CHAPTER 3
Aviation Activity Forecasts

CHAPTER 3
Aviation Activity Forecasts

3.1 Introduction

While there have been a number of commercial passenger carriers serving the Naples Airport (APF) in the past, there has not been any consistent service since 2007. Since that time the airport has focused on its general aviation customers, becoming one of the foremost airports in Florida, as well as the nation, for business/corporate aviation activity. Much of the recent success at APF has been related to the growth and popularity of fractional aircraft, charter, and aircraft management operators since the Great Recession. The federal contract tower at APF has moved up from the 15th to the 11th busiest in Florida since 2014. With respect to handling aircraft under instrument flight plans, APF's tower has consistently ranked as the 2nd busiest of the 254 contract towers in the nation and is within the top 25 out of all 518 towered airports in the nation. Similarly, since 2010, the number of based aircraft have increased, with an average annual growth over 30 percent for based jets.

This chapter presents projections of aviation activity that form the basis of future development needs for APF. The local trends above, as well as others, were evaluated to develop the new activity forecasts. Previous activity forecasts, industry trends, socioeconomic conditions, and historic data were also analyzed and applied to methodologies accepted by both the FAA and Florida Department of Transportation (FDOT) to develop these forecasts.

The standard planning period for an airport master plan is 20 years and the key planning periods include the five, ten, and 20-year horizons. Since this study was largely conducted in 2018, the forecasts are presented for 2023, 2028, and 2038. The forecasts primarily use data obtained through calendar year 2017, although in a few cases, the most recent 12 months of data were also considered. For a complete picture of operational activities and emerging opportunities at APF, interviews were also conducted with the airport tenants, customers of the airfield's facilities, airport businesses, local chamber of commerce, and industry groups, as well as airport and air traffic control management.

3.2 Recent Projections of Aircraft Activity

The most recent local, state, and national forecasts for APF include those prepared for the 1997 Airport Master Plan Update, FDOT's Florida Aviation System Plan (FASP), and the FAA's 2017 Terminal Area Forecast (TAF). Each forecast projects different levels of annual operations and based aircraft for the airport as summarized in the following sections. As required by the FAA, a

direct comparison of the recommended forecasts must be made relative to the FAA TAF. This comparison is included at the end of this chapter.

3.2.1 1997 Airport Master Plan Update

The 1997 Airport Master Plan Update included forecasts which were projected over a 20-year planning period using 1994 as the base year. The expected number of based aircraft and annual operations for the key planning horizons of that study are included in **Table 3-1** below. Given that in 2017 there were 380 based aircraft and 94,982 annual operations conducted at APF, the 1997 master plan figures were never realized.

TABLE 3-1
1997 AIRPORT MASTER PLAN UPDATE

	Based Aircraft	Annual Operations
Base Year		
1994	300	110,411
Forecast		
2000	381	144,297
2005	447	177,583
2015	616	279,188
Average Annual Change (1994 – 2015)	3.5%	4.5%

SOURCE: 1997 Airport Master Plan Update and ESA analysis, 2018.

3.2.2 Florida Aviation System Plan

The Florida Aviation System Plan (FASP) provides a comprehensive planning and development guide for the state's public airports. The FASP ensures that Florida has an effective statewide aviation transportation system which provides a link to the global air transportation network and effectively interfaces with regional surface transportation systems. In support of these goals, FDOT's Aviation Office provides regular updates of the historic aviation data and prepares forecasts of the based aircraft, annual operations, and passenger enplanements (as applicable) for each public airport in the state. The FASP information is included as part of the Florida Aviation Database with the most recent update providing historic data through 2015 and projections out to 2035. FASP data for the key forecast horizons of this study, including extrapolation to 2038, are shown in **Table 3-2**. The FASP does not include any projections of passenger enplanements for APF.

3.2.3 FAA Terminal Area Forecast

The Terminal Area Forecast (TAF) is prepared annually by the FAA to meet the budget and planning needs of the agency, as well as to provide information for use by state agencies, local authorities, the aviation industry, and the public. Projections in the FAA TAF are prepared for each airport in the National Plan of Integrated Airport Systems (NPIAS). The TAF projections detailed in **Table 3-3** are based on the federal fiscal year, which ends on September 30th. The 2017 TAF (issued in January 2018) utilizes a 2016 base year for based aircraft and a 2017 base year for annual operations. Projections of passenger enplanements in the 2017 TAF are not included in **Table 3-3** as they are flat lined at only 638 from 2017 to 2045.

TABLE 3-2
FLORIDA AVIATION SYSTEM PLAN

	Based Aircraft	Annual Operations
Base Year		
2015	383	98,936
Forecast		
2017	393	103,135
2023	425	116,832
2028	453	129,625
2035	496	149,923
Average Annual Change (2015 – 2035)	1.3%	2.1%
Extrapolated		
2038	516	159,568

SOURCE: Florida Aviation Database, January 2018 and ESA analysis, 2018.

TABLE 3-3
FAA 2017 TERMINAL AREA FORECAST

	Based Aircraft	Annual Operations
Base Year		
2016	363	93,123
Forecast		
2017	373	92,038[a]
2023	430	91,470
2028	481	93,073
2038	611	96,433
Average Annual Change (2016 – 2038)	2.4%	0.2%

[a] Actual base year for annual operations.

SOURCE: 2017 FAA Terminal Area Forecast, issued January 2018.

3.3 Factors Influencing Forecast Approach

To guide the forecasting effort, an understanding of the relationship between industry trends and the airport operating environment is essential. Using historic information and data, it is possible to compare how changes in the general aviation industry and local area economics may have had on activity at APF. The analysis of recent trends also allows educated assumptions to be made as to how the airport's service area and activity will be affected in the future.

National, regional, and local trends with the potential to impact existing, expanded, or even create new general aviation activity were identified from several sources. In addition to the historic data and recent activity forecasts, information was collected from a number of reports, studies, and industry articles including, but not limited to:

- FAA Aerospace Forecast (2018 – 2038)
- FAA Annual Business Jet Reports (2009 – 2017)
- General Aviation Manufacturers Association (GAMA) Annual Aircraft Shipment Reports (2001 – 2017)
- Florida Statewide Aviation Economic Impact Study Update and Individual Airport Summary Reports (August 2014)

The information gathered frames APF's role in the national air transportation network and provides insight into how activity at the airport may change over time.

3.3.1 State of the General Aviation Industry

General aviation encompasses all segments of the aviation industry except for the activity that is conducted by commercial airlines or the military. Examples include pilot training, law enforcement flights, medical transportation, aerial surveys, aerial photography, agricultural spraying, advertising, and various forms of recreation, not to mention business, corporate, and personal travel.

As history shows, general aviation is an industry that has experienced some very significant fluctuations, both positive and negative. Not long after the 1997 Airport Master Plan Update for APF was finalized, the general aviation industry was severely impacted by the September 11th 2001 terrorist attacks. Nationally, general aviation activity declined every year through 2006. Between 2003 and 2007, the industry experienced major advances in aircraft and navigation technologies, which created new product offerings and services during a period with an overall good economy. These included widespread use of Global Positioning Satellite (GPS) technology, the emergence of very light jet aircraft, and the introduction of an entirely new category; the light sport aircraft. These new product offerings and services bolstered most every segment of the general aviation industry. In spite of this, there was only limited growth in 2007.

By the end of 2008, most segments of the industry experienced losses as the overall national economy declined during the Great Recession. The very light jet industry was hit hardest as many manufacturers delayed development plans and/or went bankrupt. Data from the General Aviation Manufacturer's Association (GAMA) showed that general aviation aircraft manufactured in the U.S. fell from a high of 3,279 aircraft in 2007 to 1,334 in 2010. It was not until 2011 that GAMA reported the first increase in new general aviation shipments since 2007. While manufacturing has increased most every year since 2011, 2017 levels were still less than half of those before the Great Recession. Compounding this issue, the 2018 FAA Aerospace Forecast documents the decline in the number of aircraft in the nation's overall active general aviation fleet between 2007 and 2013. It is interesting to note that the greatest decline between 2011 and 2013 was attributed to the 2010 Rule for Re-Registration and Renewal of Aircraft Registration. According to the FAA, implementation of this rule removed cancelled, expired, or revoked records from the national database.

Overall, the 2018 FAA Aerospace Forecast projects general aviation growth over the next 20 years, despite the industry fluctuations that are likely to continue. While the number of active general aviation aircraft is only expected to increase slightly (less than a tenth of a percent annually) through 2038, this growth is not consistent across all segments of activity. The most common single-engine piston aircraft are expected to decline 1.0 percent annually for the period while jet aircraft are forecast to grow 2.2 percent each year. The number of hours flown by all general aviation aircraft is projected to increase at a rate of 0.8 percent each year. Similar to the fleet projections, the hours flown by turbine aircraft are forecast to grow 2.7 percent annually while the single-engine piston aircraft show a decline in activity of 1.1 percent each year. These turbine aircraft projections are supported by figures in the FAA's monthly Business Jet Reports which shows that operations conducted by general aviation jet aircraft have consistently increased since the low in 2009. They are however, still just below the level recorded for 2007, prior to the negative press during the 2008 and 2009 corporate bailouts which resulted in a 20 percent decrease in total business jet activity by the end of 2009.

3.3.2 Service Area and Other Airports

A number of different elements define the region or service area of an airport's customers. Geographical features, surface access, services offered, and competing facilities are primary factors in determining the service area. This is especially true in Florida where there are a numerous airports capable of supporting significant general aviation operations. In addition to specific airport features, most general aviation customers place a significant value on convenience.

There are four other airports in the immediate surrounding region that can accommodate similar general aviation operations as APF. Shown in **Table 3-4**, these include the Page Field (FMY), Southwest Florida International (RSW), Immokalee Regional (IMM), and Marco Island Executive (MKY) Airports.

TABLE 3-4
OTHER AREA AIRPORTS

	Longest Runway	Best Instrument Approach	Airport Traffic Control Tower	Based Aircraft[a]	Annual Operations[b]
Page Field (FMY)	6,406'	Precision	Yes	235	100,168
Southwest Florida International (RSW)	12,000'	Precision	Yes	4	82,279
Naples (APF)	**6,600'**	**Non-Precision**	**Yes**	**380**	**94,982**
Immokalee Regional (IMM)	5,000'	Non-Precision	No	52	36,500
Marco Island Executive (MKY)	5,000'	Non-Precision	No	25	20,048

[a] Based aircraft data for the other airports is from the 2017 FAA Terminal Area Forecasts (FY2016 base year).
[b] Annual operations data for the other airports is from the 2017 FAA Terminal Area Forecasts (FY2017 base year).

SOURCE: FAA Chart Supplements, FAA Terminal Procedures, and 2017 FAA Terminal Area Forecasts.

All of the airports in **Table 3-4** sell both Jet A and 100LL (AvGas) fuel, but only FMY offers MoGas that aircraft operators can purchase. APF, FMY, and RSW all have major airframe and major powerplant repairs, while MKY and IMM only provide minor airframe and minor powerplant repair services. Even though MKY is in somewhat close proximity to the greater Naples area, the facility is very small and limited. Conversely, IMM has land to develop, but is in the far northeast corner of the county. To the north in Lee County, Southwest Florida International does not provide storage for based aircraft and Page Field is in an entirely different population area.

Due to their proximity, these competing facilities generally frame the service area for APF. This area, which is estimated to be within 15 miles of APF, includes Bonita Springs in Lee County to the north (equidistance between APF and FMY), Marco Island to the south, and much of the Golden Gate area to the west. Overall, the airport's service area for general aviation customers covers most of the developed portions of Collier County, as well as a small portion of Lee County to the north.

3.3.3 Local Socioeconomic Factors

A number of socioeconomic indicators were evaluated that typically have a direct relationship to the use of aviation and therefore to airport activity. Overall and average annual growth rates for Collier County, the State of Florida, and the U.S. are presented based on data obtained from Woods & Poole Economics, Inc. It should be noted that the Naples-Immokalee-Marco Island Metropolitan Statistical Area (MSA) incorporates the same data as that for Collier County.

The Woods & Poole projections are updated annually, utilizing models which take into account specific local conditions based on historic data back to 1969. While the current historic data sets from Woods & Poole cover the period from 1969 to 2015, only data back to 2006 are shown in the tables that follow; reflecting the general trends over the past 10 years. Historic socioeconomic data prior to 2006 was utilized in the various analyses of aviation activity, especially as part of the regression models evaluated.

Population

Collier County has had overall and annual population growth rates greater than Florida's and the nation's (**Table 3-5**). For Collier County, this higher growth highlights the historic and ongoing development that has occurred in the southwest portion of Florida. While a large portion of east Collier County remains undeveloped, it ranked 11th in the state for the percent of population change between 2010 and 2017. This is based on the University of Florida Bureau of Economic and Business Research's evaluation of data for all 67 counties. This growth for Collier County is expected to continue, outpacing the related rates of both the state and nation through 2038.

TABLE 3-5
TOTAL POPULATION

	Collier County	State of Florida	United States
Historic Data			
2006	312,621	18,166,990	298,379,873
2007	314,437	18,367,842	301,231,161
2008	316,641	18,527,305	304,093,924
2009	318,485	18,652,644	306,771,487
2010	322,683	18,849,890	309,346,806
2011	327,742	19,105,533	311,718,780
2012	332,515	19,352,021	314,102,549
2013	339,537	19,594,467	316,427,327
2014	348,355	19,905,569	318,906,933
2015	357,305	20,271,272	321,420,589
Overall Growth (2006 – 2015)	14.3%	11.6%	7.7%
Average Annual Change (2006 – 2015)	1.5%	1.2%	0.8%
Forecast			
2023	422,760	22,756,779	345,864,633
2028	469,110	24,446,562	362,086,877
2038	571,267	27,929,895	393,507,447
Average Annual Change (2015 – 2038)	2.1%	1.4%	0.9%

SOURCE: Woods & Poole Economics, Inc., 2017.

Employment

Employment data can provide one indication of the economic stability of a geographic area. As shown in **Table 3-6**, Collier County employment has had slightly higher growth relative to the state and nation. It is assumed that this is attributed to the overall development being experienced in this part of the state. As Collier County continues to expand its population base, so too will the employment base to support the area's growth initially (such as real estate, banking, and construction) as well as afterwards (to include retail, health care, education, etc.). Woods & Poole's projections not only show employment levels for Collier County, the state, and nation continuing to increase, but at a higher rate for each over the course of the planning period.

TABLE 3-6
TOTAL EMPLOYMENT (NUMBER OF JOBS)

	Collier County	State of Florida	United States
Historic Data			
2006	190,541	10,400,600	176,123,566
2007	186,827	10,557,493	179,885,663
2008	179,225	10,296,804	179,639,868
2009	170,670	9,879,404	174,233,663
2010	170,460	9,813,714	173,034,686
2011	177,133	10,048,434	176,278,692
2012	183,219	10,255,578	179,081,672
2013	190,631	10,544,028	182,408,047
2014	200,800	10,930,490	186,168,101
2015	208,126	11,287,609	190,195,370
Overall Growth (2006 – 2015)	9.2%	8.5%	8.0%
Average Annual Change (2006 – 2015)	1.0%	0.9%	0.9%
Forecast			
2023	254,219	12,997,884	212,627,009
2028	283,861	14,091,999	226,668,566
2038	343,562	16,269,775	253,386,160
Average Annual Change (2015 – 2038)	2.2%	1.6%	1.3%

SOURCE: Woods & Poole Economics, Inc., 2017.

Income

Personal income per capita represents the ratio of total personal income, before income taxes, to the total resident population. Adjustments are also made if the income was earned in a different area than where the person resides. While Collier County has slightly outpaced the state (**Table 3-7**), the nation as a whole has had the most growth in personal per capita income over the last ten years. However, it is important to note that the level of per capita income for Collier County has been nearly double that of the state and nation. Over the course of the planning period, Collier County's personal income per capita is expected to have a higher average annual growth rate than the state and nation. For all three the projected average annual growth rates through 2038 are significantly higher than the historic rates.

TABLE 3-7
TOTAL PERSONAL INCOME PER CAPITA (IN 2017 DOLLARS)

	Collier County	State of Florida	United States
Historic Data			
2006	$67,858	$38,738	$38,144
2007	$70,681	$39,788	$39,821
2008	$69,784	$39,655	$41,082
2009	$59,183	$37,065	$39,376
2010	$63,677	$38,624	$40,277
2011	$67,204	$40,476	$42,453
2012	$72,506	$40,983	$44,267
2013	$70,972	$40,771	$44,462
2014	$77,226	$42,868	$46,414
2015	$78,473	$44,429	$48,111
Overall Growth (2006 – 2015)	15.6%	14.7%	26.1%
Average Annual Change (2006 – 2015)	1.6%	1.5%	2.6%
Forecast			
2023	$103,636	$58,537	$62,813
2028	$130,992	$73,729	$78,738
2038	$215,413	$119,968	$127,307
Average Annual Change (2015 – 2038)	4.5%	4.4%	4.3%

SOURCE: Woods & Poole Economics, Inc., 2017.

Households

Households represent the number of occupied housing units, which include homes, apartments, a group of rooms, or single rooms occupied as separate living quarters. The number of households does not include facilities such as retirement homes, college dormitories, military barracks, or prisons. The overall growth in the number of households for Collier County has been much higher than that for the state and nation (**Table 3-8**). Similarly, the projection over the next 20 years is that Collier County will continue to have a higher average annual growth in the number of households. This is not surprising given the expected increase in population, employment, and income described previously for Collier County.

TABLE 3-8
TOTAL NUMBER OF HOUSEHOLDS

	Collier County	State of Florida	United States
Historic Data			
2006	129,693	7,300,146	114,486,122
2007	130,717	7,389,493	115,939,528
2008	130,931	7,408,025	116,538,673
2009	131,190	7,393,209	116,761,870
2010	133,694	7,435,801	116,938,345
2011	137,795	7,617,373	119,315,163
2012	140,532	7,724,395	120,466,242
2013	143,551	7,845,644	121,834,231
2014	145,794	7,926,134	122,600,297
2015	148,968	8,047,925	123,951,413
Overall Growth (2006 – 2015)	14.9%	10.2%	8.3%
Average Annual Change (2006 – 2015)	1.6%	1.1%	0.9%
Forecast			
2023	180,050	9,183,357	135,939,466
2028	197,974	9,745,715	140,818,385
2038	234,552	10,768,076	148,472,937
Average Annual Change (2015 – 2038)	2.0%	1.3%	0.8%

SOURCE: Woods & Poole Economics, Inc., 2017.

Gross Regional Product

Gross Regional Product (GRP) is based on the U.S. Bureau of Economic Analysis gross domestic product data for each state. The nation's figures represent a total for all states while the individual county data has been estimated by Woods & Poole. For the county data, this is done by allocating the state GRP to the counties based on the proportion of total state earnings by employees originating from a particular county. It is interesting to note that unlike employment, the GRP for Collier County has had a negative trend over the past ten years. As shown by the figures in **Table 3-9**, Collier County, the state, and nation were all impacted by the Great Recession and all have recovered since. For Collier County, the recovery has not regained GRP levels recorded before the recession; however, that trend is projected to change over the course of the planning period, with GRP for the county not only expected to grow, but at a higher average annual rate than the state or nation.

TABLE 3-9
GROSS REGIONAL PRODUCT (IN MILLIONS OF 2009 DOLLARS)

	Collier County	State of Florida	United States
Historic Data			
2006	$14,857.85	$787,689	$14,539,610
2007	$14,504.98	$792,792	$14,820,650
2008	$12,713.83	$747,834	$14,617,095
2009	$11,827.90	$721,755	$14,320,115
2010	$12,265.92	$723,144	$14,618,132
2011	$12,216.12	$711,918	$14,792,272
2012	$12,172.17	$720,061	$15,115,991
2013	$12,460.76	$737,538	$15,415,698
2014	$13,522.35	$763,508	$15,829,180
2015	$14,110.57	$809,155	$16,501,908
Overall Growth (2006 – 2015)	-5.0%	2.7%	13.5%
Average Annual Change (2006 – 2015)	-0.6%	0.3%	1.4%
Forecast			
2023	$17,666.37	$985,688	$19,622,540
2028	$19,993.86	$1,103,966	$21,688,340
2038	$24,754.74	$1,358,881	$26,096,053
Average Annual Change (2015 – 2038)	2.5%	2.3%	2.0%

SOURCE: Woods & Poole Economics, Inc., 2017.

Woods & Poole Wealth Index

Woods & Poole calculates a wealth index which provides a measure of relative total personal income per capita weighted by the source of income. In calculating the index, relative income per capita is weighted positively for income with a higher proportion from dividends, interest, and rent and negatively for income with a higher proportion from transfer payments (income where no goods or services are provided). The index is also based on weighted averages of the regional income per capita; regional income from dividends, interest, and rent; and regional income from transfer payments. Since Woods & Poole consider dividends, interest, and rent income good indicators of assets, their resulting index provides a measure of relative wealth to that of the nation as a whole (**Table 3-10**). Even though the county's index is lower than its peaks of a decade ago, Collier County is well above the national average and still continues to rank as the wealthiest of Florida's 67 counties.

TABLE 3-10
WOODS & POOLE WEALTH INDEX (COMPARED TO UNITED STATES)

	Collier County	State of Florida	United States
Historic Data			
2006	189	105	100
2007	188	104	100
2008	182	101	100
2009	164	98	100
2010	172	101	100
2011	171	100	100
2012	176	97	100
2013	173	96	100
2014	178	97	100
2015	175	96	100
Overall Growth (2006 – 2015)	-7.5%	-8.4%	n/a
Average Annual Change (2006 – 2015)	-0.9%	-1.0%	n/a
Forecast			
2023	176	97	100
2028	178	98	100
2038	180	98	100
Average Annual Change (2015 – 2038)	0.1%	0.1%	n/a

SOURCE: Woods & Poole Economics, Inc., 2017.

3.3.4 Aviation Fuel Prices

As noted previously, not long after the last master plan was conducted, the general aviation industry was significantly impacted by both September 11th, 2001 and the Great Recession. This general period was also marked by dramatic increases in both Jet A and 100LL (AvGas) fuel prices, especially between 2003 and 2008. During this five-year period, Jet A prices increased an average of nearly 30 percent each year while 100LL increased nearly 17 percent each year. Since that time aviation fuel prices have fluctuated and overall, the general aviation industry has enjoyed lower Jet A fuel costs since 2012. For 100LL the lowest prices were prior to 2012, but have increased at much lower rates than in the past.

IHS Global Insight believes oil prices are at the bottom of their latest cycle and projects prices to increase as a result of growing demand and the higher costs of extraction. Using data from IHS Global Insight, the 2018 FAA Aerospace Forecast documents that the acquisition costs (dollars per barrel) for the crude oil required for aviation fuels will increase at an average annual rate of 4.4 percent through 2038.

In addition, the eventual phasing out of 100LL fuel will have an undetermined impact on every aircraft engine built from the 1920s until today that uses this leaded gasoline. Excluding experimental and light sport aircraft, many of which can use every day unleaded automobile gas (MoGas), the FAA's figures for 2017 show that nearly 70 percent of the 213,000 active general aviation aircraft are piston and use 100LL. While the costs to retrofit piston aircraft could be substantial, the ultimate cost of an unleaded aviation fuel has the potential to be much less than the current 100LL used.

3.3.5 Potential for Commercial Passenger Service

Currently there is no regularly scheduled commercial passenger service at APF. Regardless, the airport still maintains its Title 14, Code of Federal Regulations (CFR), Part 139 Airport Operating Certificate required to accommodate scheduled and unscheduled air carrier operations. Because of this, the history of passenger service at the airport, and the existing Commercial Airline Terminal facilities, the Naples Airport Authority (NAA) commissioned independent analyses on the potential market for commercial passenger service to supplement this master plan. This culminated in the following documents:

- Traffic Retention and Leakage Study
- Commercial Air Service Activity Review

Copies of these analyses (included in **Appendix C**) indicate that while APF is located in a large commercial passenger catchment area, securing scheduled commercial service remains challenging. However, for the purposes of airport master planning, there are specific commercial passenger activity types that should be planned to ensure that the airport has flexibility to serve potential future commercial passenger demand.

3.4 Forecast of Based Aircraft

Based aircraft are those aircraft that are operational, airworthy, and kept at the airport for a majority of the year (more than six months). Therefore, the number of aircraft owners projected to base their aircraft at APF is an important consideration for airfield planning since it is a key indicator of the demand for facilities. Projections of based aircraft also provide an indication of the anticipated growth in general aviation activity.

Information on the aircraft based at general aviation airports is uploaded to the FAA's National Based Aircraft Inventory Program. The FAA determines if all of the aircraft reported have a current registration, then a check is made to see if any of the aircraft have been reported by another airport. This creates a validated number of based aircraft for a given airport. This validated count goes back to 2009 and includes a break out of the single-engine, multi-engine, jet, and rotorcraft models. As shown in **Table 3-11**, the FAA's National Based Aircraft Inventory Program documents 380 aircraft were based at APF in 2017.

It is worth noting that the National Based Aircraft Inventory Program does not count glider, military, or ultralight aircraft since these may not always have a tail number for registration. These categories of aircraft are included as part of the FAA Airport Master Record (Form 5010); however, no glider, military, or ultralight aircraft have been included on recent 5010 forms for APF. It also appears that the figure for 2011 may not be accurate since it reflects a loss of 81 aircraft and then a gain of 141 the following year. Some of the earlier data in **Table 3-11** also does not align very well with the numbers in the FASP and FAA TAF. Nonetheless, because of the validation process, the historic level of based aircraft from the National Based Aircraft Inventory Program will be utilized to project future levels of based aircraft.

TABLE 3-11
HISTORIC BASED AIRCRAFT

	Single-Engine	Multi-Engine	Jet	Rotorcraft	Total
2009	182	57	11	14	264
2010	176	55	10	14	255
2011	115	39	8	12	174
2012	199	67	36	13	315
2013	223	72	43	13	351
2014	223	72	58	12	365
2015	218	71	54	12	355
2016	226	73	55	15	369
2017	230	69	67	14	380

SOURCE: FAA's National Based Aircraft Inventory Program, 2018.

3.4.1 Historic Growth

Given the cyclical nature of the general aviation industry, it is important to analyze the overall changes that have occurred at the airport. Despite the challenges the industry has faced over the last decade, there has been an overall increase in the number of based aircraft since 2009. For any aviation forecast, such historic data should be considered when analyzing potential growth.

However, in this case the average annual growth since 2009 is considered overly optimistic since it does not account for the cyclical nature of the industry, especially given the economic conditions that occurred before 2009. Therefore, the historic growth was not considered as a forecast option.

3.4.2 Previous Growth Projections

As shown in **Table 3-1**, the 1997 Airport Master Plan Update projected 381 based aircraft by 2000, matching the current 2017 count of 380. While the FAA's national inventory program does not have data prior to 2009, historic data in the 2017 FAA TAF shows there were 384 based aircraft at APF in 2002. Between 2005 and 2007, the TAF shows there were upwards of 439 based aircraft at the airport. Most likely the decline in total based aircraft after 2007 (see **Table 3-11**) is primarily attributed to the Great Recession. As noted previously, the 2018 FAA Aerospace Forecast documents the decrease in the nation's overall general aviation fleet between 2007 and 2013. Even though the number of based aircraft have been significantly less than what was projected in the previous master plan, that study's expected average annual growth rate (3.5 percent) was applied to the current based aircraft figure for comparison purposes. This results in an estimate of 783 based aircraft at APF by the end of the 20-year planning period (**Table 3-12**).

As mentioned, the FASP is updated on a regular basis and therefore incorporates changes in the industry that can ultimately affect the level of based aircraft. The most recent data for the system plan projects an average annual growth of 1.3 percent for the based aircraft at APF. Applied to the 2017 count, this would result in 498 based aircraft by 2038 (**Table 3-12**).

The current TAF projects an average growth rate of 2.4 percent for the based aircraft at APF. When applied to the current 2017 level, this would result in a projection of 625 based aircraft by 2038 (**Table 3-12**).

3.4.3 National Active Fleet Forecasts

Each year the FAA provides a long-term projection for the active general aviation fleet, with active being defined as any aircraft flying at least one hour during the year. Decreases in the nation's total active fleet occurred between 2007 and 2013. Since that period, there has been a four-year increase through 2017. In the 2018 FAA Aerospace Forecast, a slight increase is projected for 2018 and 2019, but after, a slow decline in the nation's total active general aviation fleet is projected through 2028. Afterwards very limited growth is expected with the current 2017 level not being re-achieved until 2036. Overall, there is no change expected by the FAA in the size of the nation's active general aviation fleet over the next 20-years. Given that APF has experienced growth in the number of based aircraft since the last master plan and additional based aircraft are expected during the 20-year horizon of this study, the FAA's national active fleet projections were not utilized to create a based aircraft forecast.

3.4.4 Regression Analysis

Regression forecasting methodologies were also employed to estimate the number of based aircraft for the planning period. The regression models developed and tested incorporated three types of independent variables to identify correlations with historic based aircraft counts. The first included

a number of the socioeconomic datasets previously summarized. These were applied based on initial assumptions made for each as to their potential correlation to based aircraft. For example, it was assumed that the tendency for aircraft to be based at APF is directly related to the number of people in the surrounding areas. The FAA's data on fuel costs was also included as an independent variable, since this is such an important element of owning and operating any general aviation aircraft. In addition, an indicator variable was introduced to take into consideration the impacts associated with the Great Recession on the level of based aircraft at APF. Indicator variables are used in regression models for events such as the recession that cannot be easily quantified.

For any model with multiple independent variables, an adjusted R^2 is used as the coefficient of determination. An adjusted R^2 value of zero shows no relationship while values approaching one show a strong relationship and overall fit between the estimated regression equation and the sample data. Typically, values of 0.95 or higher indicate a significant relationship.

A variety of models were evaluated using the different independent variables against the historic based aircraft data for APF. Initially, simple regression analyses were conducted using the local socioeconomic datasets. This identified the general relationship between key socioeconomic variables for Collier County with historic based aircraft levels. While none of the individual variables had a significant correlation, most did demonstrate the expected relationship with historic based aircraft data. Multiple regression models where then evaluated using different combinations of the independent variables. The final regression model selected had an adjusted R^2 of 0.975 using the independent variables of employment, GRP, and wealth index. Using the final regression equation, the number of based aircraft at APF are forecasted to increase from 380 in 2017 to 571 by 2038, resulting in an average annual growth rate of 2.0 percent (**Table 3-12**).

TABLE 3-12
COMPARISON OF BASED AIRCRAFT PROJECTIONS

	Previous Master Plan[a]	State System Plan[a]	2017 FAA TAF[a]	Regression Analysis (recommended)
Base Year				
2017	380	380	380	380
Forecast				
2023	467	411	438	436
2028	555	438	493	482
2038	783	498	625	571
Average Annual Change (2017 – 2038)	3.5%	1.3%	2.4%	2.0%

[a] Applies growth projection to current annual operations count.

SOURCE: ESA, 2018.

3.4.5 Selected Based Aircraft Forecast

For the recommended based aircraft projection, the forecast generated using the multiple regression equation was adopted. While the regression model results in an average annual growth rate of 2.0 percent, the growth over the 20-year planning horizon is not linear. The model projects slightly higher growth in the number of based aircraft between 2017 and 2023 than between 2023 and 2028. And the intermediate-term growth is slightly higher than that projected for the long-term planning period. The initial higher growth rate is supported by the fact that the airport has 100 percent occupancy of its general aviation hangar facilities and 108 confirmed on the airport's hangar wait list (as of March 2018).

3.5 Forecast of Based Aircraft Fleet Mix

Projecting the types of based aircraft is necessary since different aircraft require different facilities. Overall, the future based aircraft fleet mix was determined by studying the projections of the national fleet, then comparing those to the current aircraft types at APF. While the overall growth in the nation's active fleet was not utilized to forecast based aircraft, the individual projections of aircraft types are useful in predicting the future based aircraft fleet mix. Information obtained from interviews with the various airport tenants was also used to determine the future mix of based aircraft.

3.5.1 The Nation's Active General Aviation Fleet

Every year, the nation's active general aviation fleet is published as part of the FAA Aerospace Forecast. In 2017 there were 213,050 active general aviation aircraft. As noted previously, this figure was on a decline between 2007 and 2013; however, has recovered some since. Even though the 2018 FAA Aerospace Forecast may only project limited growth in the overall active aircraft through 2038, their forecast provides detail on how the individual aircraft categories are expected to evolve over the next 20 years.

While the FAA provides counts for a number of aircraft categories, they have been simplified into the five major categories shown in **Table 3-13**. Within the single-engine grouping are the single-engine piston, experimental, and light sport aircraft categories. The multi-engine group contains both piston and turboprop models, as the rotorcraft group contains both piston and turbine models. The jet category covers all ranges of turbojet general aviation aircraft, from the very light jets to the heaviest business jets.

The FAA projects considerable growth in the jet category. While the use of business aircraft fell after 2007, jet aircraft usage by smaller companies continues to increase as various charter, lease, time-share, partnership, and fractional ownership agreements provide more cost effective options for these aircraft users resulting in higher utilization rates. More businesses also rely on general aviation because it provides safe, efficient, flexible, and reliable transportation. Fractional ownership offers consumers a more efficient use of time by providing faster point-to-point travel, the ability to conduct business while flying, and more convenient enplaning and deplaning of flights

(when compared to the airlines). While not many of the current based aircraft at APF are fractional aircraft, different fractional aircraft certainly conduct a number of operations at the airport.

TABLE 3-13
FAA FORECAST OF NATIONAL ACTIVE GENERAL AVIATION FLEET

	2017 Fleet Mix	2038 Fleet Mix	Average Annual Growth Rate
Single-Engine	75.5%	68.4%	-0.4%
Multi-Engine (piston & turboprop)	10.5%	11.5%	0.5%
Jet	6.6%	10.4%	2.2%
Rotorcraft	5.1%	7.4%	1.8%
Other (gliders, balloons, etc.)	2.3%	2.3%	0.0%

SOURCE: FAA 2018 Aerospace Forecast.

The continuing popularity of travel by general aviation aircraft is also due to the ability to use smaller, less-congested airports which are more convenient to the final destination. A large part of this is the result of the expanded application of GPS technologies in navigation, but more specifically, the myriad of new runway specific instrument approach procedures that have been established at even the smallest airports. In the FAA's projections, jet aircraft models (including the very light jets) are expected to replace a number of the piston aircraft in the future. This is just one of the reasons the single-engine (piston) category is on a decline and the multi-engine group shows virtually no growth. In all, jets are expected to represent over 10 percent of the active general aviation fleet by 2038.

3.5.2 Current and Future Based Aircraft Fleet Mix

The 2017 based aircraft fleet mix at APF is comprised of 60.5 percent single-engine, 18.2 percent multi-engine, 17.6 percent jet, and 3.7 percent rotorcraft. Throughout the planning period, the mix of aircraft is expected to remain predominately single-engine, but they will account for a lower overall percentage of based aircraft. The more significant changes are expected to occur in the number of jets based at the airport. This is reasonable considering that the FAA has predicted that turbojet technology is at the point where it is truly feasible as a replacement to the more traditional piston-powered fleet. The expected future based aircraft types shown in **Table 3-14** have been based on the national trends and tenant interviews, as well as the types of hangars being requested by the 108 on the current wait list.

As with most airports, the single-engine category is predominantly comprised of Beech, Cessna, Mooney, and Piper models. Multi-engine aircraft tend to include the Beech King Air series; Cessna models, such as the 414 Chancellor; or Piper Seminole aircraft. As indicated previously, the national fleet of single-engine aircraft is expected to decline slightly while the multi-engine group is only anticipated to increase slightly in the future. While many of the additional single-engine

aircraft are expected to be similar to those currently at APF, additional aircraft in the multi-engine category are expected to be mostly turboprops.

TABLE 3-14
FORECAST OF BASED AIRCRAFT FLEET MIX

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Single-Engine	230	257	277	323
Multi-Engine (piston & turboprop)	69	76	84	94
Jet	67	83	94	120
Rotorcraft	14	20	27	34
Total	**380**	**436**	**482**	**571**

SOURCE: FAA's National Based Aircraft Inventory Program and ESA analysis, 2018.

Based jets will continue to include the entire range of business jet aircraft flying today. For the small to medium-sized business jet aircraft, these include popular models from the Embraer, Bombardier Learjet, Cessna Citation, and Dassault Falcon series. Larger jet aircraft models include those from the Beechcraft Hawker, Bombardier Challenger, Dassault Falcon, Bombardier Global, and Gulfstream series. Overall, the number of based jets at APF is expected to double over the course of the 20-year planning horizon. Figures for the short-term show an additional 16 jets expected by 2023; which is supported by the 19 individuals currently waiting for hangar space that can accommodate cabin class aircraft at APF.

Rotorcraft will continue to include both piston and turbine powered models, such as the popular Bell, Eurocopter, and Robinson models. The current based helicopters include the two Bell OH-58 Kiowas and one Bell UH-1 Huey operated by the Collier County Sheriff's Office Aviation Unit, as well as the five MD-500 helicopters operated by the Collier Mosquito Control District. Both of these operators are currently looking to add additional heavier duty helicopters like the Bell 429 and Bell 412, in the near future.

While approximately 2.3 percent of the nation's active fleet fall within the "Other" category (gliders, balloons, and ultralights), none were documented at APF in 2017. Likewise, no aircraft in this category are expected to be based at the airport over the course of the planning period. Therefore, this category was not included in **Table 3-14**.

3.6 Forecast of Annual Operations

The FAA defines an aircraft operation as either a single aircraft landing or takeoff. Further, a touch and go operation is counted as two operations, since the aircraft technically lands and immediately takes off. The FAA's Operations Network (OPSNET) data provides the official activity counts based on the actual airport traffic control tower (ATCT) activity logs. The FAA classifies aircraft operations into four different categories for OPSNET as well as for their other datasets, airport traffic control tower logs, and Aerospace Forecast. These categories, which include air carrier, air taxi, general aviation, and military, are defined by the FAA as:

- Air Carrier - 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.
- Air Taxi - an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation.
- General Aviation - all civil aircraft, except those classified as air carriers or air taxis.
- Military - all classes of military aircraft.

It was stated previously that general aviation encompasses all segments of the aviation industry except for the activity that is conducted by commercial airlines or the military. Given there are no commercial airlines and very limited military operations at APF, the historic (see **Table 3-15**) and future annual operations for APF have been analyzed as a whole, since the activity that is not truly general aviation is relatively insignificant.

3.6.1 Historic Activity

Over the past 20 years there have only been a few operations included in the air carrier and military categories. Since 1998 only 637 total operations have been recorded under air carrier, with most occurring in 2016-17 when Elite Airways was conducting flights at APF. Since 1998, military operations have averaged less than 0.2 percent of activity with a high of 307 operations in 2002 and a low of 56 in 2007. Air taxi operations have averaged 13.4 percent of the activity since 1998, but have been 15 percent and higher since 2014. As confirmed by ATCT management, the air taxi figures reflect those operations that are being conducted by aircraft with an approved air taxi call sign. These include some, but certainly not all, of the fractional aircraft and air charter operations. For example, since air taxi call signs are only recognized in the U.S., any operator flying out of the country must utilize their registered tail or "N" number for the flight.

TABLE 3-15
PAST 20 YEARS OF AIRCRAFT OPERATIONS

	Air Carrier	Air Taxi	General Aviation	Military	Annual Operations	Change over Prior Year
1998	-	13,744	112,965	62	113,027	0.9%
1999	9	13,175	123,088	62	123,159	9.0%
2000	50	13,811	118,432	162	118,644	-3.7%
2001	74	14,259	140,919	283	141,276	19.1%
2002	-	13,056	127,871	307	128,178	-9.3%
2003	-	10,671	114,453	255	114,708	-10.5%
2004	-	11,372	137,409	195	137,604	20.0%
2005	-	13,595	158,286	134	158,420	15.1%
2006	55	11,940	134,614	278	134,947	-14.8%
2007	-	11,638	128,390	56	128,446	-4.8%
2008	-	11,851	129,160	98	129,258	0.6%
2009	-	6,773	100,810	148	100,958	-21.9%
2010	-	7,658	82,234	115	82,349	-18.4%
2011	-	8,135	82,925	238	83,163	1.0%
2012	95	8,763	85,986	192	86,273	3.7%
2013	-	9,664	91,711	218	91,929	6.6%
2014	-	10,942	92,850	228	93,078	1.2%
2015	-	11,718	98,705	231	98,936	6.3%
2016	239	12,765	91,625	132	91,996	-7.0%
2017	115	13,985	94,645	222	94,982	3.2%
			Average Annual Change (1998 – 2017)		-0.9%	n/a

SOURCE: FAA OPSNET database, 2018.

As shown in **Table 3-15**, the level of annual operations at APF has fluctuated over the past 20 years. When reviewing the historic data, these changes are quite dynamic and can increase or decrease significantly in short periods of time. While general aviation activity is certainly linked to the local area economy, major impacts to the overall industry have had the most significant impact.

Prior to September 11th, activity at the airport was increasing nearly every year, including 2001, which recorded the second highest level over the past two decades. The impacts of September 11th produced two years of significant losses, which were followed by two years of growth. Afterwards, activity remained relatively consistent around 130,000 annual operations, until 2009 when nearly 22 percent of the operations disappeared as a result of the Great Recession. Another 18.4 percent were lost the following year (2010), resulting in the airport's lowest recorded operations since the ATCT was commissioned. While activity has increased most every year since, the current level of activity is well below what it has been in the past, resulting in a negative number for the average annual historic growth. As a result, historic levels could not be used to develop a projection of the annual operations expected through 2038.

3.6.2 Previous Growth Projections

Overall annual operations in the 1997 Airport Master Plan Update were projected to have an average growth rate of 4.5 percent through 2015 (**Table 3-1**). The general aviation portion of this projection (1997 forecasts also included air carrier operations) was based on a subjective analysis of the activity and industry at that time. This contributed significantly to an overall forecast of approximately 279,000 operations by 2015 (nearly three times the actual number that occurred).

Because so much has changed at the airport, this previous master plan growth rate was not utilized to develop a new forecast.

As with based aircraft, projections of annual operations in the FASP benefit from being updated on a regular basis. Not only does this help temper annual industry fluctuations, it also allows adjustments to be made to accommodate any local or regional changes. The most recent system plan forecast uses 2015 as the base year. General aviation operations are projected by FDOT to grow at 2.1 percent each year after 2015. Interestingly, this is the same average annual rate the airport operations have grown since the low recorded in 2010. This rate has been applied to the current base year level (**Table 3-16**) to provide an updated projection based on the current FASP forecast.

The general aviation operations data in the 2017 TAF utilize data from the FAA's 2017 fiscal year as the base level of activity. While the 2017 TAF also documents the overall growth since 2010, the average annual growth through 2038 is limited to 0.2 percent. This rate has been applied to the current base year level to provide a more current projection based on the TAF's relatively flat lined growth for APF (**Table 3-16**).

3.6.3 Utilization of the General Aviation Fleet

Each year as part of their Aerospace Forecast, the FAA provides historic data and projections on the number of hours flown by general aviation aircraft. In the 2018 Aerospace Forecast, the FAA anticipates the utilization of the fleet to increase at an average annual rate of 0.8 percent between 2017 and 2038. This fairly limited growth is partly related to the long-term costs associated with aviation fuels, which the FAA documents as increasing 4.4 percent each year through 2038. As noted before, the most active aircraft types (and therefore higher utilization rates) will be those in the turbine fleet (both aircraft and rotorcraft) versus a number of piston aircraft which are not expected to be utilized as much.

The FAA's overall expectation on the general aviation hours to be flown have been applied to the operations for APF to create another forecast scenario. As shown in **Table 3-16**, this results in just over 112,000 annual operations by the end of the planning period.

3.6.4 Market Share

A common methodology for forecasting aviation activity is the use of market share analysis. This approach allows a comparison to be made of the annual operations APF has supported against a defined data set. In the Aerospace Forecast, the FAA documents and projects the operations conducted at all of the towered airports in the nation. A separate count and forecast for the general aviation operations are also included in these data sets. It is important to note that just like APF's historic data, the nation's level of general aviation operations also experienced double digit losses after the Great Recession. However, unlike the nation, APF has recorded increases for all but one year between 2010 and 2017. At the national level, general aviation operations have been down for all but two years since 2010.

The aircraft operations for APF over the past 15 years were evaluated against the same FAA data for the nation. Since the lowest point in 2010, all but one year through 2017 reflected an increase in APF's share of the nation's general aviation activity. In fact, the airport has recorded an overall increase in its market share since 2003. When historic increases in the annual market share were applied to estimate the future potential, the result is that by the end of the 20-year planning period, APF will nearly return to the highest historic level recorded back in 2005.

For the nation, the FAA expects the aircraft activity to increase every year through 2038. When the expected local market share is combined with the FAA's projected increase in general aviation activity, approximately 125,000 of those operations (**Table 3-16**) would be accommodated at APF.

3.6.5 Operations per Based Aircraft

Another forecast was generated by assigning a representative level of annual operations for each based aircraft. This methodology is not considered the most accurate if a set ratio is assigned to a group of similarly categorized airports (since no two airports operate the same). Additionally, based jets and multi engine aircraft tend to generate less operations than single engine aircraft, particularly when those are used for flight training. However, to develop an alternate estimate for the level of annual operations at APF, this methodology can be useful if local data is utilized. In doing so, there were 250 operations per based aircraft in 2017. When applied to the selected forecast of based aircraft, this methodology projects that 142,750 annual operations would occur by 2038 (see **Table 3-16**).

3.6.6 Regression Analysis

Regression modeling was used in an attempt to forecast the annual general aviation activity at APF. However, no significant correlations could be derived using different combinations of the independent variables. Essentially, none of the local socioeconomic or industry data available would generate a model that could reliable explain the past activity. Therefore, this method to project future annual operations was not included in the analysis.

TABLE 3-16
COMPARISON OF PROJECTIONS FOR GENERAL AVIATION OPERATIONS

	State System Plan[a]	2017 FAA TAF[a]	Utilization of National Fleet	Market Share Analysis (recommended)	Operations per Based Aircraft
Base Year					
2017	94,982	94,982	94,982	94,982	94,982
Forecast					
2023	107,596	96,127	99,633	103,184	109,000
2028	119,378	97,093	103,683	109,995	120,500
2038	146,954	99,052	112,283	125,082	142,750
Average Annual Change (2017 – 2038)	2.1%	0.2%	0.8%	1.3%	2.0%

[a] Applies growth projection to current annual operations count.

SOURCE: ESA, 2018.

3.6.7 Selected Forecast of Aircraft Operations

Each of the projections shown in **Table 3-16** were generated using commonly accepted methods. Therefore, selection of a preferred forecast largely depends on the potential of the airport's general aviation customers and the associated assumptions on future airport activity. In addition, the selection of a preferred forecast also needs to take into account the airport improvements that have occurred and will continue to occur. Finally, no future projection should be selected if it does not account for past and future changes in the aviation industry.

Between 2000 and 2017, general aviation operations at the nation's towered airports decreased an average of 2.6 percent each year. Activity for Florida's towered airports over the same period only had an average annual decrease of 0.7 percent. Even more significant is that since 2010 (after the Great Recession) the nation's total general aviation activity at towered airports declined 0.6 percent annually while Florida's have increased 1.6 percent (and APF's 2.1 percent for the same period). This demonstrates that Florida's general aviation industry has been recovering each year since 2010. This creates an optimistic outlook when coupled with the population and economic growth expected in Collier County, as demonstrated in the different local socioeconomic factors.

Given the state's recovery, the two forecasts generated utilizing the 2017 TAF growth rate and the overall utilization of the nation's general aviation fleet are considered constrained for the Florida market. Operations per based aircraft does utilize local conditions to predict future activity; however, the results still appear optimistic. This is especially true given that a majority of the based aircraft include the types of aircraft the FAA expects to have some of the lowest utilization rates in the future. Therefore, these three projections were excluded from further consideration.

While the regularly updated FASP projection is a regionally focused forecast that addresses growth factors specific to Florida, this projection seems overly ambitious given the nominal growth the airport has experienced over the past 5 years. The market share projection is considered a more reasonable projection of the expected activity at APF. Essentially the market share analysis creates a performance index between APF and all of the other airports in the nation with an ATCT. The index is then utilized with the FAA's projected level of general aviation operations for all towered airports through 2038. This is an important comparison given that the next section will show that nearly 80 percent of APF's traffic is itinerant. It is assumed that much of that itinerant traffic, originates from or flies to other towered airports in the U.S. Therefore, while the market share projection may not reflect as much growth as the FASP forecast, it is better suited to account for actual airport activity as well as expected changes in the general aviation industry overall.

3.7 Categories of Aircraft Operations

The following sections present different categories or types of activity that will make up the forecasted operations. This includes a break out of the local, itinerant, and instrument operations. Further analyses include determining the operational aircraft fleet mix and estimates of activity peaks. For each section, the total recommended annual operations from **Table 3-16** have been rounded to the nearest hundred.

3.7.1 Local versus Itinerant Operations

The FAA also categorizes aircraft operations as either local or itinerant. Local operations are those arrivals or departures performed by aircraft that remain in the airport traffic pattern or are within sight of the ATCT. Local operations are most often associated with training activity and flight instruction. Itinerant operations are arrivals or departures other than local operations, performed by either based or transient aircraft. Itinerant operations are generated by a wide range of recreational, business/corporate, and air charter/taxi flights.

The historic split between operations has averaged 21 percent local and 79 percent itinerant since the Great Recession (2010). However, for the past three years, itinerant activity has been in the 80 to 82 percent range. It is believed this more recent shift can in part be attributed to the increase in the number of turboprop and jet aircraft using APF, especially given the increasing activity by fractional and flex jet type operators. Given the current operational profile of the airport, it is expected that the percentage of itinerant operations will continue to increase over the planning period; however, this shift is estimated to peak at 83 percent as shown in **Table 3-17**.

In addition to the higher utilization of business/corporate aviation, the increase is also supported by the surrounding area growth and continued airport improvements. Finally, it should be noted that the growth of based aircraft at an airport does not significantly increase the level of local operations. For local operations to increase, there typically has to be an increase in flight training. While it is certainly possible for additional flight training to occur, it is assumed the itinerant traffic will continue to represent a majority of the activity.

TABLE 3-17
FORECAST OF LOCAL VERSUS ITINERANT OPERATIONS

	Local		Itinerant		Total
Base Year					
2017	18,708	20%	76,274	80%	94,982
Forecast					
2023	19,600	19%	83,600	81%	103,200
2028	19,800	18%	90,200	82%	110,000
2038	21,300	17%	103,800	83%	125,100

SOURCE: FAA OPSNET database and ESA analysis, 2018.

3.7.2 Instrument Operations

A separate estimate of instrument operations conducted at APF is important when evaluating future facility requirements. Using FAA OPSNET data, the number of instrument flight rule (IFR) operations was calculated. Over the past 20 years, instrument operations have averaged 34 percent of the total operations conducted with significant increases more recently. In 2014 and 2015 the instrument activity was 40 percent. This level was then eclipsed in 2016 and 2017 when the activity operating under IFR was documented at 43 and 44 percent, respectively; setting the highest levels ever recorded.

Similar to the increase in itinerant traffic described previously, the higher number of operations conducted under IFR at APF likely has a lot to do with the growth in business/corporate aviation, particularly by the increasing activity at APF by fractional, charter, and aircraft management operators. It is also related to the fact that even the smallest of general aviation aircraft now have fairly sophisticated instrument capability and conduct more IFR operations than they have in the past. This trend of increasing IFR operations is expected to continue over the course of the planning period. However, its growth has been limited to 50 percent of the total operations, by the end of the planning period. The resulting estimate of future instrument operations are shown in **Table 3-18**.

TABLE 3-18
ESTIMATE OF INSTRUMENT OPERATIONS

	Instrument Operations
Base Year	
2017	41,595
Forecast	
2023	48,500
2028	52,800
2038	62,600

SOURCE: FAA OPSNET database and ESA analysis, 2018.

It should be noted that the percent of instrument operations is different from the actual percentage of the year that the airport experiences IFR conditions. Unlike the weather observations addressed in the following chapter, the count and subsequent estimate of instrument operations include those conducted during actual instrument meteorological conditions as well as the ones simply under an IFR flight plan.

3.7.3 Operational Fleet Mix

Operational fleet mix is an important factor in determining the needs for airfield improvements. However, even at airports with an ATCT, it is difficult to estimate the type of aircraft conducting operations since this information is not recorded by tower staff. Instead, the current operational fleet mix percentages were based on the 2017 calendar year operational data collected by the airport's InFlight data system. Information from the 2018 FAA Aerospace Forecast as well as that obtained during the various interviews with airport tenants and customers was then utilized to predict how the operational fleet mix would change over the next 20 years.

TABLE 3-19
PROJECTED OPERATIONAL FLEET MIX

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Single-Engine	52,810	54,700	55,600	59,400
Multi-Engine (piston & turboprop)	13,677	14,400	14,900	15,700
Jet	26,690	32,000	36,300	44,400
Rotorcraft	1,805	2,100	3,200	5,600
Total	**94,982**	**103,200**	**110,000**	**125,100**

SOURCE: 2017 InFlight data for APF, FAA OPSNET database, FAA 2017 Aerospace Forecast, and ESA analysis, 2018.

The projections reflected in **Table 3-19** are generally based on expected national trends. The significant growth shown for jet aircraft operations at APF also takes into consideration the expected level of based jets, as well as the increasing number of fractional users and the business and overall economic outlook for Collier County. Due to their size, weight, and performance requirements, jet aircraft are typically the critical aircraft for most airside airport facilities. This will be addressed further as part of the facility requirements.

The FAA anticipates growth and increased utilization for every aircraft category with the exception of the single-engine piston and multi-engine piston types. As described previously, the most significant growth and utilization is expected to occur in the jet and rotorcraft categories. Activity by single- and multi-engine aircraft at APF is expected to increase given the large number of these aircraft at the airport and in Florida overall.

Overall, the general aviation jet activity will continue to include nearly every type of business jet aircraft flying in the nation. In the light to medium-sized business jets (maximum allowable takeoff weight between 10,000 and 60,000 pounds) this activity includes the Embraer Phenom and Legacy aircraft, Beechcraft Hawker, Bombardier Learjet, Cessna Citation, and Dassault Falcon type jet aircraft. For the larger and heavier business jet fleet over 60,000 pounds, typical examples include the Bombardier Global, larger Dassault Falcon, and Gulfstream series of aircraft.

3.7.4 Peak Activity Projections

Annual projections provide a good overview of the activity at an airport, but may not reflect certain operational characteristics of the facility. In many cases, facility requirements are not driven by annual demand, but rather by the capacity shortfalls and delays experienced during peak times. Therefore, estimates of the peak month, the average day in the peak month, and the peak hour demand for aircraft operations are needed.

Review of the monthly FAA OPSNET data reveals that since 2008, operations have peaked in March for all but one of the ten years. In 2009 the peak was in February; beating out March of that year by only 151 annual operations. Regardless, the peak months all reflected similar percentages with respect to the overall annual operations. On average the peak months represent 11.3 percent of the annual operations. For the average number of days in the peak month, 31 was simply applied. No historical data was available to determine the peak hour operations. Therefore, a typical industry average of 15 percent of the peak month average day was identified to represent the number of peak hour operations. It should be noted that the airport does experience extreme peaking events that exceed these levels and those will be addressed in a separate analysis. With the exception of the peak hour, the resulting estimates in **Table 3-20** have been rounded to the nearest ten for the forecast years.

TABLE 3-20
PEAKS IN TOTAL AIRCRAFT OPERATIONS

	Total Annual Operations	Peak Month	Average Day of Peak Month	Peak Hour of Average Day
Base Year				
2017	94,982	9,940	321	48
Forecast				
2023	103,200	11,660	380	56
2028	110,000	12,430	400	60
2038	125,100	14,140	460	68

SOURCE: FAA OPSNET database and ESA analysis, 2018.

3.8 FAA Terminal Area Forecast Comparison

If an airport is included in the FAA TAF, any new forecasts need to be reviewed and approved by the agency before they can be applied to further analyses. During this review for general aviation airports, the FAA looks to see if the annual operations or based aircraft forecasts differ from the TAF by any more than ten percent in the five-year and/or 15 percent in the ten-year planning periods.

Regarding the review, the FAA Airport Planning and Programming division published a guidance paper entitled, *Review and Approval of Aviation Forecasts*. This guidance states: "If the forecast is not consistent with the TAF, differences must be resolved if the forecast is to be used in FAA decision-making. This may involve revisions to the airport sponsor's submitted forecasts, adjustments to the TAF, or both. FAA decision-making includes key environmental issues (e.g. purpose and need, air quality, noise, land use), noise compatibility planning (14 CFR Part 150), approval of development on an airport layout plan, and initial financial decisions including issuance of LOI's and calculation of BCA's."

As shown in **Table 3-21**, the recommended forecasts for based aircraft are within the FAA's review criteria for consistency with the TAF, while the annual operations are slightly higher. The annual operations are considered acceptable given that the base year level of annual operations recorded for calendar year 2017 were already 3.2 percent greater than the fiscal year 2017 count used in the TAF. If this difference is taken into consideration (adjustment shown in **Table 3-21**), then both the five and ten-year recommended annual operations of this master plan are within the FAA's review criteria for consistency with the TAF.

TABLE 3-21
COMPARISON OF FORECAST TO 2017 FAA TAF

	Recommended Baseline Forecast	2017 FAA TAF[a]	Difference	Adjusted TAF (3.2%) for CY[b]	Adjusted Difference
Annual Operations					
Base Year (2017)	94,982	92,038	3.2%[b]	94,982	0%
5 Year (2023)	103,200	91,470	12.8%	94,396	9.3%
10 Year (2028)	110,000	93,073	18.2%	96,050	14.5%
Based Aircraft					
Base Year (2017)	380	373	1.9%	n/a	1.9%
5 Year (2023)	436	430	1.4%	n/a	1.4%
10 Year (2028)	482	481	0.2%	n/a	0.2%

[a] Issued January 2018 with data based on FAA fiscal year which ends September 30th.
[b] TAF annual operations data for fiscal year FY2017 is 3.2 percent less than actual calendar year CY2017 data used for forecasting.

SOURCE: 2017 FAA TAF and ESA Analysis, 2018.

3.9 Aviation Activity Forecast Summary

Table 3-22 presents an overview of the recommended forecasts. The data and methods used to forecast aviation demand for the airport are consistent with those used by the FAA, FDOT, and other airports around the nation. These forecasts are considered to reasonably reflect the activity anticipated at APF through 2038 given the information available during this study.

TABLE 3-22
SUMMARY OF AVIATION ACTIVITY FORECASTS

	Base Year	Forecast		
	2017	**2023**	**2028**	**2038**
Based Aircraft				
Single-Engine	230	257	277	323
Multi-Engine (piston & turboprop)	69	76	84	94
Jet	67	83	94	120
Rotorcraft	14	20	27	34
Total	**380**	**436**	**482**	**571**
Categories of Operations				
Local Operations	18,708	19,600	19,800	21,300
Itinerant Operations	76,274	83,600	90,200	103,800
Total	**94,982**	**103,200**	**110,000**	**125,100**
Instrument Operations	41,595	48,500	52,800	62,600
Operational Fleet Mix				
Single-Engine	52,810	54,700	55,600	59,400
Multi-Engine (piston & turboprop)	13,677	14,400	14,900	15,700
Jet	26,690	32,000	36,300	44,400
Rotorcraft	1,805	2,100	3,200	5,600
Peaks in Total Aircraft Operations				
Peak Month	9,490	11,660	12,430	14,140
Average Day of Peak Month	321	380	400	460
Peak Hour of Average Day	48	56	60	68

SOURCE: FAA's National Based Aircraft Inventory Program, FAA OPSNET database, and ESA analyses, 2018.