurs during the summer months of June and July. Over the past five years, 9.4 percent of enplaned passengers departed in July compared to 9.3 percent of enplaned passengers in June. **Exhibit 3.8-1** graphically depicts the monthly seasonality for enplaned passengers at ABIA.

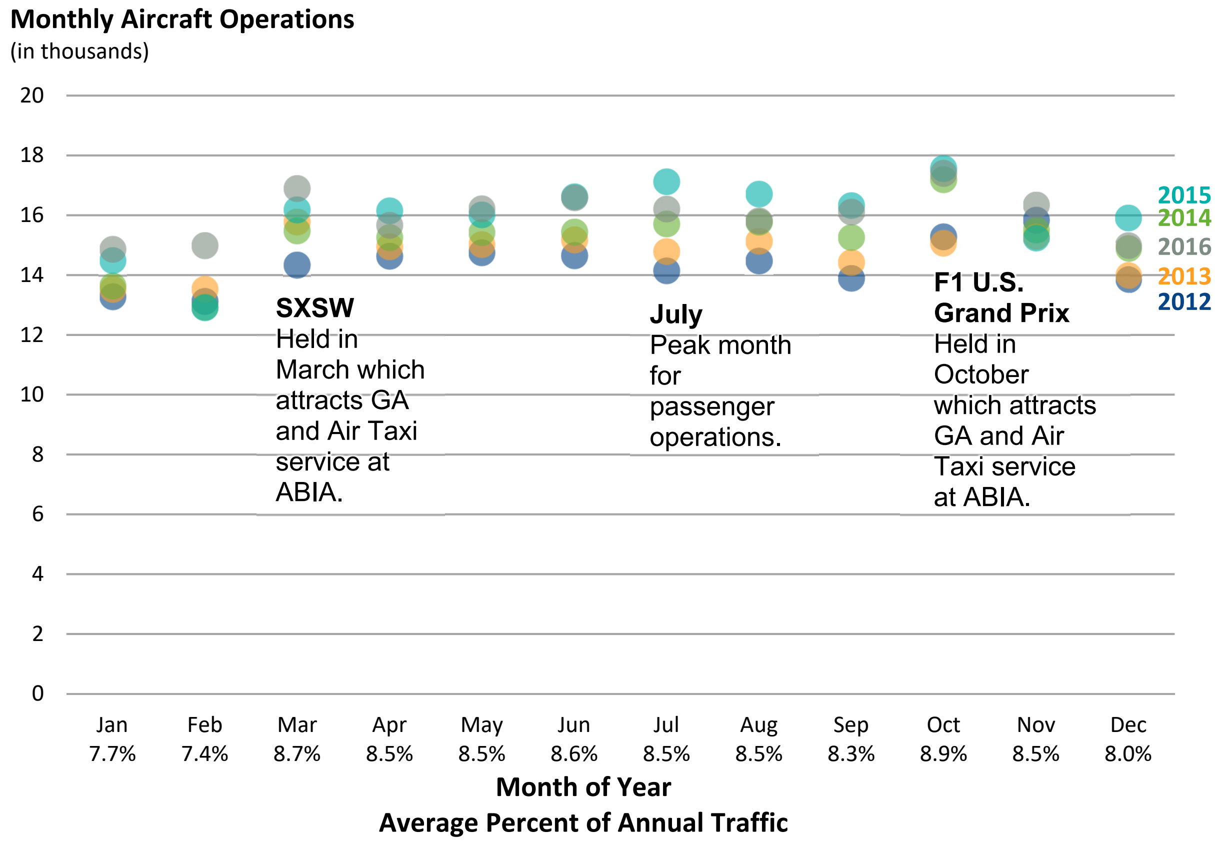
Exhibit 3.8-1: Monthly Enplaned Passengers



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Landrum & Brown analysis, 2017.

Although June and July are the peak months for enplaned passengers, October and March have been the peak months for aircraft operations. In March, Austin is the host of SXSW which caters to a number of affluent people capable of utilizing GA aircraft and air taxi services. The Formula 1 U.S. Grand Prix, and to a lesser extent the Austin City Limits Music Festival, attracts a number of similar clientele to the region in the month of October. Over the past five years, July has been the peak month for scheduled passenger aircraft operations. **Exhibit 3.8-2** graphically depicts the monthly seasonality for aircraft operations at ABIA.

Exhibit 3.8-2: Monthly Aircraft Operations



Sources: City of Austin Aviation Department, Austin-Bergstrom International Airport Aviation Activity Reports; Landrum & Brown analysis, 2017.

3.8.2 Daily Patterns

The FAA recommends the use of the average day of the peak month, typically referred to as the peak month average day (PMAD), for purposes of physical planning. The PMAD is the day that most closely represents the average day in the peak month. As an alternative, the peak month average weekday (PMAWD) can be used at airports that have domestic service as the predominant activity and at airports where weekend activity is consistently less than weekday activity as is the case at ABIA.

As demonstrated above, the peak month for enplaned passengers is July and it is also the peak month for scheduled passenger aircraft operations. Therefore, although total aircraft operations peak in October, July was selected as the peak month for ABIA.

Seating data from OAG was used as a proxy to determine the PMAWD as passenger data was not available at the daily level. Additionally, operations at ABIA were significantly lower on the 4th of July holiday than the rest of the month and was removed from the analysis for determining the PMAWD. In 2016, July 22nd was selected as the design day because it most closely resembled the average weekday of the month. However, to account for changes in the schedule that may impact the peak hour, a design day for 2017 was also selected. July 19th was selected because it closest resembles the average weekday for the month.

3.8.3 Design Day Flight Schedules

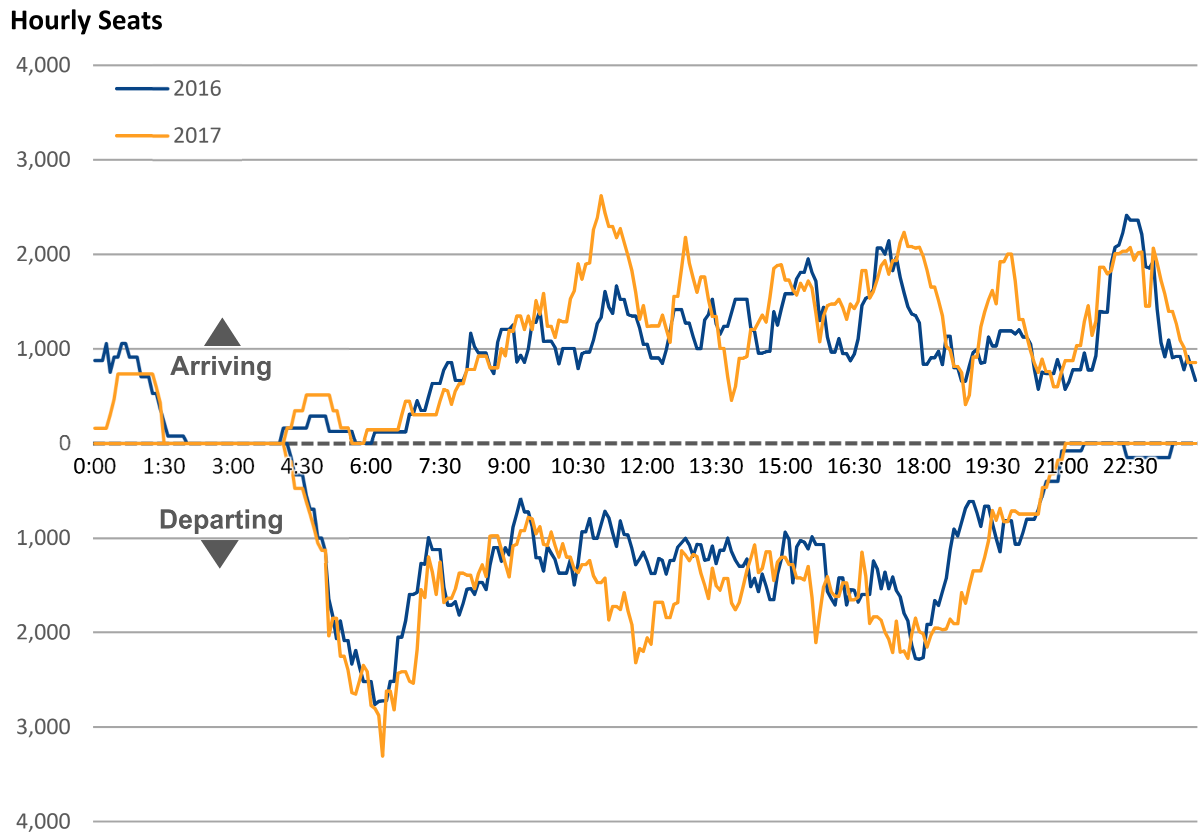
Design Day Flight Schedules (DDFS) for 2016 and 2017 were developed to determine the hourly profile of the traffic at ABIA. In order to develop DDFSs that are representative of the traffic at ABIA, a combination of OAG schedules and historical radar data was used.

OAG schedules for the design days provided the passenger aircraft operations. The passenger flight schedule for July 22, 2016 was used for the 2016 DDFS. The passenger aircraft operations from OAG were supplemented with information from the radar data for cargo, air taxi, and GA aircraft operations. Accurate military data was not available in the radar data so additional flights were added to the DDFS to account for an average day (monthly military aircraft operations divided by 31). The passenger flight schedule for July 19, 2017 was used for the 2017 DDFS and was supplemented with the radar data used for the 2016 DDFS since historical data was not available at the time of constructing the 2017 DDFS.

3.8.4 Hourly Profiles

The DDFS for 2016 and 2017 were analyzed to determine the hourly profile at ABIA to identify the periods of time that traffic is most concentrated. Using a clock hour as the basis for peak periods does not allow for peak periods of traffic that occur across clock hours to be identified, i.e. traffic occurring late in the first hour combined with the traffic at the beginning of the next hour. Therefore, a rolling 60-minute hour approach was used to determine the design day profile. In this case, aircraft operations were categorized into one of the 288 five-minute buckets, or bins, that occur during the given day. The sum of twelve sequential buckets represents a rolling 60-minute hour. In 2016 and 2017, the peak for departing seats occurs in the morning during the early morning departure push. In 2016, the peak for arriving seats occurred at the end of the day during the last bank of arrivals. While there is still a substantial peak at the end of the day in 2017, added flights combined with an increase in the average seating configuration during the midday shifted the peak in arriving seats. **Exhibit 3.8-3** provides a comparison of the scheduled passenger seats for the rolling 60-minute hours for the 2016 DDFS and 2017 DDFS.

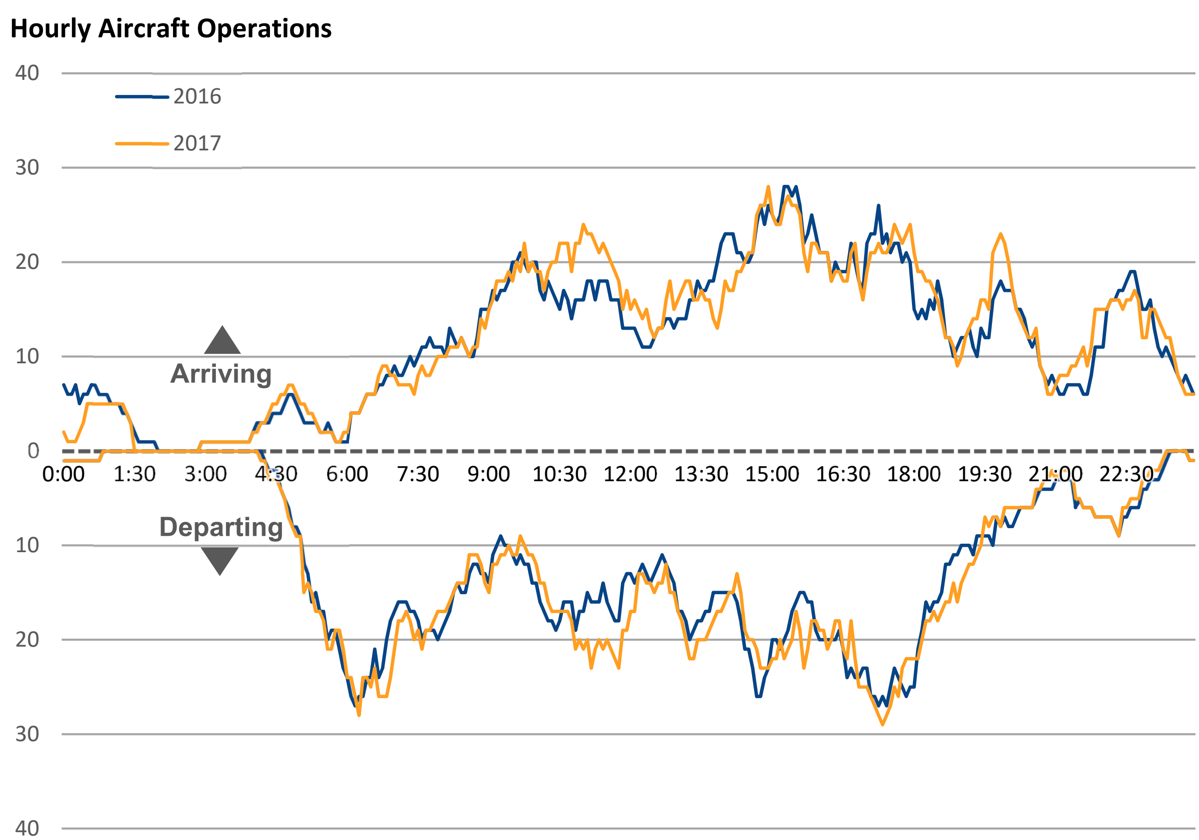
Exhibit 3.8-3: Rolling 60-Minute Seating Profile



Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis, 2017.

Exhibit 3.8-4 provides a comparison of the total aircraft operations (including scheduled passenger, cargo, air taxi, GA, and military) for the rolling 60-minute hours for the 2016 DDFS and 2017 DDFS. The 2017 DDFS has 24 additional scheduled passenger flights. However, the total aircraft operation profiles between the two schedules are relatively consistent despite the increased frequency of scheduled passenger aircraft operations.

Exhibit 3.8-4: Rolling 60-Minute Aircraft Operations Profile



Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis, 2017.

3.8.5 Derivative Forecast

Information regarding the peak month, average day, and peak hour were used to formulate metrics to determine the peak period forecast. These metrics include the peak month as a percent of the annual, the design day as a percent of the peak month, and the peak hour as a percent of the design day. It should be noted that peak hour metrics are specific to ABIA's design day. As airlines begin to add future flights, more flights will likely be added outside of the peaks thereby reducing the peak month, design day, and peak hour metrics.

3.8.5.1 Aircraft Operations Forecast

Annual aircraft operations were divided by the peak month aircraft operations, peak month aircraft operations were divided by the design day aircraft operations, and the design day aircraft operations were divided by peak hour aircraft operations to determine the peak period factors. Peak period factors were expressed for each of the segments (scheduled passenger, cargo, air taxi, GA, and military).

It was assumed that the peak month and design day factors would remain relatively unchanged through the forecast period. Although there are some distinct peaks in the schedule, the scheduled passenger aircraft operations are relatively spread evenly throughout the active hours at ABIA. Therefore, the peak hour aircraft operations factors will also remain relatively unchanged through the forecast period.

The annual, monthly, daily, and hourly peak aircraft operations forecasts are presented in **Table 3.8-1**. The total of annual, monthly, and design day aircraft operations is the aggregation of the individual segments. However, each of the individual segments peak at different periods of the day. For example, during the 2017 design day passenger aircraft operations peak at 11:10 and again at 17:30 while all-cargo aircraft operations peak at 06:00. As a result, peak hour total aircraft operations are not equal to the sum of the categories. The total peak hour aircraft operations are expected to increase from 56 in 2016 to 71 in 2037.

3.8.5.2 Passenger Forecast

Peak hour passengers were calculated using a similar methodology as peak hour aircraft operations. The annual and monthly passengers were determined from ABIA's records. The design day passengers are based on the scheduled seats for the design day as a share of the scheduled seats for the month. Peak hour passengers were calculated from the peak hour aircraft operations and the average passengers per aircraft operation for the month. Peak hour passengers as a percent of the design day are expected to remain relatively consistent through the forecast period. **Table 3.8-2** provide the peak hour passenger forecasts for ABIA.

Table 3.8-1: Peak Period Aircraft Operations Forecast

SEGMENT	LEVEL	DIRECTION	OPERATIONS					
			2016	2017	2019	2021	2024	2037
Domestic Passenger	Annual	Both	109,834	116,520	129,320	136,680	148,960	205,960
	Peak Month	Both	9,738	10,533	11,690	12,355	13,465	18,618
	Design Day	Both	330	350	388	411	448	619
	Peak Hour	Arriving	16	18	20	22	25	38
		Departing	20	22	24	26	29	44
		Total	28	30	33	35	38	53
International Passenger	Annual	Both	2,452	3,138	4,414	4,960	5,396	7,698
	Peak Month	Both	250	314	442	496	540	770
	Design Day	Both	6	10	14	16	17	25
	Peak Hour	Arriving	2	2	3	3	3	5
		Departing	2	2	3	3	3	5
		Total	2	2	3	3	3	5
Total Passenger	Annual	Both	112,286	119,658	133,734	141,640	154,356	213,658
	Peak Month	Both	9,988	10,847	12,132	12,851	14,005	19,388
	Design Day	Both	336	360	402	427	465	644
	Peak Hour	Arriving	16	18	20	22	25	39
		Departing	20	22	24	26	29	43
		Total	30	30	33	35	38	54
All-Cargo	Annual	Both	5,854	6,450	7,350	7,960	8,700	11,440
	Peak Month	Both	478	527	600	650	710	934
	Design Day	Both	20	22	25	27	30	39
	Peak Hour	Arriving	4	4	5	5	6	7
		Departing	5	5	6	6	7	8
		Total	5	5	6	6	7	8
Air Taxi	Annual	Both	11,609	11,880	12,420	12,960	13,770	17,280
	Peak Month	Both	770	788	824	860	913	1,146
	Design Day	Both	29	30	31	32	34	43
	Peak Hour	Arriving	5	5	5	5	5	5
		Departing	3	3	3	3	3	3
		Total	6	6	6	6	6	6
General Aviation	Annual	Both	51,929	51,160	49,350	48,160	46,890	43,650
	Peak Month	Both	3,976	3,917	3,779	3,687	3,590	3,342
	Design Day	Both	181	178	172	168	163	152

SEGMENT	LEVEL	DIRECTION	OPERATIONS					
			2016	2017	2019	2021	2024	2037
	Peak Hour	Arriving	12	12	12	12	11	10
		Departing	12	12	12	12	11	10
		Total	24	24	23	23	22	20
Military	Annual	Both	10,354	10,400	10,400	10,400	10,400	10,400
	Peak Month	Both	990	994	994	994	994	994
	Design Day	Both	32	32	32	32	32	32
	Peak Hour	Arriving	4	4	4	4	4	4
		Departing	3	3	3	3	3	3
		Total	5	5	5	5	5	5
Grand Total	Annual	Both	192,032	199,548	213,254	221,120	234,116	296,428
	Peak Month	Both	16,202	17,073	18,329	19,042	20,212	25,804
	Design Day	Both	598	622	662	686	724	910
	Peak Hour	Arriving	29	30	31	32	34	42
		Departing	28	28	29	30	32	40
		Total	56	56	58	59	61	71

Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis, 2017.

Table 3.8-2: Peak Period Passengers

SEGMENT	LEVEL	DIRECTION	PASSENGERS					
			2016	2017	2019	2021	2024	2037
Domestic Passenger	Annual	Both	12,190,224	13,596,282	15,196,000	16,172,000	17,738,000	25,632,000
	Peak Month	Both	1,100,993	1,274,775	1,424,750	1,516,220	1,663,040	2,403,220
	Design Day	Both	37,285	42,779	47,760	50,940	55,880	80,690
	Peak Hour	Arriving	2,054	2,222	2,488	2,755	3,152	5,006
		Departing	2,353	2,807	3,084	3,364	3,776	5,988
		Total	3,138	3,757	4,163	4,447	4,859	7,082
International Passenger	Annual	Both	267,658	338,800	522,200	615,600	684,400	1,025,200
	Peak Month	Both	32,648	42,526	65,210	76,180	83,110	119,010
	Design Day	Both	801	1,319	2,010	2,390	2,550	3,760
	Peak Hour	Arriving	333	358	585	609	610	1,021
		Departing	271	264	431	449	450	753
		Total	333	358	585	609	610	1,021
Total Passenger	Annual	Both	12,457,882	13,935,082	15,718,200	16,787,600	18,422,400	26,657,200
	Peak Month	Both	1,133,641	1,317,301	1,489,960	1,592,400	1,746,150	2,522,230
	Design Day	Both	38,086	44,098	49,770	53,330	58,430	84,450
	Peak Hour	Arriving	2,054	2,222	2,488	2,755	3,152	5,006
		Departing	2,353	2,807	3,084	3,364	3,776	5,988
		Total	3,409	3,954	4,563	4,859	5,257	7,789

Sources: OAG Aviation Worldwide Ltd, OAG Schedules Analyser; Federal Aviation Administration, Flight Track Data for 2016; Landrum & Brown analysis, 2017.

3.9 Comparison to the TAF

The FAA publishes its own forecast annually for each U.S. airport, including ABIA. The Terminal Area Forecast (TAF) is "prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements."[20] The most recent release is the Draft 2017 TAF which was issued in July 2017.

If the Sponsor forecast is used for FAA decision-making, such as key environmental issues, noise capability planning, airport layout plan, and initial financial decisions, the FAA requires that the Sponsor forecast is compared to the most recent TAF to determine if they are consistent. For all classes of airports, forecasts for total passenger enplanements, based aircraft, and total aircraft operations are considered consistent with the TAF if they meet the following criterion:[21]

- Forecasts differ by less than 10 percent in the 5-year forecast period.
- Forecasts differ by less than 15 percent in the 10-year forecast period.

If the Sponsor forecast is not consistent with the TAF, differences must be resolved before proceeding.

The TAF is prepared on a U.S. Government Fiscal Year basis (October through September) rather than calendar year. The forecast presented herein was developed on a calendar year basis. When an airport's traffic is growing rapidly, a timing difference between the FY base year and the calendar base year can be significant. This timing difference distorts a straight future year comparison between the two forecasts. The true comparison that needs to be made is between the projected growth rate of the TAF and the projected growth rate of the Sponsor forecast.

The Draft 2017 TAF includes historical information on aircraft operations from FY1990 through FY2016 and forecasts for FY2017[22] to FY2045. At airports with FAA towers like ABIA, historical aircraft operations data is provided by FAA air traffic controllers, which count landings and takeoffs. These aircraft operations are recorded as either air carrier, commuter & air taxi, GA, or military. Air carrier is defined as an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. Commuter & air taxi aircraft are designed to have a maximum seating capacity of 60 seats or a maximum payload capacity of 18,000 pounds carrying passengers or cargo for hire or compensation.

[20] Federal Aviation Administration, Terminal Area Forecast Summary: Fiscal Years 2016-2045, July 2017.
[21] Federal Aviation Administration, Review and Approval of Aviation Forecasts, June 2008.
[22] Operations data for FAA towers and Federal contract towers for 2016 are actual.

According to the Draft 2017 TAF, aircraft operations at ABIA have increased from 177,124 in FY2009 to 197,382 in FY2017, representing an AAGR of 1.4 percent. The Draft 2017 TAF projects that aircraft operations at ABIA will increase from 197,382 in FY2017 to 235,340 in 2026, representing an AAGR of 2.0 percent.

The enplaned passenger information in the Draft 2017 TAF includes historical values from FY1976 through FY2016, estimated enplaned passenger figures for FY2017, and forecasts from FY2018 to FY2040. Historical enplaned passenger data is obtained through the U.S. Department of Transportation T-100 Reports.

According to the Draft 2017 TAF, enplaned passengers at ABIA have increased from 4.0 million in FY2009 to an estimated 6.7 million in FY2017, representing a AAGR of 6.5 percent. During this span, enplaned passengers provided in the Draft 2017 TAF have on average been within 4.2 percent of ABIA's records. There are two reason for this difference. The data provided in the TAF is on a fiscal year basis. Additionally, the enplaned passengers provided in the TAF exclude non-revenue passengers and military charter passengers. In 2016, ABIA reported 6.2 million enplaned passengers, which is 3.5 percent higher than the 6.0 million for FY2016 in the Draft 2017 TAF. The Draft 2017 TAF projects that enplaned passengers will increase from an estimated 6.7 million in FY2017 to 8.7 million in FY2026, representing a CAGR of 3.0 percent.

In order to compare the forecast presented herein to the Draft 2017 TAF, Appendix B and C templates from the FAA Office of Aviation Policy and Plans (APO) document, Forecasting Aviation Activity by Airport, have been completed and are provided in the **Table 3.9-1** and **Table 3.9-2**, respectively.

Table 3.9-1: FAA TAF Forecast Comparison – Appendix B

A. Forecast Levels and Growth Rates

	Base Year 2016	Base Year + 1 year 2017	Base Year + 5 years 2021	Base Year + 10 years 2026	Base Year + 15 years 2031	Base Year to + 1 year 2016-2017	Base Year to + 5 years 2016-2021	Base Year to + 10 years 2016-2026	Base Year to + 15 years 2016-2031
Passenger Enplanements									
Air carrier	5,520,103	6,388,235	7,691,226	8,963,116	10,355,888	15.7%	6.9%	5.0%	4.3%
Commuter	708,838	579,306	702,574	819,684	947,912	-18.3%	-0.2%	1.5%	
TOTAL ENPLANEMENTS	6,228,941	6,967,541	8,393,800	9,782,800	11,303,800	11.9%	6.1%	4.6%	4.1%
Operations									
Itinerant									
Air carrier	92,762	105,168	123,770	142,608	161,092	13.4%	5.9%	4.4%	3.7%
Commuter/air taxi	36,987	32,820	38,790	44,280	50,100	-11.3%	1.0%	1.8%	2.0%
Total Commercial Operations	129,749	137,988	162,560	186,888	211,192	6.3%	4.6%	3.7%	3.3%
General aviation	51,929	51,160	48,160	46,090	44,580	-1.5%	-1.5%	-1.2%	-1.0%
Military	10,354	10,400	10,400	10,400	10,400	0.4%	0.1%	0.0%	0.0%
Local									
General aviation	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Military	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	192,032	199,548	221,120	243,378	266,172	3.9%	2.9%	2.4%	2.2%
Instrument Operations									
Peak Hour Operations	56	56	59	63	66	0.0%	1.0%	1.2%	1.1%
Cargo/Mail									
(Enplaned + Deplaned Tons)	87	97	120	139	157	10.8%	6.6%	4.8%	4.0%
Based Aircraft									
Single Engine (Nonjet)	84								
Multi Engine (Nonjet)	17								
Jet Engine	46								
Helicopter	9								
Other	-								
TOTAL BASED AIRCRAFT	156								

B. Operational Factors

	Base Year 2016	Base Year + 1 year 2017	Base Year + 5 years 2021	Base Year + 10 years 2026	Base Year + 15 years 2031
Average aircraft size (seats)					
Air carrier	149.4	152.7	154.7	155.1	157.4
Commuter	72.7	73.9	74.1	74.1	74.2
Average enplaning load factor					
Air carrier	82.2%	82.1%	83.0%	83.7%	84.3%
Commuter	87.0%	88.6%	87.0%	87.4%	87.5%
GA operations per based aircraft	333				

Sources: Federal Aviation Administration, Draft 2017 Terminal Area Forecast; Landrum & Brown analysis, 2017.

Table 3.9-2: FAA TAF Forecast Comparison – Appendix C

	FORECAST YEAR	SPONSOR FORECAST	DRAFT 2017 FAA TAF	% VARIANCE SPONSOR VS DRAFT 2017 TAF
PASSENGER ENPLANEMENTS				
Base Year	2016	6,228,941	6,020,961	3.5%
Base Year +5 Years	2021	8,393,800	7,586,718	10.6%
Base Year +10 Years	2026	9,782,800	8,675,109	12.8%
Base Year +15 Years	2031	11,303,800	9,927,630	13.9%
COMMERCIAL OPERATIONS				
Base Year	2016	129,749	130,344	-0.5%
Base Year +5 Years	2021	162,560	152,009	6.9%
Base Year +10 Years	2026	186,888	171,999	8.7%
Base Year +15 Years	2031	211,192	194,827	8.4%
TOTAL OPERATIONS				
Base Year	2016	192,032	192,010	0.0%
Base Year +5 Years	2021	221,120	214,802	2.9%
Base Year +10 Years	2026	243,378	235,340	3.4%
Base Year +15 Years	2031	266,172	258,722	2.9%

Sources: Federal Aviation Administration, Draft 2017 Terminal Area Forecast; Landrum & Brown analysis, 2017.

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