



## CHAPTER TWO

# AVIATION DEMAND FORECASTS

The definition of demand that may reasonably be expected to occur during the useful life of an airport's key components (e.g., runways, taxiways, terminal buildings, etc.) is an important factor in facility planning. In airport master planning, this involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for the Georgetown Municipal Airport (Airport) will primarily consider based aircraft, aircraft operations, and peak activity periods.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. As a block-grant state, TxDOT has the authority to review aviation demand forecasts for general aviation airports. Typically, TxDOT will review and approve aviation forecasts following FAA guidance.

TxDOT will review individual airport forecasts with the objective of comparing them to its *Terminal Area Forecasts* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Even though the TAF is updated annually, in the past there was almost always a disparity between the TAF and master planning forecasts. This was primarily because the TAF forecasts are the result of a top-down model that does not consider local conditions or recent trends. While the TAF forecasts are to be a point of comparison for master plan forecasts, they serve other purposes, such as asset allocation by the FAA.

When reviewing a sponsor's forecast (from the master plan), TxDOT must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), forecasts should be:





- Realistic;
- Based on the latest available data;
- Reflective of current conditions at the airport (as a baseline);
- Supported by information in the study; and
- Able to provide adequate justification for airport planning and development.

The forecast process for an airport master plan consists of a series of basic steps that vary in complexity depending upon the issues to be addressed and the level of effort required. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results. FAA Advisory Circular (AC) 150/5070-6C, *Airport Master Plans*, outlines seven standard steps involved in the forecast process, including:

- 1) **Identify Aviation Activity Measures:** The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.
- 2) **Review Previous Airport Forecasts:** May include the FAA *Terminal Area Forecast*, state or regional system plans, and previous master plans.
- 3) **Gather Data:** Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
- 4) **Select Forecast Methods:** There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
- 5) **Apply Forecast Methods and Evaluate Results:** Prepare the actual forecasts and evaluate for reasonableness.
- 6) **Summarize and Document Results:** Provide supporting text and tables as necessary.
- 7) **Compare Forecast Results with FAA's TAF:** For general aviation airports such as Georgetown Municipal Airport, forecasts for based aircraft and total operations are considered consistent with the TAF if they meet the following criteria:
  - Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period, or
  - Forecasts do not affect the timing or scale of an airport project, or
  - Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems*.

Aviation activity can be affected by many influences on the local, regional, and national levels, making it virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty. Therefore, it is important to remember that forecasts are to serve only as guidelines, and planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for the Airport was produced following these basic guidelines. Existing forecasts are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide



an updated set of aviation demand projections for the Airport that will permit airport management to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

## **SOCIOECONOMIC TRENDS**

Local and regional forecasts of key socioeconomic variables, such as population, employment, and income, provide an indication of the potential for growth in aviation activities at an airport. **Exhibit 2A** summarizes the socioeconomic history and projections for four distinct areas: Williamson County, Travis County, the State of Texas, and the five-county Austin-Round Rock Metropolitan Statistical Area (MSA). Those counties are Williamson, Travis, Hays, Caldwell and Bastrop.

As noted previously, the primary airport service area is considered to include Williamson and Travis counties. The data for the state and for the MSA is included as a data point for comparison.

In 2016, the population of Williamson County was estimated at 519,746. It is forecast to grow at an annual rate of more than 3.0 percent, reaching 940,516 people by 2036. The forecast growth rate, while substantial, is approximately half of what was experienced between 1970 and 2010. Travis County population is forecast to increase from 1,192,546 in 2016 to 1,678,408 by 2036. This is an additional 486,000 people, an increase of 40 percent.

Employment is growing in both Williamson and Travis counties at an average annual rate of nearly 3.0 percent. This growth rate exceeds that of the five-county MSA and the state of Texas. Income is also growing at a substantial rate, with Travis County exceeding that of the MSA and the state of Texas. Williamson County income is slightly lower than that of the MSA and the state which is not unexpected for a commuter/bedroom community.

## **NATIONAL AVIATION TRENDS**

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aerospace Forecasts – Fiscal Years 2016-2036*, published in March 2016. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the FAA Aerospace Forecasts.

Since its deregulation in 1978, the U.S. commercial air carrier industry has been characterized by boom-to-bust cycles. The volatility that was associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor. However, the Great Recession of 2008-



09 marked a fundamental change in the operations and finances of U.S. airlines. Air carriers fine-tuned their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation with four major mergers in five years. These changes, along with capacity discipline exhibited by carriers, have resulted in a fifth consecutive year of profitability for the industry in 2015. Looking ahead, there is optimism that the industry has been transformed from that of a boom-to-bust cycle to one of sustainable profits.

## ECONOMIC ENVIRONMENT

According to the FAA forecast report, as the economy recovers from the most serious economic downturn since the Great Depression and slow recovery, aviation will continue to grow over the long run. Fundamentally, demand for aviation is driven by economic activity. As economic growth picks up, so will growth in aviation activity.

Employee wages in 2015 continued to stagnate, household income growth was weak, the housing market's recovery was patchy across the country, and government spending at the federal and local levels remained stagnant and are projected to remain so for the next few years. Despite these dire statistics, the unemployment rate fell, consumer spending was up, and many urban housing markets have been revived strongly. U.S. economic performance in 2015 is estimated to have grown in real GDP to 16.3 trillion (inflation adjusted to 2009 dollars) and is forecast to grow at an average annual growth rate of 2.3 percent through 2036. Oil prices should remain below \$50 per barrel through 2016, but are projected to grow at an annual average growth rate of 4.8 percent, reaching over \$150 per barrel by 2036. Although the U.S. economy has managed to avoid a recession, a prolonged period of faster economic growth (e.g., > 3.0 percent) may not be forthcoming.

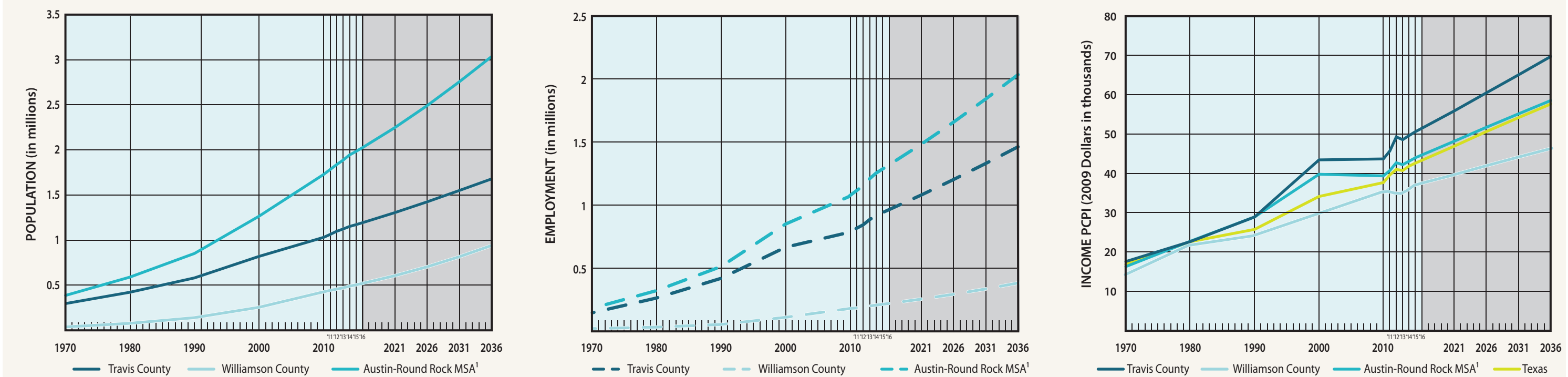
## FAA GENERAL AVIATION FORECASTS

The FAA forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

The long-term outlook for general aviation is favorable, led by gains in turbine aircraft activity. The active general aviation fleet is forecast to increase 0.2 percent a year between 2015 and 2036, equating to an absolute increase in the fleet of about 7,000 units. While steady growth in both GDP and corporate



	HISTORICAL													PROJECTED				
	1970	1980	1990	2000	2010	CAGR 1970-2010	2011	2012	2013	2014	2015	2016	CAGR 2010-2016	2021	2026	2031	2036	CAGR 2016-2036
Population																		
Texas	11,258,475	14,337,818	17,056,755	20,944,499	25,245,717	2.04%	25,657,477	26,094,422	26,505,637	26,956,958	27,370,346	27,811,299	1.39%	30,127,388	32,624,041	35,272,724	37,988,744	1.57%
Austin-Round Rock MSA <sup>1</sup>	402,939	589,651	851,898	1,264,950	1,727,743	3.71%	1,782,089	1,836,149	1,885,803	1,943,299	1,982,665	2,024,340	2.29%	2,245,826	2,489,573	2,754,382	3,034,379	2.04%
Williamson County	37,740	77,658	140,570	255,379	426,541	6.25%	442,482	456,593	471,225	489,250	504,088	519,746	2.86%	605,221	703,575	815,579	940,516	3.01%
Travis County	298,436	422,016	581,024	819,692	1,030,443	3.15%	1,062,609	1,097,104	1,122,748	1,151,145	1,171,245	1,192,546	2.11%	1,304,096	1,423,699	1,549,835	1,678,408	1.72%
Employment																		
Texas	5,045,480	7,495,949	9,242,894	12,139,164	14,291,032	2.64%	14,719,187	15,126,531	15,563,453	15,981,821	16,333,786	16,683,175	2.24%	18,425,339	20,231,603	22,081,828	23,968,203	1.83%
Austin-Round Rock MSA <sup>1</sup>	184,371	322,222	512,916	849,771	1,076,924	4.51%	1,114,869	1,152,354	1,208,017	1,252,927	1,285,315	1,317,668	2.92%	1,482,125	1,656,951	1,840,939	2,033,804	2.19%
Williamson County	13,781	25,290	46,515	103,160	173,271	6.53%	177,195	183,601	192,694	199,662	206,250	212,874	2.98%	247,292	285,557	327,991	374,950	2.87%
Travis County	147,496	263,762	419,753	666,437	786,256	4.27%	816,807	843,298	884,177	917,569	940,496	963,397	2.95%	1,079,658	1,202,329	1,330,054	1,462,169	2.11%
Income - PCPI (\$2009)																		
Texas	\$16,844	\$22,621	\$25,750	\$34,121	\$37,659	2.03%	\$39,592	\$40,995	\$40,724	\$41,857	\$42,641	\$43,342	2.03%	\$46,915	\$50,635	\$54,181	\$57,644	1.44%
Austin-Round Rock MSA <sup>1</sup>	\$16,284	\$22,728	\$28,913	\$39,777	\$39,358	2.23%	\$40,722	\$42,707	\$42,211	\$43,102	\$43,999	\$44,696	1.83%	\$48,169	\$51,733	\$55,154	\$58,538	1.36%
Williamson County	\$14,231	\$21,683	\$24,120	\$37,441	\$35,245	2.29%	\$35,422	\$34,992	\$34,868	\$35,688	\$36,907	\$37,401	0.85%	\$39,709	\$42,036	\$44,236	\$46,396	1.08%
Travis County	\$17,572	\$22,728	\$28,913	\$43,432	\$43,679	2.30%	\$45,700	\$49,270	\$48,577	\$49,627	\$50,637	\$51,493	2.38%	\$55,882	\$60,496	\$65,072	\$69,744	1.53%



<sup>1</sup>Williamson, Travis, Hays, Caldwell and Bastrop Counties    MSA: Metropolitan Statistical Area    PCPI - Per Capita Personal Income    CAGR: Compound Annual Growth Rate



Source: Woods & Poole Complete Economic and Demographic Data Source (CEEDS) 2016

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profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft - continues to shrink over the FAA's forecast.

In 2015, the general aviation industry experienced its first decline in aircraft deliveries since 2010. While the single engine piston aircraft deliveries by U.S. manufacturers continued to grow and business jet deliveries recorded a very modest increase compared to the previous year, turboprop deliveries declined by 10 percent, and the much smaller category of multi-engine piston deliveries declined 40 percent.

In 2015, the FAA estimated there were 138,135 piston-powered aircraft in the national fleet. The total number of piston-powered aircraft in the fleet is forecast to decline by 0.7 percent from 2015-2036, resulting in 118,855 by 2036. This includes a decline of 0.7 percent annually for single engine pistons and -0.5 percent for multi-engine pistons.

Total turbine aircraft are forecast to grow at an annual growth rate of 2.1 percent through 2036. The FAA estimates there were 29,040 turbine-powered aircraft in the national fleet in 2015, and there will be 44,655 by 2036. This includes annual growth rates of 1.3 percent for turboprops, 2.5 percent for business jets, and 2.3 percent for turbine helicopters.

While comprising a much smaller portion of the general aviation fleet, experimental aircraft, typically identified as home-built aircraft, are projected to grow annually by 0.9 percent through 2036. The FAA estimates there were 26,435 experimental aircraft in 2016, and these are projected to grow to 31,640 by 2036. Sport aircraft are forecast to grow 4.5 percent annually through the long term, growing from 2,410 in 2015 to 6,100 by 2036. **Exhibit 2B** presents the historical and forecast U.S. active general aviation aircraft.

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military.

General aviation operations, both local and itinerant, declined significantly as a result of the 2008-2009 recession and subsequent slow recovery. Through 2036, total general aviation operations are forecast to grow 0.3 percent annually. Air taxi/commuter operations are forecast to decline by 3.4 percent through 2025, and then increase slightly through the remainder of the forecast period. Overall, air taxi/commuter operations are forecast to decline by 1.1 percent annually from 2015 through 2036.

### **General Aviation Aircraft Shipments and Revenue**

As previously discussed, the 2008-2009 economic recession had a negative impact on general aviation aircraft production, and the industry has been slow to recover. Aircraft manufacturing declined for three straight years from 2008 through 2010. According to the General Aviation Manufacturers Association (GAMA), there is optimism that aircraft manufacturing will stabilize and return to growth, which has been evidenced since 2011; however, total production did see a slight decline in 2015. **Table 2A** presents historical data related to general aviation aircraft shipments.



**TABLE 2A**  
**Annual General Aviation Airplane Shipments**  
**Manufactured Worldwide and Factory Net Billings**

Year	Total	SEP	MEP	TP	J	Net Billings (\$millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1,043	80	279	438	7,170
1998	2,457	1,508	98	336	515	8,604
1999	2,808	1,689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,120

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet

Source: General Aviation Manufacturers Association 2015 General Aviation Statistical Databook & 2016 Industry Outlook

Worldwide shipments of general aviation airplanes decreased in 2015 with a total of 2,331 units delivered around the globe compared to 2,454 units in 2014. Worldwide general aviation billings were also lower than the previous year. In 2015, \$24 billion in new general aviation aircraft were shipped, but yearend results were mixed across the market segments. Results were impacted by economic uncertainty in key markets, including Brazil, Europe, and China; however, the U.S. experienced stronger delivery numbers, which is cause for cautious optimism.

**Business Jets:** General aviation manufacturers delivered 718 business jets in 2015, as compared to 722 units in 2014. The industry's continued investment in new products helped maintain the delivery rate for business jets.

**Turboprops:** In 2015, 557 turboprop airplanes were delivered to customers around the world, a decline from the 603 delivered in 2014. Overall, the turboprop market is still significantly stronger over the past five years compared to years prior to 2011.

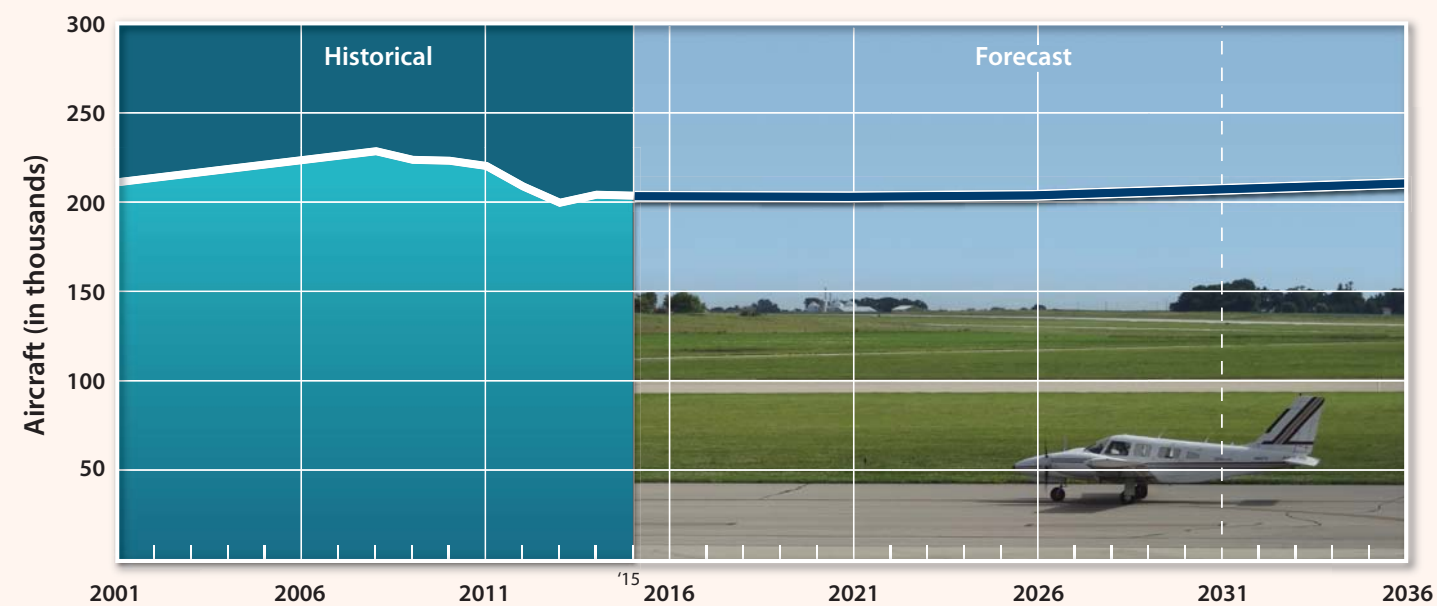
**Pistons:** Piston deliveries declined from 1,129 units during 2014 to 1,056 in 2015. Two-thirds of piston shipments were to North American customers, a significant increase from the 2014 North American market share of 55.1 percent.





## U.S. ACTIVE GENERAL AVIATION AIRCRAFT

	2015	2021	2026	2036	AAGR 2015-2036
<b>Fixed Wing</b>					
<b>Piston</b>					
Single Engine	125,050	119,585	115,045	107,160	-0.7%
Multi-Engine	13,085	12,760	12,480	11,695	-0.5%
<b>Turbine</b>					
Turboprop	9,570	9,215	9,775	12,635	1.3%
Turbojet	12,475	13,975	15,735	20,770	2.5%
<b>Rotorcraft</b>					
Piston	3,245	3,770	4,170	5,005	2.1%
Turbine	6,995	8,215	9,185	11,250	2.3%
<b>Experimental</b>					
	26,435	27,690	28,735	31,640	0.9%
<b>Sport Aircraft</b>					
	2,410	3,490	4,410	6,100	4.5%
<b>Other</b>					
	4,615	4,525	4,495	4,440	-0.2%
<b>Total Pistons</b>	<b>141,380</b>	<b>136,115</b>	<b>131,695</b>	<b>123,860</b>	<b>-0.6%</b>
<b>Total Turbines</b>	<b>29,040</b>	<b>31,405</b>	<b>34,695</b>	<b>44,655</b>	<b>2.1%</b>
<b>Total Fleet</b>	<b>203,880</b>	<b>203,225</b>	<b>204,030</b>	<b>210,695</b>	<b>0.2%</b>

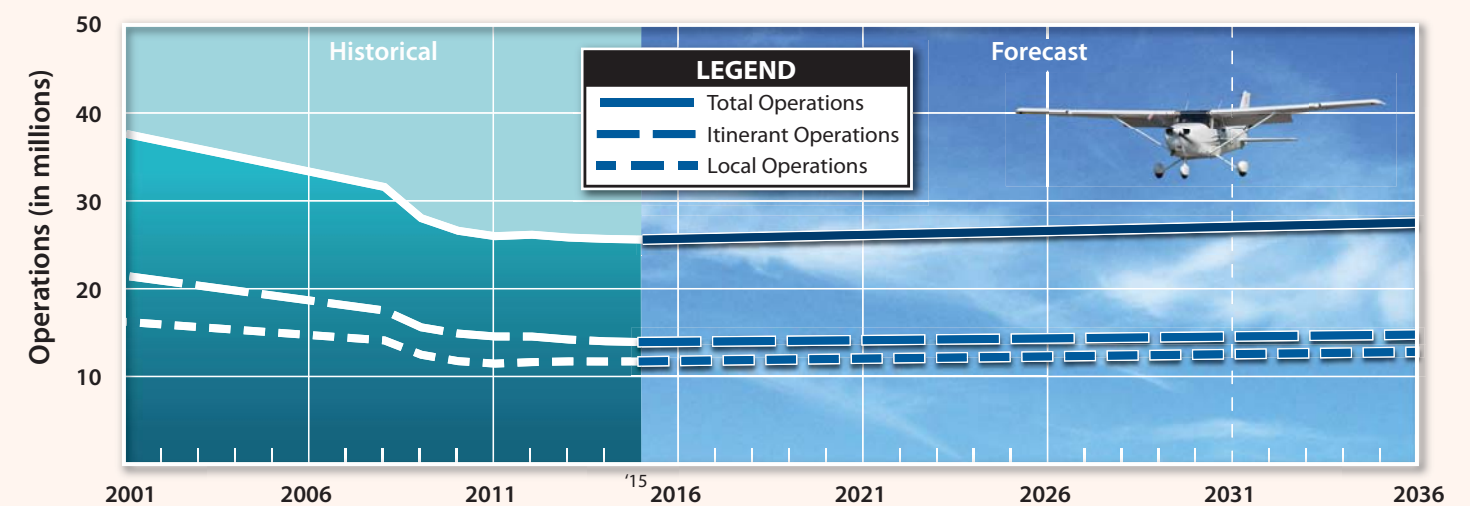


Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

Source: FAA Aerospace Forecast - Fiscal Years 2016-2036

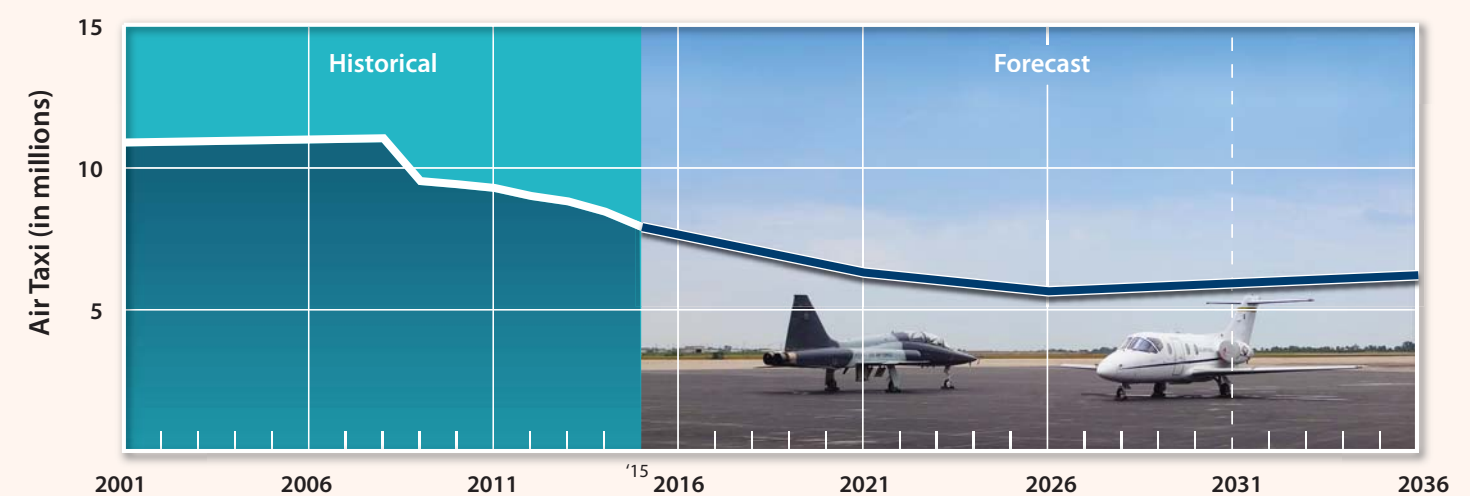
## U.S. GENERAL AVIATION OPERATIONS

	2015	2021	2026	2036	AAGR 2015-2036
<b>Itinerant</b>					
	13,887,000	14,103,000	14,309,000	14,742,000	0.3%
<b>Local</b>					
	11,691,000	12,011,000	12,255,000	12,772,000	0.4%
<b>Total GA Operations</b>	<b>25,578,000</b>	<b>26,114,000</b>	<b>26,564,000</b>	<b>27,514,000</b>	<b>0.3%</b>



## U.S. GENERAL AVIATION AIR TAXI

	2015	2021	2026	2036	AAGR 2015-2036
<b>Air Taxi/Commuter Operations</b>					
<b>Itinerant</b>	<b>7,895,000</b>	<b>6,294,000</b>	<b>5,631,000</b>	<b>6,199,000</b>	<b>-1.1%</b>



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## **FORECASTING APPROACH**

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis.

Trend line/time-series projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical data, then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of direct relationship between two separate sets of historical data. Should there be a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures statistical relationships between dependent and independent variables, yielding a “correlation coefficient.” The correlation coefficient (Pearson’s “ $r$ ”) measures association between the changes in the dependent variable and the independent variable(s). If the “ $r^2$ ” value (coefficient determination) is greater than 0.95, it indicates good predictive reliability. A value less than 0.95 may be used, but with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of the airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined, providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

Forecasts will age and the further one is from the base year, the less reliable a forecast may become, particularly due to changing local and national conditions. Nonetheless, the FAA indicates that a Master Plan include a 20-year forecast for an airport. Facility and financial planning usually require at least a ten-year view, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of aviation activity in both the local and national markets. Historically, the nature and trend of the national economy has had a direct impact on the level of aviation activity. Recessionary periods have been closely followed by declines in aviation activity. Nonetheless, over time, trends emerge and provide the basis for airport planning.



Future facility requirements, such as hangar and apron needs, are derived from projections of various aviation demand indicators. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts are presented for the following aviation demand indicators:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Air Taxi and Military Operations
- Operational Peaks

This forecasting effort was completed in January 2017, with a base year of 2016.

### **FAA TERMINAL AREA FORECAST (TAF)**

On an annual basis, the FAA publishes the *Terminal Area Forecast* (TAF) for each airport included in the *National Plan of Integrated Airport Systems* (NPIAS). The TAF is a generalized forecast of airport activity used by FAA for internal planning purposes. It is available to airports and consultants to use as a baseline projection and important point of comparison while developing local forecasts.

**Table 2B** presents the 2016 TAF for the Airport. As can be seen, the TAF forecast for operations and based aircraft shows modest growth. Itinerant operations are forecast to grow at an average annual rate of 0.49 percent, while local operations grow at a rate of 0.43 percent. Based aircraft are forecast to grow at an annual rate of 2.25 percent.

**TABLE 2B**

**2016 FAA Terminal Area Forecast  
Georgetown Municipal Airport**

	2016	2021	2026	2031	2036	CAGR
<b>ITINERANT OPERATIONS</b>						
General Aviation	37,018	37,953	38,912	39,897	40,903	0.50%
Air Taxi	639	639	639	639	639	0.00%
Military	131	131	131	131	131	0.00%
<b>Total Itinerant</b>	<b>37,788</b>	<b>38,723</b>	<b>39,682</b>	<b>40,667</b>	<b>41,673</b>	<b>0.49%</b>
<b>LOCAL OPERATIONS</b>						
General Aviation	40,040	40,903	41,785	42,685	43,603	0.43%
Military	207	207	207	207	207	0.00%
<b>Total Local</b>	<b>40,247</b>	<b>41,110</b>	<b>41,992</b>	<b>42,892</b>	<b>43,810</b>	<b>0.43%</b>
<b>Total Operations</b>	<b>78,035</b>	<b>79,833</b>	<b>81,674</b>	<b>83,559</b>	<b>85,483</b>	<b>0.46%</b>
<b>Based Aircraft</b>	<b>198</b>	<b>223</b>	<b>249</b>	<b>276</b>	<b>309</b>	<b>2.25%</b>

CAGR: Compound annual growth rate

Source: FAA Terminal Area Forecast (Jan. 2016)



The FAA TAF is an aviation forecast for the Airport developed at FAA headquarters in Washington, D.C., using a top-down distribution method. One of the purposes of the TAF is to distribute overall aviation activity to all airports so that the FAA can better plan workload measures. The TAF forecast for commercial service airports considers many variables, while the TAF for most general aviation airports take into consideration few, if any, local factors. For these reasons, the TAF is only one data point, and it is used as a point of comparison for evaluating the reasonableness of the master plan forecasts.

One area of concern is the 2016 based aircraft count of 198 included in the TAF. It is known that there are 318 aircraft based at the airport currently. This count is included in the FAA's based aircraft database ([www.basedaircraft.com](http://www.basedaircraft.com)), which is updated by the Airport and verified by the FAA. It is likely that the 2016 based aircraft numbers simply have not been transferred to the TAF. The historical total operations counts, however, are accurate, because there is a control tower at the Airport which provides operational counts included in FAA databases.

## GENERAL AVIATION FORECASTS

General aviation encompasses all portions of civil aviation except commercial service and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity at the Airport, certain elements of this activity must be forecast. These indicators of general aviation demand include based aircraft, aircraft fleet mix, operations, and peak periods.

### REGISTERED AIRCRAFT FORECAST

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft for the Airport, other demand indicators can be projected. The process of developing forecasts of based aircraft begins with an analysis of aircraft ownership in the primary general aviation service area through a review of historical aircraft registrations.

The area that most represents the general aviation service area is Williamson and Travis counties. Certainly, some aviation activity and based aircraft will originate from outside this area but generally, most based aircraft will come from this area. Aircraft ownership trends for the service area are typically an indicator of the based aircraft trends for an airport.

**Table 2C** presents the history of registered aircraft in the two-county service area from 1993 through 2016. These figures are derived from the FAA aircraft registration database that categorizes registered aircraft by county based on the zip code of the registered aircraft. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in a specific county but based at an airport outside the county or vice versa.

In 2016, there were 1,318 aircraft registered in the two-county area, which is the fourth consecutive year of year-over-year growth. The previous high for registered aircraft was 1,375 in 2011, which was followed by two consecutive years of decline. The decline in registered aircraft is attributable to two primary factors; the impact of the 2008-2009 recession and FAA's re-registration process between 2010





and 2013 saw an overall 10.5 percent decline in active aircraft. This decline appears to be represented in the registered aircraft figures for the two-county area. Now that the actual number of registered aircraft has been identified, several projections of future registered aircraft are considered for the 20-year planning horizon.

**TABLE 2C**  
**Historical Registered Aircraft**  
**Williamson and Travis Counties**

Year	SEP	MEP	TP	J	H	O	Total
1993	642	109	41	29	23	67	911
1994	650	103	39	27	31	70	920
1995	669	94	37	26	27	71	924
1996	694	95	43	23	25	73	953
1997	703	100	44	33	30	69	979
1998	716	94	39	37	34	71	991
1999	757	102	49	35	43	80	1,066
2000	799	120	41	30	47	84	1,121
2001	836	97	75	31	49	88	1,176
2002	842	96	71	32	41	90	1,172
2003	817	80	110	33	41	88	1,169
2004	840	80	110	44	38	90	1,202
2005	839	79	107	49	39	79	1,192
2006	891	111	38	37	40	79	1,196
2007	969	104	36	33	45	108	1,295
2008	959	97	50	41	44	109	1,300
2009	958	94	48	43	51	116	1,310
2010	973	93	48	45	55	127	1,341
2011	1017	85	49	47	53	124	1,375
2012	950	71	68	54	54	105	1,302
2013	916	67	64	58	53	109	1,267
2014	939	65	47	65	54	99	1,269
2015	932	63	50	64	79	106	1,294
2016	967	63	57	67	55	109	1,318

SEP - Single Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Jet; H - Helicopter; O - Other (Balloons, gliders, gyroplane, etc.)

Source: FAA aircraft registration database.

## Time Series and Regression Analysis

A time-series and several regression analyses were considered. Time-series analysis is a statistical process that essentially “fits” a line over historical data, in this case registered aircraft, and extends that line into the future. The time-series analysis results in 1,404 registered aircraft by 2021, 1,461 by 2026, and 1,577 by 2026. The  $r^2$  value was 0.643 indicating a low degree of reliability.



The regression analysis conducted considered the following independent variables: Year, U.S. active aircraft as projected by the FAA, and population, employment, and income for the two-county area. Seventeen years of data was analyzed for a period from the year 2000 through 2016. **Table 2D** presents the results of this analysis.

**TABLE 2D**  
**Registered Aircraft Forecasts (Top 10 Regression Analysis and Time-Series)**  
**Georgetown Municipal Airport**

		FORECAST			
2016 Registered Aircraft: 1,318	r <sup>2</sup>	2021	2026	2036	CAGR 2016-2036
TIME-SERIES					
Year- Time Series	0.643	1,404	1,461	1,577	0.90%
REGRESSION VARIABLES					
Year, US Active Aircraft, Pop., Emp., Income	0.951	1,323	1,394	1,662	1.17%
Year, US Active Aircraft, Pop., Emp.	0.944	1,328	1,401	1,660	1.16%
Year, US Active Aircraft, Pop., Income	0.939	1,332	1,405	1,680	1.22%
US Active Aircraft, Pop., Emp., Income	0.906	1,355	1,419	1,594	0.96%
US Active Aircraft, Pop., Emp.	0.906	1,355	1,419	1,595	0.96%
US Active Aircraft, Pop., Income	0.890	1,366	1,432	1,611	1.01%
Year, US Active Aircraft, Pop.	0.864	1,386	1,473	1,718	1.33%
US Active Aircraft, Pop.	0.854	1,473	1,473	1,674	1.20%
Year, US Active Aircraft, Emp., Income	0.853	1,378	1,443	1,598	0.97%
Year, US Active Aircraft, Income	0.851	1,378	1,442	1,589	0.94%

Notes: Analysis conducted with 2000-2016 annual data.

CAGR = Compound annual growth rate

Pop., Emp., Income = Combined Williamson and Travis County

The regression that considered all five variables resulted in an r<sup>2</sup> value above 0.95, which indicates a relatively high degree of reliability. The next four regressions had r<sup>2</sup> values above 0.90, which provides a medium to high level of correlation. The remaining five regressions has r<sup>2</sup> values between 0.85 and 0.90, which provides a moderate level of correlation. The five-variable regression will be carried forward for further analysis of reasonableness through market share comparative analysis. **Appendix E** shows the actual calculations of the regressions and other forecast related documentation.

## Market Share Analysis

**Table 2E** presents several market share projections of registered aircraft for the two-county service area. The first projection considers the relationship between U.S. active aircraft, as projected by the FAA, to registered aircraft in the two-county area. In 2016, the number of registered aircraft in the two-county area represented 0.6479 percent of active aircraft in the U.S. By maintaining this ratio as a constant share, a long-term forecast emerges which results in a low growth rate of 0.18 percent. This is likely a low-end projection as the growth rate in registered aircraft since 2000 has been 0.96 percent.



The market share projection considers the number of registered aircraft in relation to the two-county population. In 2016, there were 0.7697 registered aircraft in the two-county service area per 1,000 people. By maintaining this ratio at a constant level through the 20-year planning period, a long-term forecast results with an annual growth rate of 2.15 percent. With population growing at a very high rate, this is likely a high-end projection.

**TABLE 2E**

**Market Share Registered Aircraft Projections  
Georgetown Municipal Airport**

Year	Two-County Registrations <sup>1</sup>	U.S. Active Aircraft <sup>2</sup>	Market Share of Active Aircraft	Two-County Population <sup>3</sup>	Aircraft Per 1,000 Residents
2006	1,196	221,942	0.5389%	1,277,121	0.9365
2007	1,295	231,606	0.5591%	1,329,122	0.9743
2008	1,300	228,664	0.5685%	1,376,136	0.9447
2009	1,310	223,876	0.5851%	1,417,303	0.9243
2010	1,341	223,370	0.6003%	1,456,984	0.9204
2011	1,375	220,453	0.6237%	1,505,091	0.9136
2012	1,302	209,034	0.6229%	1,553,697	0.8380
2013	1,267	199,927	0.6337%	1,593,973	0.7949
2014	1,269	204,408	0.6208%	1,640,395	0.7736
2015	1,294	203,880	0.6347%	1,675,333	0.7724
2016	1,318	203,425	0.6479%	1,712,292	0.7697
<b>Constant Market Share of U.S. Active Aircraft Projection (CAGR = 0.18%)</b>					
2021	1,317	203,225	0.6479%	1,909,317	0.6896
2026	1,322	204,030	0.6479%	2,127,274	0.6214
2036	1,365	210,695	0.6479%	2,618,924	0.5212
<b>Constant Ratio of Aircraft per 1,000 Two-County Residents (CAGR = 2.15%)</b>					
2021	1,470	203,225	0.7232%	1,909,317	0.7697
2026	1,637	204,030	0.8025%	2,127,274	0.7697
2036	2,016	210,695	0.9568%	2,618,924	0.7697
<b>17-Year Growth Rate (CAGR = 0.96%)</b>					
2021	1,382	203,225	0.6800%	1,909,317	0.7238
2026	1,450	204,030	0.7107%	2,127,274	0.6816
2036	1,595	210,695	0.7570%	2,618,924	0.6090
<b>Highest Correlation Regression (CAGR = 1.17%)</b>					
2021	1,323	203,225	0.6510%	1,909,317	0.6929
2026	1,394	204,030	0.6832%	2,127,274	0.6553
2036	1,662	210,695	0.7888%	2,618,924	0.6346
<b>Selected Registered Aircraft Forecast (CAGR - 0.91%)</b>					
2021	1,360	203,225	0.6692%	1,909,317	0.7123
2026	1,420	204,030	0.6960%	2,127,274	0.6675
2036	1,580	210,695	0.7499%	2,618,924	0.6033

<sup>1</sup>Combined Williamson and Travis County Aircraft Registrations from FAA Aircraft Registration Database

<sup>2</sup>U.S. Active Aircraft from FAA Aerospace Forecasts – Fiscal Years 2016-2036

<sup>3</sup>Williamson and Travis Counties population from Woods & Poole Economics (CEDDS 2016)

CAGR: Compound annual growth rate



The next market share projection applies the average annual growth rate of registered aircraft since the year 2000 (0.96 percent) and extends that into the future. This results in a reasonable forecast of future registered aircraft in line with historical trends. As a share of U.S. active aircraft, this forecast shows an increasing trend (in line with historical) and as a share of aircraft per 1,000 people, this forecast shows a decreasing trend.

The last market share projection is a check on the reasonableness of the regression analysis considered previously. By utilizing the regression with the highest correlation ( $r^2$  value of 0.951), one can examine if the resulting market share of U.S. active aircraft and the two-county population is reasonable. The market share percent of U.S. active aircraft increases moderately over time, while the population to registered aircraft ratio decreases moderately. These are consistent with historical trends.

### Selected Registered Aircraft Forecast

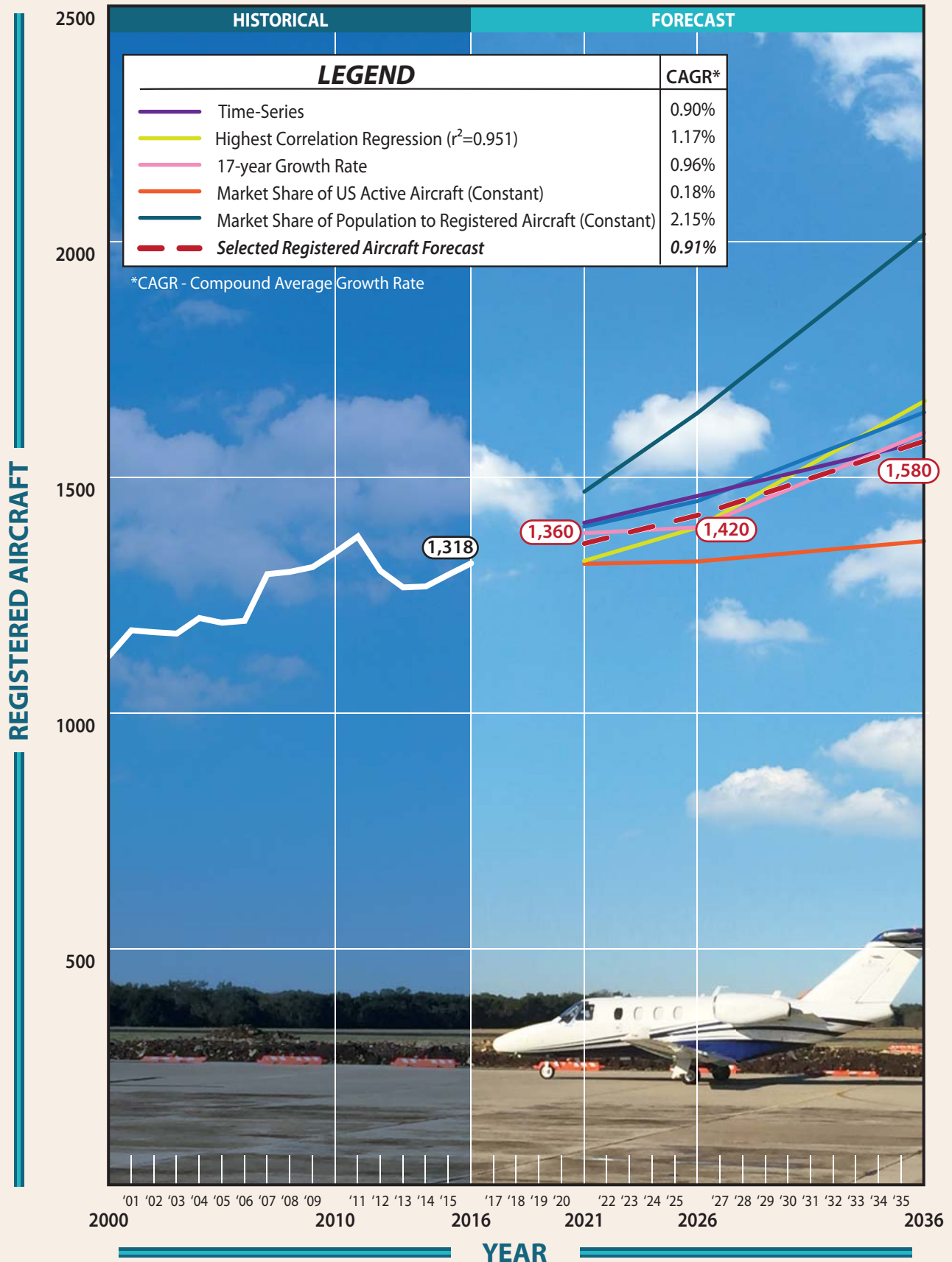
The final step in the forecasting process is to apply the experience and judgement of the forecast analyst. Even the most mathematical and statistically sound forecast methodology must be considered for its reasonableness. The statistically reliable regression forecast results in the addition of only five new registered aircraft in the two-county area over the next five years. With growing national and local economies and a rapidly growing local population, this short-term growth seems quite low. The long-term regression forecast is more reasonable; however, it is above the 17-year growth trend.

**Exhibit 2C and Table 2F** present several registered aircraft forecasts which together form a reasonable planning envelope. Over time, it is difficult to predict what may influence trends in registered aircraft but it is reasonable to consider a selected planning forecast within the planning envelope. As required in airport master plans, a specific 20-year forecast must be identified. While the airport service area is growing in regard to several aviation demand indicators, the fact that aircraft ownership is somewhat stagnant nationally lends to a somewhat tempered forecast as compared to the regression projection and the 17-year growth trend. The following forecast of registered aircraft for the two-county area will be used as a data point for development of the based aircraft forecast:

- 2021 – 1,360 Service Area Registered Aircraft
- 2026 – 1,420 Service Area Registered Aircraft
- 2036 – 1,580 Service Area Registered Aircraft

**TABLE 2F**  
**Registered Aircraft Summary**  
**Georgetown Municipal Airport**

Method	2021	2026	2036	CAGR
Time-Series	1,404	1,461	1,577	0.90%
Highest Correlation Regression ( $r^2=0.951$ )	1,323	1,394	1,662	1.17%
17-year Growth Rate	1,382	1,394	1,595	0.96%
Market Share of US Active Aircraft (Constant)	1,317	1,322	1,365	0.18%
Market Share of Population to Registered Aircraft (Constant)	1,470	1,637	2,016	2.15%
<b>Selected Registered Aircraft Forecast</b>	<b>1,360</b>	<b>1,420</b>	<b>1,580</b>	<b>0.91%</b>



Source: FAA aircraft registration database Williamson and Travis Counties





## BASED AIRCRAFT FORECAST

Forecasts of based aircraft may directly influence needed facilities and the applicable design standards. The needed facilities may include hangars, aprons, taxilanes, etc. The applicable design standards may include separation distances and object clearing surfaces. The size and type of based aircraft are also an important consideration. The addition of numerous small aircraft may have no effect on design standards, while the addition of a few larger business jets can have a substantial impact on applicable design standards.

Because of the numerous variables known to influence aviation demand, several separate forecasts of based aircraft are developed. Each of the forecasts is then examined for reasonableness and any outliers are discarded or given less weight. The remaining forecasts collectively will create a planning envelope. A single planning forecast is then selected for use in developing facility needs for the Airport. The selected forecast of based aircraft can be one of the several forecasts developed or, based on the experience and judgement of the forecaster, it can be a blend of the forecasts.

### Based Aircraft History

Documentation of the historical number of based aircraft at the Airport has been somewhat intermittent. For many years, FAA did not require airports to report the number of based aircraft. It is only in recent years that the FAA has established a based aircraft inventory in which it is possible to cross reference based aircraft claimed by one airport with other airports. The FAA is now utilizing this based aircraft inventory as a baseline for determining how many, and what type of aircraft are based at any individual airport. This database evolves daily as aircraft are added or removed, and it does not provide an annual history of based aircraft. It is the responsibility of the sponsor (owner) of each airport to input based aircraft information into the FAA database ([www.basedaircraft.com](http://www.basedaircraft.com)). In 2016, there were 318 based aircraft for the Airport included in the database.

**NOTE:** The forecasts were completed in the fall of 2016. As of February 22, 2018, the [www.basedaircraft.com](http://www.basedaircraft.com) database indicated there were 288 validated based aircraft at the Airport.

### Historical Growth Rate Forecast

The number of aircraft based at the Airport has grown from 256 in 2005 to 318 in 2016. This is an average annual growth rate of 1.99 percent. By applying this growth rate, a forecast of 351 based aircraft by 2021, 387 by 2026, and 472 by 2036 emerges. It should be noted that two regional airports closed in the 1998-1999 timeframe and, as a result, the number of aircraft based at Georgetown Municipal Airport increased sharply from 133 in 1998 to 268 by the year 2000. By 2005, movement of aircraft due to the closure of other airports had settled back to a more normal trend. Therefore, the historic growth rate is considered from 2005 to 2016.



## Time-Series and Regression Analysis Forecast

Time-series analysis is a statistical process that essentially “fits” a line over historical data, in this case based aircraft, and extends that line into the future. The time-series analysis results in 327 based aircraft by 2021, 346 by 2026, and 384 by 2036, which is an annual growth rate of 1.94 percent. The  $r^2$  value was 0.830 indicating a moderate degree of reliability.

A series of statistical regressions were done which considered the variables of time (year), registered aircraft (as projected in the previous section), U.S. active aircraft (as forecast by FAA), and population, employment, and income (for the two-county area). The top ten of these resulted in  $r^2$  values higher than 0.95, which indicated a high degree of reliability. **Table 2G** presents a summary of the regression analysis and detail of the methodology is presented in **Appendix E**.

**TABLE 2G**  
**Based Aircraft Forecasts - Top 10 Regressions and Time-Series**  
**Georgetown Municipal Airport**

		FORECAST			
2015 Based Aircraft: 318	r <sup>2</sup>	2021	2026	2036	CAGR 2016-2036
TIME-SERIES					
Year- Time Series	0.830	327	346	384	0.94%
REGRESSION VARIABLES					
Year, Registered Aircraft, US Active Aircraft, Pop., Emp., Income	0.968	337	358	402	1.18%
Year, Registered Aircraft, US Active Aircraft, Emp., Income	0.968	337	358	403	1.19%
Registered Aircraft, US Active Aircraft, Pop., Emp., Income	0.968	337	358	399	1.14%
Registered Aircraft, US Active Aircraft, Emp., Income	0.965	336	357	398	1.13%
Year, Registered Aircraft, US Active Aircraft, Pop., Emp.	0.964	336	358	403	1.20%
Year, Registered Aircraft, US Active Aircraft, Income	0.964	336	357	405	1.21%
Year, Registered Aircraft, US Active Aircraft, Pop., Income	0.964	335	356	400	1.15%
Registered Aircraft, US Active Aircraft, Pop., Income	0.963	336	356	397	1.11%
Year, Registered Aircraft, US Active Aircraft, Income	0.962	336	356	396	1.10%
Registered Aircraft, US Active Aircraft, Income	0.962	335	356	396	1.10%

Notes: Analysis conducted with 2000-2016 annual data.

CAGR = Compound annual growth rate

Pop., Emp., Income = Combined Williamson and Travis County

## Market Share Forecast

Several market share forecasts of based aircraft have been developed. The first considers the relationship between historical based aircraft and registered aircraft in the two-county airport service area. Currently, the number of based aircraft at the Airport accounts for 24.1 percent of the two-county registered aircraft. By maintaining this ratio as a constant, a projection of based aircraft emerges, as shown on **Table 2H**.

The next market share forecast considers the relationship between based aircraft and population. In 2016, there were 0.1898 based aircraft at the Airport per 1,000 people in the two-county service area.



When maintaining this ratio as a constant into the future, a forecast results, as shown in **Table 2H**. It is more common for this ratio to decrease as population increases; therefore, this forecast is considered a high-range forecast.

**Table 2H** also includes a methodology for checking the reasonableness of 11-year growth rate and regression forecasts previously presented. When performing this check, the key indicators are the projected trend in the market share of registered aircraft and population per based aircraft. As shown the projected trends appear reasonable for an unconstrained forecast and are considered as part of the overall planning envelope.

**Table 2H**

**Market Share Based Aircraft Forecast**

**Georgetown Municipal Airport**

Year	Two-County Registered Aircraft <sup>1</sup>	Based Aircraft	Market Share	Two-County Population <sup>1</sup>	Based Aircraft Per 1,000 Population
2005	1,192	256	21.5%	1,223,435	0.2092
2016	1,318	318	24.1%	1,675,333	0.1898
<b>Constant Share of Two-County Registered Aircraft (CAGR 0.91%)</b>					
2021	1,360	328	24.1%	1,909,317	0.1719
2026	1,420	343	24.1%	2,127,274	0.1611
2036	1,580	381	24.1%	2,618,924	0.1456
<b>Constant Share of Population to Based Aircraft (CAGR = 2.26%)</b>					
2021	1,360	362	26.6%	1,909,317	0.1898
2026	1,420	404	28.4%	2,127,274	0.1898
2036	1,580	497	31.5%	2,618,924	0.1898
<b>11-Year Growth Rate (CAGR = 1.99%)</b>					
2021	1,360	351	25.8%	1,909,317	0.1838
2026	1,420	387	27.3%	2,127,274	0.1819
2036	1,580	472	29.9%	2,618,924	0.1802
<b>Highest Correlation Regression (CAGR = 1.18%)</b>					
2021	1,360	337	24.8%	1,909,317	0.1765
2026	1,420	358	25.2%	2,127,274	0.1683
2036	1,580	402	25.4%	2,618,924	0.1535
<b>Selected Based Aircraft Forecast (CAGR = 1.15%)</b>					
2021	1,360	340	25.0%	1,909,317	0.1781
2026	1,420	370	26.1%	2,127,274	0.1739
2036	1,580	400	25.3%	2,618,924	0.1527

<sup>1</sup>Williamson and Travis Counties

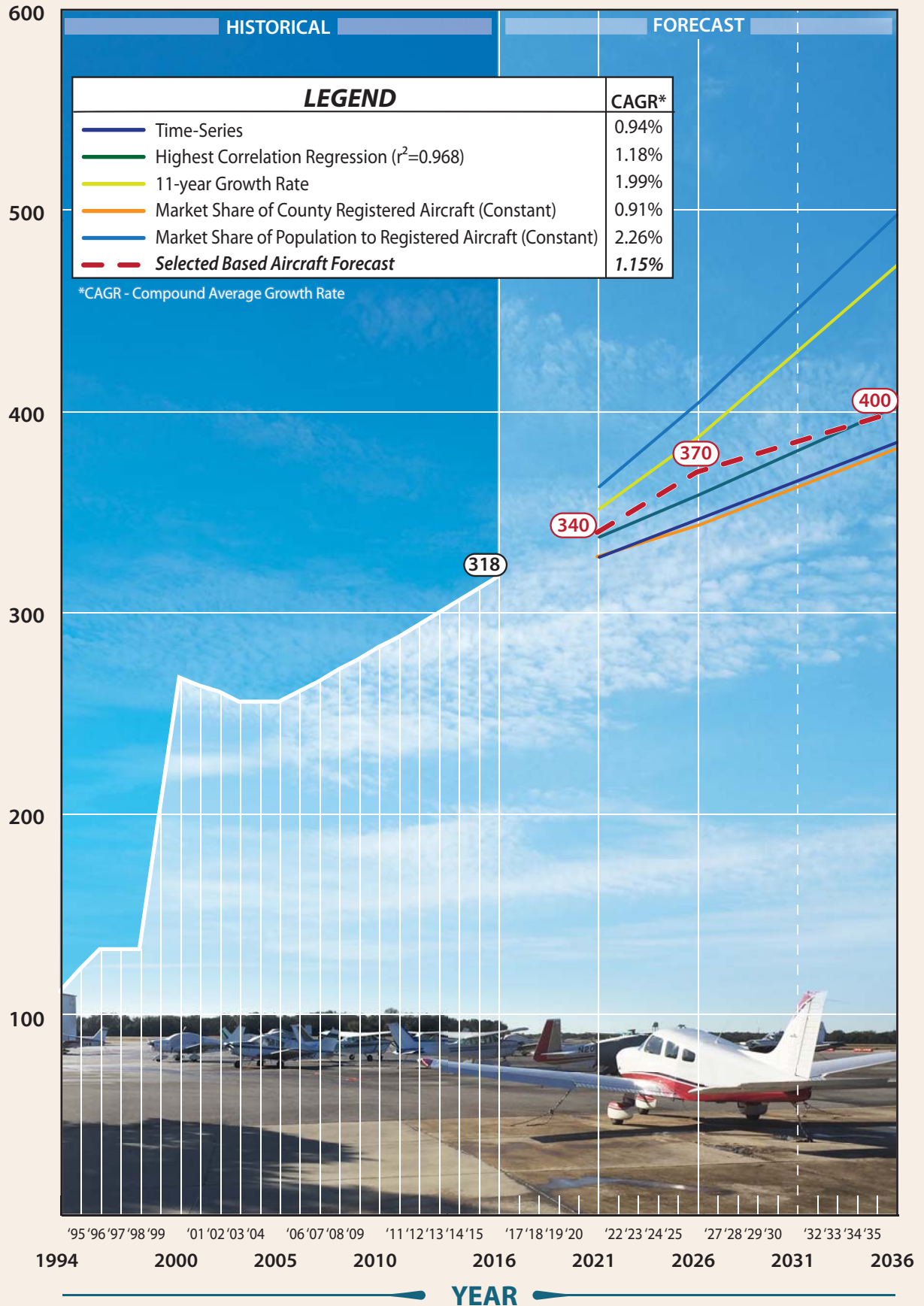
CAGR: Compound annual growth rate

**Selected Based Aircraft Forecast**

**Exhibit 2D and Table 2J** present the based aircraft forecasts developed to create the planning envelope for consideration. A selected forecast is also included in the graph. It is at this point that the judgement of the forecast analyst is considered when selecting a preferred forecast.



BASED AIRCRAFT





An unconstrained forecast of aviation demand is commonly used for Master Plans so that airport management can prepare and plan for a range of possibilities. For example, some of the based aircraft forecasts indicate a long-term potential for nearly 500 based aircraft. Many local factors, such as growth in population, employment, and income growth, may lead to a selected forecast on the higher range of the planning envelope. In addition, there is a current wait list of 180+ aircraft owners, which would indicate a high demand for more hangars and, thus, more based aircraft. However, at Georgetown Municipal Airport, there are constraining factors that cannot be ignored.

There are challenges to constructing enough hangars to accommodate the demand primarily due to the cost of construction and the time for a builder to amortize their investment. Much of the developable land may also require additional infrastructure, such as utilities, access roads, and potentially environmental remediation. Some City policies related to the Airport also indicate a local desire to limit unfettered aviation growth. For example, in 1996, City Council passed a resolution indicating no desire to extend either runway in the future (which can be changed by future councils). These factors are considered by the analyst in tempering the long-range forecast.

The short and intermediate planning horizons (years 1-10) are projected to fall in the mid-range of the planning envelope; however, in the long term (years 11-20), the forecast has been tempered somewhat to indicate that the Airport will begin approaching a point where development opportunities become noticeably constrained. For purposes of this Master Plan, the following based aircraft forecasts will be utilized to determine future facility needs.

- 2021 – 340 Based Aircraft
- 2026 – 370 Based Aircraft
- 2036 – 400 Based Aircraft

**TABLE 2J**  
**Based Aircraft Summary**  
**Georgetown Municipal Airport**

Method	2021	2026	2036	CAGR
Time-Series	327	346	384	0.94%
Highest Correlation Regression ( $r^2=0.968$ )	337	358	402	1.18%
11-year Growth Rate	351	387	472	1.99%
Market Share of County Registered Aircraft (Constant)	328	343	381	0.91%
Market Share of Population to Registered Aircraft (Constant)	362	404	497	2.26%
<b>Selected Based Aircraft Forecast</b>	<b>340</b>	<b>370</b>	<b>400</b>	<b>1.15%</b>

CAGR: Compound annual growth rate

## BASED AIRCRAFT FLEET MIX FORECAST

It is important to have an understanding of the current and projected based aircraft fleet mix at an airport to ensure the planning of proper facilities in the future. For example, the addition of one or several larger turboprop or business jet aircraft to the airfield can have a significant impact on the separation requirements and the various obstacle clearing surfaces.





The current based aircraft fleet mix consists of 251 single engine piston aircraft, 24 multi-engine piston aircraft, 20 turboprops, 15 business jets, and eight helicopters. The role of the Airport is expected to remain as a general aviation reliever facility; therefore, a significant departure from the current fleet mix is not anticipated. The future fleet mix is expected to continue to be dominated by single engine piston aircraft with moderate increases in turboprops, jets, and helicopters. Multi-engine piston aircraft are projected to increase slightly but decline as a percentage of total based aircraft. These forecast growth trends in the based aircraft mix are consistent with FAA projections of the national general aviation fleet mix. **Table 2K** presents the forecast fleet mix for based aircraft at Georgetown Municipal Airport.

**TABLE 2K**  
**Based Aircraft Fleet Mix Forecast**  
**Georgetown Municipal Airport**

Aircraft Type	EXISTING <sup>1</sup>		FORECAST					
	2016	%	2021	%	2026	%	2036	%
Single Engine P	251	78.93%	267	78.53%	290	78.38%	311	77.75%
Multi-Engine P	24	7.55%	25	7.35%	26	7.03%	26	6.50%
Turboprop	20	6.29%	22	6.47%	24	6.49%	28	7.00%
Jet	15	4.72%	17	5.00%	19	5.14%	22	5.50%
Helicopter	8	2.52%	9	2.65%	11	2.97%	13	3.25%
<b>Totals</b>	<b>318</b>	<b>100.00%</b>	<b>340</b>	<b>100.00%</b>	<b>370</b>	<b>100.00%</b>	<b>400</b>	<b>100.00%</b>

<sup>1</sup>Airport Records/www.basedaircraft.com

## OPERATIONS FORECAST

General aviation operations include a wide range of activity from recreational use to business and corporate uses. Military operations include those operations conducted by various branches of the U.S. military. Air taxi operations are those conducted by aircraft operating under FAR Part 135, otherwise known as “for-hire” or “on-demand” activity. Air taxi operations typically include commuter, air cargo, air ambulance, and many fractional ownership operations.

Aircraft operations are further classified as local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of an airport, or which executes simulated approaches or touch-and-go operations at an airport. Generally, local operations are characterized by training activity. Itinerant operations are those performed by aircraft with a specific origin or destination away from an airport. Typically, itinerant operations increase with business and commercial use since business aircraft are used primarily to transport passengers from one location to another.

The following sections present several new general aviation operations forecasts. Once a forecast of general aviation operations has been selected, they will be combined with air taxi and military operations to provide a total operations forecast for use in determining facility requirements for the Airport. Several methods for determining general aviation operations have been employed to develop a reasonable planning envelope.



## Historical Operations

Georgetown Municipal Airport has had an airport traffic control tower since 2007. Tower personnel collect operational data when the tower is open between the hours of 7:00 am and 10:00 pm. **Table 2L** presents the historical operations at the Airport. In 2008, the first full year of tower operations, there were 75,407 operations. The next year operations declined to approximately 59,103, primarily due to the national recession. Since 2009, operations have steadily increased every year, closely following the slow but steady improvement of the national economy. Between 2015 and 2016, operations increased significantly from 75,941 to 97,346. The increase can be attributed to the addition of two flight schools to the airport and the improving economy.

**TABLE 2L**  
**Operations History**  
**Georgetown Municipal Airport**

Year	Itinerant				Local			Grand Total
	Air Taxi	General Aviation	Military	Total	General Aviation	Military	Total	
2008	1,448	37,220	260	38,928	35,961	518	36,479	75,407
2009	966	32,619	155	33,740	25,153	210	25,363	59,103
2010	940	33,549	240	34,729	25,066	301	25,367	60,096
2011	530	34,192	336	35,058	28,579	156	28,735	63,793
2012	387	33,166	117	33,670	34,632	89	34,721	68,391
2013	343	33,915	75	34,333	36,015	84	36,099	70,432
2014	539	34,278	81	34,898	37,697	97	37,794	72,692
2015	656	35,492	153	36,301	39,426	214	39,640	75,941
2016	811	45,006	207	46,024	50,972	350	51,322	97,346
<b>CAGR</b>		<b>2.13%</b>		<b>1.88%</b>	<b>3.95%</b>		<b>3.87%</b>	<b>2.88%</b>

CAGR: Compound annual growth rate

Source: FAA airport operations count (excluding overflights) from Operations Network (OPSNET)

## Local General Aviation Operations Forecast

Local general aviation operations are associated with training activity or touch-and-go activity. This segment of activity has been growing steadily over the past eight years at the Airport. Nationally, the FAA forecasts local general aviation activity to grow at an annual average rate of 0.42 percent. Local general aviation operations at the Airport have grown 3.95 percent annually since 2008 and 9.23 percent annually since 2009. From 2008-2015, total operations were relatively flat. The sharp increase in 2016 is attributable to the addition of two flight schools to the Airport as well as the improving economy.



### Time-Series and Regression Analysis

For regression analysis, nine years of data may be considered a somewhat limited data set so the results must be examined with some caution. Both a time-series and multi-variable regression analysis were conducted and are presented in **Table 2M**.

**TABLE 2M**

**GA Local Operations Forecasts - Time-Series and Regression Analysis**  
**Georgetown Municipal Airport**

		FORECAST			
2016 GA Local Operations: 50,972	r <sup>2</sup>	2021	2026	2036	CAGR 2016-2036
TIME-SERIES					
Year- Time Series	0.588	55,168	66,464	89,058	2.83%
REGRESSION VARIABLES					
Year, FAA Local GA Ops., Pop., Emp., Income	0.959	77,343	103,399	149,266	5.52%
Year, FAA Local GA Ops., Emp., Income	0.959	77,058	102,553	146,514	5.42%
Year, FAA Local GA Ops., Pop., Income	0.952	69,205	83,603	94,344	3.13%
Year, FAA Local GA Ops., Emp.	0.951	80,619	108,587	157,006	5.79%
Year, Pop., Emp., Income	0.946	66,524	76,627	73,559	1.85%
FAA Local GA Ops., Pop., Emp., Income	0.943	76,788	110,977	193,915	6.91%
FAA Local GA Ops., Pop., Emp.	0.941	73,579	103,989	176,508	6.41%
Year, FAA Local GA Ops., Income	0.931	64,359	81,944	116,822	4.23%
Year, Pop., Income	0.927	68,039	77,554	67,447	1.41%
FAA Local GA Ops., Pop., Income	0.924	62,864	80,441	118,024	4.29%

Notes: Analysis conducted with 2008-2016 annual data.

Pop., Emp., Income = Combined Williamson and Travis County

CAGR: Compound Annual Growth Rate

As noted previously, time-series analysis is statistically “fitting” a line over historical data and extending that line into future years. For local operations, this resulted in a low statistical reliability with an  $r^2$  value of 0.588. This is likely due to the 30 percent decline from 2008 to 2009 and the 23 percent increase from 2015 to 2016. Such variations tend to negatively impact the statistical reliability ( $r^2$  value) of the results. Because of the low statistical reliability, the time series forecast is not considered further.

For the regression analysis, the independent variables considered were the year, the FAA forecast of local general aviation operations, population, employment and income for the two-county area. The top ten results of the multi-variable analysis indicate a relatively high degree of statistical reliability.

### Market Share Analysis

Market share analysis compares several known historical data points. Local general aviation operations are sourced from the control tower data since 2008. Total local general aviation operations in the U.S.



are sourced from the FAA forecasts. The number of based aircraft at the Airport is sourced from historical Airport data (as interpolated). **Table 2N** presents a summary of the market share forecasts.

**TABLE 2N**  
**General Aviation Local Operations Forecast**  
**Georgetown Municipal Airport**

Year	GTU Local GA Operations <sup>1</sup>	U.S. ATCT GA Local Operations <sup>2</sup>	GTU Market Share	GTU Based Aircraft	Local GA Ops per Based Aircraft
2008	35,961	14,081,000	0.2554%	272	132
2009	25,153	12,448,000	0.2021%	277	91
2010	25,066	11,716,000	0.2139%	283	89
2011	28,579	11,437,000	0.2499%	288	99
2012	34,632	11,608,000	0.2983%	294	118
2013	36,015	11,688,000	0.3081%	300	120
2014	37,697	11,675,000	0.3229%	306	123
2015	39,426	11,691,000	0.3372%	312	126
2016	50,972	11,776,000	0.4328%	318	160
<b>Constant Market Share of National Local GA Operations (CAGR = 0.42%)</b>					
2021	51,989	12,011,000	0.4328%	340	153
2026	53,045	12,255,000	0.4328%	370	143
2036	55,283	12,772,000	0.4328%	400	138
<b>Increasing Market Share of National Local GA Operations (CAGR = 3.92%)</b>					
2021	65,406	11,688,000	0.5596%	340	192
2026	80,133	11,675,000	0.6864%	370	217
2036	109,881	11,691,000	0.9399%	400	275
<b>Constant Local GA Operations Per Based Aircraft (CAGR = 1.15%)</b>					
2021	54,498	12,011,000	0.4537%	340	160
2026	59,307	12,255,000	0.4839%	370	160
2036	64,116	12,772,000	0.5020%	400	160
<b>Increasing Itinerant GA Operations Per Based Aircraft (CAGR = 2.15%)</b>					
2021	56,100	11,688,000	0.4800%	340	165
2026	64,750	11,675,000	0.5546%	370	175
2036	78,000	11,691,000	0.6672%	400	195

<sup>1</sup>Tower operations

<sup>2</sup>FAA Aerospace Forecasts – Fiscal Years 2016-2036

GTU = Georgetown Municipal Airport; GA = General Aviation; ATCT = Airport Traffic Control Tower

CAGR: Compound annual growth rate

The first market share forecast considers the Airport maintaining a constant share of the local general aviation operations nationally (0.4348 percent). This results in 51,989 local general aviation operations by 2021, 53,045 by 2026, and 55,283 by 2036. The average annual growth rate is 0.42 percent. Considering the fact that local general aviation operations have been growing steadily at the Airport since 2009 and they increased by 23 percent from 2015 and 2016, this is considered a low-end forecast.

The next market share forecast considers the Airport realizing an increasing share of national local general aviation operations following the actual trend at the Airport since 2008. This results in 65,406 local



general aviation operations by 2021, 80,133 by 2026, and 109,881 by 2036 for an average annual growth rate of 3.92 percent.

The next market share forecast considered the historical relationship between local general aviation operations and based aircraft. In 2008, there were an estimated 273 based aircraft, which equated to 132 local general aviation operations per based aircraft. In 2016, there were 318 based aircraft and 160 operations per based aircraft. Since 2009, when there were 91 local general aviation operations per based aircraft, there has been an increase of 69 local general aviation operations per based aircraft. By maintaining a constant 160 local general aviation operations per based aircraft, a forecast emerges. This results in 54,498 local general aviation operations by 2021, 59,307 by 2026, and 64,116 by 2036 for an average annual growth rate of 1.15 percent.

The last market share forecast considers an increasing number of local operations per based aircraft, which has been the trend for the last nine years. This results in 56,100 local general aviation operations by 2021, 64,750 by 2026, and 78,000 by 2036 for an average annual growth rate of 2.15 percent.

#### *Additional Local General Aviation Forecasts*

The FAA forecasts local general aviation operations nationally to grow at 0.4 percent annually through 2036. By applying this growth factor, a forecast emerges of 52,051 by 2021, 53,154 by 2026, and 55,429 by 2036.

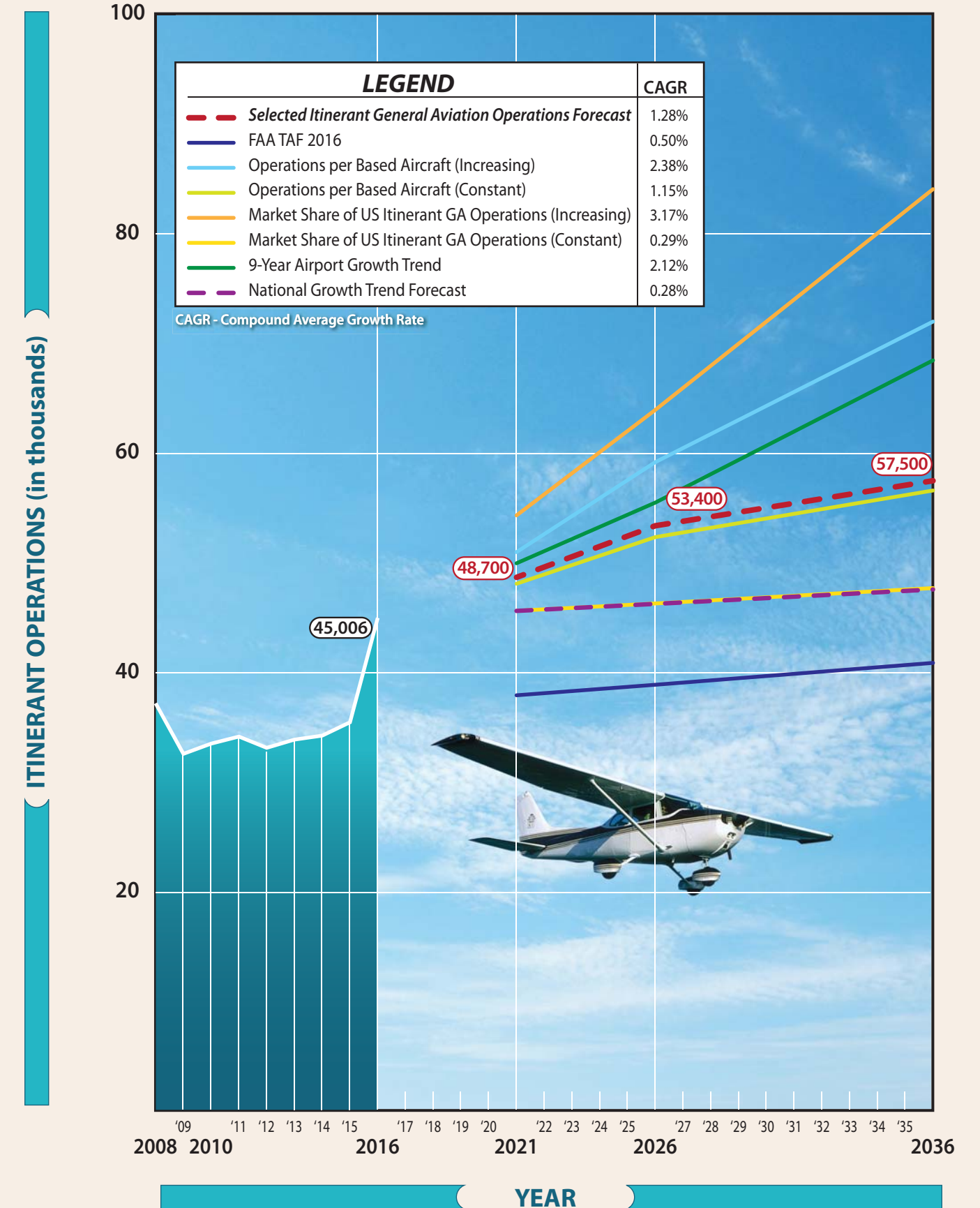
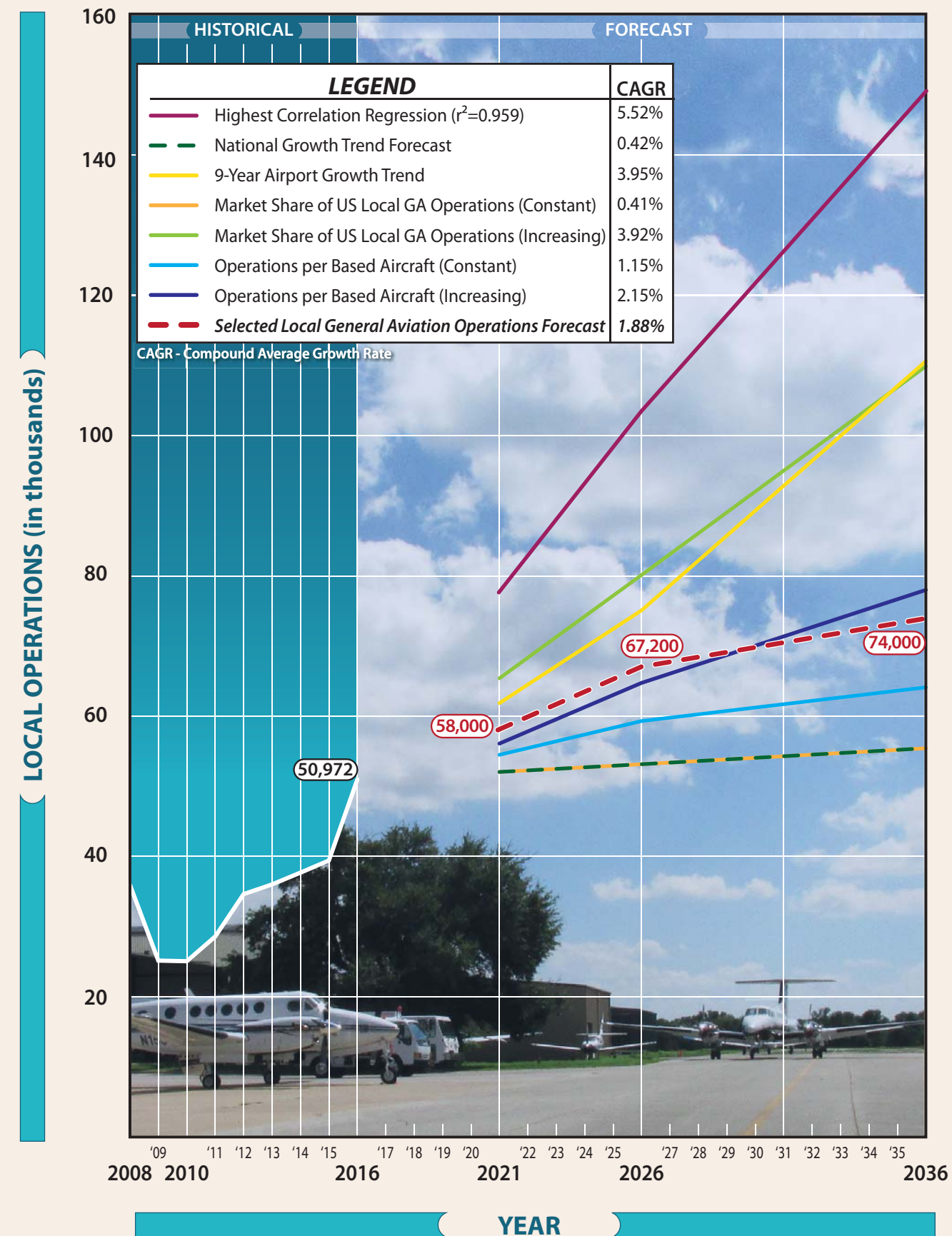
A final forecast applies the growth trend in local general aviation operations at the Airport since 2008, which is 3.95 percent annually. This forecast is 61,866 by 2021, 75,089 by 2026, and 110,617 by 2036. Sustaining the current growth rate for the next 20 years seems unlikely due to constraints at the Airport, such as limited developable land, but it is shown to provide the reader the range of possibilities.

#### *Local General Aviation Operations Forecast Summary*

**Table 2P** presents the seven forecasts of local general aviation operations that comprise the planning envelope. From the planning envelope, a forecast is selected. While there is a case to be made for local operations continuing to increase at or near rates experienced since the tower opened in 2007, there are several potential constraining factors that are taken into consideration when selecting a preferred forecast of local general aviation operations. For example, it may not be financially feasible for either the airport or the private sector to construct all the hangars needed to meet demand.

The selected forecast considers mid-range growth rate through 2026, which then begins to become constrained in years 10-20. Between 2016 and 2026, the annual growth rate is 3.00 percent and from 2026 through 2036, it is 0.97 percent. The selected forecast for local general aviation operations is 58,000 by 2021, 67,200 by 2026, and 74,000 by 2036. **Exhibit 2E** presents the local general aviation operations forecast in graphic form.





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**TABLE 2P**  
**Local General Aviation Operations Planning Forecast Envelope**  
**Georgetown Municipal Airport**

Method	2021	2026	2036	CAGR
Highest Correlation Regression ( $r^2=0.959$ )	77,343	103,399	149,266	5.52%
National Growth Trend Forecast	52,051	53,154	55,429	0.42%
9-Year Airport Growth Trend	61,866	75,089	110,617	3.95%
Market Share of US Local GA Operations (Constant)	51,989	53,045	55,283	0.41%
Market Share of US Local GA Operations (Increasing)	65,406	80,133	109,881	3.92%
Operations per Based Aircraft (Constant)	54,498	59,307	64,116	1.15%
Operations per Based Aircraft (Increasing)	56,100	64,750	78,000	2.15%
<b>Selected Local General Aviation Operations Forecast</b>	<b>58,000</b>	<b>67,200</b>	<b>74,000</b>	<b>1.88%</b>

CAGR = Compound annual growth rate 2016-2036

### General Aviation Itinerant Operations Forecast

Itinerant operations are associated with aircraft arriving from or departing to another airport. Itinerant operations do not include training or touch-and-go operations. This segment of activity has been growing at the Airport at a more moderate rate than local operations. Nationally, the FAA forecasts itinerant general aviation activity to grow at an annual average rate of 0.3 percent. Since 2008, itinerant operations have increased by an average annual rate of 2.02 percent and since 2009, the average annual growth rate has been 3.98 percent.

#### *Time-Series and Regression Analysis*

Both a time series and regression analysis were conducted for itinerant general aviation operations. None of these resulted in an  $r^2$  value above 0.91, which indicates a moderate level of statistical reliability. These results are presented in **Table 2Q**.

As noted previously, time-series analysis is statistically “fitting” a line over historical data and extending that line into future years. For itinerant operations, this resulted in a low statistical reliability with an  $r^2$  value of 0.240.

For the regression analysis, the independent variables considered were the year, the FAA forecast of itinerant general aviation operations, population, employment, and income for the two-county area. The top ten results of the multi-variable analysis are also shown in **Table 2Q** and they indicate a moderate to low degree of statistical reliability. Because of the low statistical reliability of both the time series and regression analysis, neither were considered when determining a planning forecast for itinerant general aviation operations. They are only included for comparative purposes.



**TABLE 2Q**  
**GA Itinerant Operations Forecasts - Time-Series and Regression Analysis**  
**Georgetown Municipal Airport**

		FORECAST			
2016 GA Itinerant Operations: 45,006	r <sup>2</sup>	2021	2026	2036	CAGR 2016-2036
TIME-SERIES					
Year- Time Series	0.240	41,635	45,047	51,871	0.71%
REGRESSION VARIABLES					
Year, FAA Itinerant GA Ops., Pop., Emp., Income	0.907	80,089	116,683	193,351	7.56%
Year, FAA Itinerant GA Ops., Emp., Income	0.904	75,340	104,363	157,408	6.46%
FAA Itinerant GA Ops., Pop., Emp., Income	0.879	89,999	144,845	281,586	9.60%
Year, FAA Itinerant GA Ops., Pop., Emp.	0.877	65,007	78,837	85,917	3.29%
Year, FAA Itinerant GA Ops., Pop., Income	0.854	59,108	65,410	51,741	0.70%
Year, FAA Itinerant GA Ops., Pop.	0.847	60,103	68,927	64,650	1.83%
Year, Pop., Emp., Income	0.840	56,200	57,716	28,649	-2.23%
Year, Pop., Income	0.832	56,671	58,004	26,747	-2.57%
Year, FAA Itinerant GA Ops., Emp.	0.753	63,568	83,358	118,374	4.95%
Year, Pop., Emp.	0.742	53,574	55,734	35,721	-1.15%

Notes: Analysis conducted with 2008-2016 annual data.

Pop., Emp., Income = Combined Williamson and Travis County

CAGR: Compound Annual Growth Rate

### Market Share Analysis

The market share analysis compares several known historical data points. Itinerant general aviation operations are sourced from the tower data since 2008. Total itinerant general aviation operations in the U.S. is sourced from the FAA forecasts. The number of based aircraft at the Airport is sourced from historical Airport data (as interpolated). **Table 2R** presents the market share forecasts.

The first market share forecast considers the Airport maintaining a constant share of national itinerant general aviation operations (0.3237 percent). This results in 45,653 itinerant general aviation operations by 2021, 46,320 by 2026, and 47,722 by 2036. The average annual growth rate is 0.29 percent. Considering the fact that itinerant general aviation operations have been growing steadily at the Airport since 2009, this is considered a low-end forecast.

The next market share forecast considers the Airport realizing an increasing share of national itinerant general aviation operations following the actual trend at the Airport. This results in 54,346 itinerant general aviation operations by 2021, 63,959 by 2026, and 84,067 by 2036 for an average annual growth rate of 3.17 percent.



The next market share forecast considered the historical relationship between itinerant general aviation operations and based aircraft. In 2008, there were an estimated 273 based aircraft, which equated to 137 itinerant general aviation operations per based aircraft. In 2016, there were 318 based aircraft, which equated to 142 operations per based aircraft. By maintaining a constant 142 itinerant general aviation operations per based aircraft, a forecast emerges. This results in 48,120 itinerant general aviation operations by 2021, 52,365 by 2026, and 56,611 by 2036 for an average annual growth rate of 1.15 percent.

The last market share forecast considers an increasing number of itinerant operations per based aircraft which has been the trend for the last nine years. This results in 51,000 local general aviation operations by 2021, 59,200 by 2026, and 72,000 by 2036 for an average annual growth rate of 2.38 percent.

**TABLE 2R**  
**Itinerant General Aviation Operations - Market Share Forecasts**  
**Georgetown Municipal Airport**

Year	GTU Itinerant GA Operations <sup>1</sup>	U.S. ATCT Itinerant GA Operations <sup>2</sup>	GTU Market Share	GTU Based Aircraft	Itinerant GA Ops per Based Aircraft
2008	37,220	17,493,000	0.2128%	272	137
2009	32,619	15,571,000	0.2095%	277	118
2010	33,549	14,864,000	0.2257%	283	119
2011	34,192	14,528,000	0.2354%	288	119
2012	33,166	14,522,000	0.2284%	294	113
2013	33,915	14,117,000	0.2402%	300	113
2014	34,278	13,979,000	0.2452%	306	112
2015	35,492	13,887,000	0.2556%	312	114
2016	45,006	13,903,000	0.3237%	318	142
<b>Constant Market Share of National Itinerant GA Operations (CAGR = 0.29%)</b>					
2021	45,653	14,103,000	0.3237%	340	134
2026	46,320	14,309,000	0.3237%	370	125
2036	47,722	14,742,000	0.3237%	400	119
<b>Increasing Market Share of National Itinerant GA Operations (CAGR = 3.17%)</b>					
2021	54,346	14,103,000	0.3853%	340	160
2026	63,959	14,309,000	0.4470%	370	173
2036	84,067	14,742,000	0.5703%	400	210
<b>Constant Itinerant GA Operations Per Based Aircraft (CAGR = 1.15%)</b>					
2021	48,120	14,103,000	0.3412%	340	142
2026	52,365	14,309,000	0.3660%	370	142
2036	56,611	14,742,000	0.3840%	400	142
<b>Increasing Itinerant GA Operations Per Based Aircraft Projection (CAGR = 2.38%)</b>					
2021	51,000	14,103,000	0.3616%	340	150
2026	59,200	14,309,000	0.4137%	370	160
2036	72,000	14,742,000	0.4884%	400	180

<sup>1</sup>Tower operations

<sup>2</sup>FAA Aerospace Forecasts – Fiscal Years 2016-2036

GTU = Georgetown Municipal Airport; GA = General Aviation; ATCT = Airport Traffic Control Tower

CAGR: Compound annual growth rate





### *Additional Itinerant General Aviation Forecasts*

The FAA forecasts itinerant general aviation operations nationally to grow at 0.28 percent annually through 2036. By applying this growth factor, a forecast emerges of 45,640 by 2021, 46,282 by 2026, and 47,595 by 2036.

A final forecast applies the growth trend in itinerant general aviation operations at the Airport since 2008, which is 2.12 percent annually. This forecast is 49,983 by 2021, 55,511 by 2026, and 68,468 by 2036.

### *General Aviation Itinerant Operations Forecast Summary*

**Table 2S** presents a summary of the six forecasts of itinerant general aviation operations which comprise the planning envelope. **Exhibit 2E** presents these forecasts in graphic form.

While there is a case to be made for itinerant operations continuing to increase at or near historical rates, there are several potential constraining factors that are taken into consideration when selecting a preferred forecast. For example, there is limited developable space at the Airport so the introduction of new businesses that would cater to itinerant operators may be somewhat limited, especially in the longer term.

**TABLE 2S**  
**Itinerant General Aviation Operations Planning Forecast Envelope**  
**Georgetown Municipal Airport**

Method	2021	2026	2036	CAGR
National Growth Trend Forecast	45,640	46,282	47,595	0.28%
9-Year Airport Growth Trend	49,983	55,511	68,468	2.12%
Market Share of US Itinerant GA Operations (Constant)	45,653	46,320	47,722	0.29%
Market Share of US Itinerant GA Operations (Increasing)	54,346	63,959	84,067	3.17%
Operations per Based Aircraft (Constant)	48,120	52,365	56,611	1.15%
Operations per Based Aircraft (Increasing)	51,000	59,200	72,000	2.38%
<b>Selected Itinerant General Aviation Operations Forecast</b>	<b>48,700</b>	<b>53,400</b>	<b>57,500</b>	<b>1.28%</b>

CAGR = Compound annual growth rate

The selected forecast considers an average growth rate through 2026, which then begins to become constrained in years 10-20. Between 2016 and 2026, the annual growth rate is 1.72 percent and from 2026 through 2036, it is 0.74 percent. The selected forecast for itinerant general aviation operations is 48,700 by 2021, 53,400 by 2026, and 57,500 by 2036.





## Air Taxi and Military Operations Forecast

Air taxi operations are those with authority to provide “on-demand” or “for-hire” transportation of persons or property via aircraft with fewer than 60 passenger seats. Air taxi includes a broad range of operations, including some smaller commercial service aircraft, some charter aircraft, air cargo aircraft, many fractional ownership aircraft, and air ambulance services.

Air taxi operations at the Airport declined each year from 2009 through 2013. This was common at airports across the country as there was a national recession from 2008-2009 and the recovery was relatively slow historically. Air taxi operations have increased at the Airport each year since 2014.

**Table 2T** presents the air taxi operations forecast which consider the Airport’s market share of national air taxi operations as forecast by the FAA. The FAA forecast shows a decline in air taxi operations nationally through 2026 and then a return to growth thereafter. The Airport is already seeing growth in air taxi operations today; therefore, a constant market share forecast is not the selected forecast. The second forecast shows an increasing share, which is certainly possible considering other regional growth indicators, such as population and employment. The selected forecast considers the Airport recapturing the level of air taxi operations experienced in 2008.

**TABLE 2T**

**Air Taxi Operations Forecast  
Georgetown Municipal Airport**

Year	GTU Air Taxi Operations	FAA Air Taxi Forecast <sup>1</sup>	GTU Market Share
2008	1,428	11,032,000	0.01294%
2009	961	9,521,000	0.01009%
2010	934	9,410,000	0.00993%
2011	527	9,279,000	0.00568%
2012	387	8,994,000	0.00430%
2013	343	8,803,000	0.00390%
2014	539	8,440,000	0.00639%
2015	656	7,895,000	0.00831%
2016	811	7,499,000	0.01081%
<b>Constant Share of National Air Taxi Operations (CAGR = -0.95%)</b>			
2021	681	6,294,000	0.01081%
2026	609	5,631,000	0.01081%
2036	670	6,199,000	0.01081%
<b>Increasing Share of National Air Taxi Operations (CAGR = 4.24%)</b>			
2021	944	6,294,000	0.01500%
2026	1,126	5,631,000	0.02000%
2036	1,860	6,199,000	0.03000%
<b>Recapture 2008 High Level of Air Taxi Operations/Selected (CAGR = 3.12%)</b>			
2021	800	6,294,000	0.01271%
2026	1,100	5,631,000	0.01953%
2036	1,500	6,199,000	0.02420%

<sup>1</sup>FAA Aeronautical Forecasts 2016-2036

CAGR: Compound annual growth rate



Military aircraft can and do utilize civilian airports across the country. Georgetown Municipal Airport does on occasion have activity by military aircraft. Forecasts of military activity are inherently difficult to predict because of the national security nature of their operations and the fact that their missions can change without notice. Thus, it is typical for the FAA to plug in a flat line number for military operations. For Georgetown Municipal Airport, the FAA TAF has 338 annual military operations for every year. For consideration in this master plan, a flat 400 military operations will be projected for each year through 2036.

### Total Operations Forecast Summary

The selected total operations forecast to be used for planning purposes is as follows:

- 2021 – 107,900 total operations
- 2026 – 122,100 total operations
- 2036 – 133,400 total operations

**Table 2U** presents the classification of the selected operations forecast. The Airport experiences a mix of operation types, including general aviation, air taxi, and military. The TAF estimates that local general aviation operations account for 52 percent of total operations with itinerant operations representing 48 percent. These percentages are applied to the planning forecast for general aviation operations.

**TABLE 2U**

**Total Operations Forecast  
Georgetown Municipal Airport**

Year	Local Operations			Itinerant Operations				Grand Total
	General Aviation	Military	Total	General Aviation	Air Taxi	Military	Total	
2016	50,027	336	50,363	44,579	790	213	45,582	95,945
2021	58,000	200	58,200	48,700	800	200	49,700	107,900
2026	67,200	200	67,400	53,400	1,100	200	54,700	122,100
2036	74,000	200	74,200	57,500	1,500	200	59,200	133,400
CAGR	1.98%		1.96%	1.28%	3.26%		1.32%	1.66%

CAGR = Compound annual growth rate

### PEAKING CHARACTERISTICS

Many aspects of facility planning relate to levels of peaking activity – times when an airport is busiest. For example, the appropriate size of terminal facilities can be estimated by determining the number of people that could reasonably be expected to use the facility at a given time. The following planning definitions apply to the peak periods:



- **Peak Month** -- The calendar month when peak aircraft operations occur.
- **Design Day** -- The average day in the peak month.
- **Busy Day** -- The busy day of a typical week in the peak month.
- **Design Hour** -- The peak hour within the design day.

The peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. The peak period forecasts represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

Tower records at the Airport were examined for this analysis. The most recent peak month for operations over a 12-month period was June 2016 when there were 9,868 operations, which accounted for 12.82 percent of total annual operations. Hourly operations data for June 2016 are presented in **Table 2V**. In June 2016, the peak operational hour was between 2:00 and 3:00 p.m., which accounted for 10.3 percent of total operations during that month.

**TABLE 2V**  
**Operations by Hour (June 2016)**  
**Georgetown Municipal Airport**

Hour	Itinerant			Local		Total Operations	Percent
	AT	GA	MIL	GA	MIL		
7-8 am	2	95	0	88	0	185	1.87%
8-9 am	8	181	2	140	8	339	3.44%
9-10 am	9	326	0	296	0	631	6.39%
10-11 am	2	414	0	542	6	964	9.77%
11-12 am	5	392	2	392	14	805	8.16%
12-1 pm	6	382	2	408	8	806	8.17%
1-2 pm	5	399	0	456	6	866	8.78%
2-3 pm	5	403	0	606	2	1,016	10.30%
3-4 pm	6	323	4	550	0	883	8.95%
4-5 pm	3	358	0	490	2	853	8.64%
5-6 pm	6	335	0	440	2	783	7.93%
6-7 pm	5	271	0	462	0	738	7.48%
7-8 pm	5	194	2	228	18	447	4.53%
8-9 pm	2	111	0	148	0	261	2.64%
9-10 pm	2	119	0	170	0	291	2.95%
<b>Total</b>	<b>71</b>	<b>4,303</b>	<b>12</b>	<b>5,416</b>	<b>66</b>	<b>9,868</b>	<b>100.00%</b>

AT - Air Taxi; GA - General Aviation; MIL - Military

Source: Georgetown Air Traffic Control Tower

**Table 2W** presents the operational peaking characteristics at the Airport. The design day is calculated by dividing the peak month operations by 30. The busy day is determined by averaging the four busiest days of each week of the peak month and applying that factor (1.34) to the design day. Design hour operations were calculated at 10.3 percent of design day operations.



**TABLE 2W**  
**Peak Total Operations**  
**Georgetown Municipal Airport**

	2016	2021	2026	2036
Annual	97,346	107,900	122,100	133,400
Peak Month (10.14%)	9,868	13,833	15,653	17,102
Busy Day	442	618	699	764
Design Day	329	461	522	570
Design Hour (10.3%)	34	47	54	59

Note: Baseline peak month is June 2016.

Source: Coffman Associates analysis of ATCT records

Currently, the operational design hour is 34, which means facility planning that considers this variable, such as airfield capacity, should be designed to this level. By 2036, the design hour is projected to increase to 59.

## OPERATIONS BY FLEET MIX

Developing an understanding of the operational fleet mix, including the approximate volume of operations by aircraft type, is utilized in airfield capacity analysis, fuel storage capacity analysis, and pavement utilization determination. The FAA Traffic Flow Management System Count (TFMSC) database captures a portion of operations by aircraft type utilizing flight plan data. However, most flights are not required to file a flight plan and, therefore, this database represents a minimum level of activity.

Operators of jet aircraft tend to file flight plans at a higher rate than others. In visual conditions, it is common for some turboprops, and most piston and helicopter operators, to not file a flight plan. **Table 2Y** presents unadjusted TFMS data for the Airport for the last 11 years. The jet and turboprop raw data is used as a starting point for estimating the operating fleet mix at the Airport.

**TABLE 2Y**  
**Unadjusted TFMS Operations by Aircraft Type**  
**Georgetown Municipal Airport**

Year	Piston	Turboprop	Jet	Helicopter
2006	3,522	1,584	1,480	2
2007	4,242	1,680	1,642	4
2008	6,108	2,108	1,790	34
2009	6,310	1,778	1,702	44
2010	6,028	1,886	1,782	14
2011	4,958	1,828	1,764	2
2012	4,656	1,726	1,178	6
2013	6,508	1,750	1,276	0
2014	6,394	2,046	1,502	4
2015	7,638	2,132	1,418	4
2016	5,226	2,262	1,494	8

TFMSC: Traffic Flow Management System Count (FAA Database)



Jet operations have consistently been above 1,100 annually and were above 1,700 for several years in a row from 2008 to 2011. Turboprop operations have consistently been above 1,500 annually and have exceeded 2,000 for the last three years in a row.

**Table 22** presents the fleet mix operations forecast for the Airport.

**TABLE 22**

**Fleet Mix Operations Forecast  
Georgetown Municipal Airport**

	2016	2021	2026	2036
<b>Local Operations</b>				
Piston	46,762	53,128	61,608	67,592
Multi-Piston	2,496	2,600	2,704	2,704
Turboprop	400	600	800	1,200
Helicopter	1,664	1,872	2,288	2,704
Total Local	51,322	58,200	67,400	74,200
<b>Itinerant Operations</b>				
Single Piston	38,084	41,072	45,192	48,508
Multi-Piston	2,304	2,400	2,496	2,496
Turboprop	2,500	2,700	2,900	3,300
Jet	1,600	1,800	2,000	2,400
Helicopters	1,536	1,728	2,112	2,496
Total Itinerant	46,024	49,700	54,700	59,200
Total Operations (rounded)	97,346	107,900	122,100	133,400

*Source: Coffman Associates analysis*

## ANNUAL INSTRUMENT APPROACHES

An instrument approach, as defined by the FAA, is “an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.” To qualify as an instrument approach, aircraft must land at the airport after following one of the published instrument approach procedures in less than visual conditions. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport’s requirements for navigational aid facilities, such as an instrument landing system. Practice or training approaches do not count as AIAs nor do IFR approaches in visual conditions.

During poor weather conditions, pilots are less likely to fly and rarely would perform training operations. As a result, an estimate of the total number of AIAs can be made based on a percent of itinerant operations. Generally, AIAs total between three and seven percent of itinerant operations. An estimate of five percent of itinerant operations is utilized to forecast AIAs at the Airport. This results in a 2016 estimate of 2,301 AIAs and 2,485, 2,735, 2,960 in years 2021, 2026, and 2036, respectively.



## FORECAST SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period. **Exhibit 2F** presents a summary of the aviation forecasts prepared in this chapter. Actual activity is included for 2016, which was the base year for these forecasts. The primary aviation demand indicators forecast are based aircraft and operations.

Based aircraft are forecast to increase from 318 in 2016 to 400 by 2036. Total operations are forecast to increase from 97,346 in 2016 to 133,400 by 2036. Several forecasts for each aviation demand indicator were developed to create a planning envelope, or a range of reasonable forecasts. The selected forecast for both based aircraft and operations considers a relatively unconstrained average growth for the first 10 years. In years 10-20, the forecasts have been tempered somewhat to reflect the local constraints to growth at the Airport, most notably, the limited land available for development.

Projections of aviation demand will be influenced by unforeseen factors and events in the future. In the recent past, events such as terrorist attacks and economic recession, have impacted aviation demand. Therefore, it is not reasonable to assume that future demand will follow the exact projection line but over time, forecasts of aviation demand tend to fall within the planning envelope. The forecasts developed for this master planning effort are considered reasonable for planning purposes. The need for additional facilities will be based upon these forecasts; however, if demand does not materialize as projected, then implementation of facility construction can be slowed. Likewise, if demand exceeds these forecast, then implementation of facility construction can be accelerated.

**Appendix E** provides supplemental forecasts information including the input data for each of the regression models, the forecast comparison sheet, and the 2018 Terminal Area Forecast.

## AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

The FAA has established several aircraft classification systems that group aircraft types based on their performance (approach speed in landing configuration) and design characteristics (wingspan and landing gear configuration). These classification systems are used to determine the appropriate airport design standards for specific airport elements, such as runways, taxiways, taxilanes, and aprons.

### AIRCRAFT CLASSIFICATION

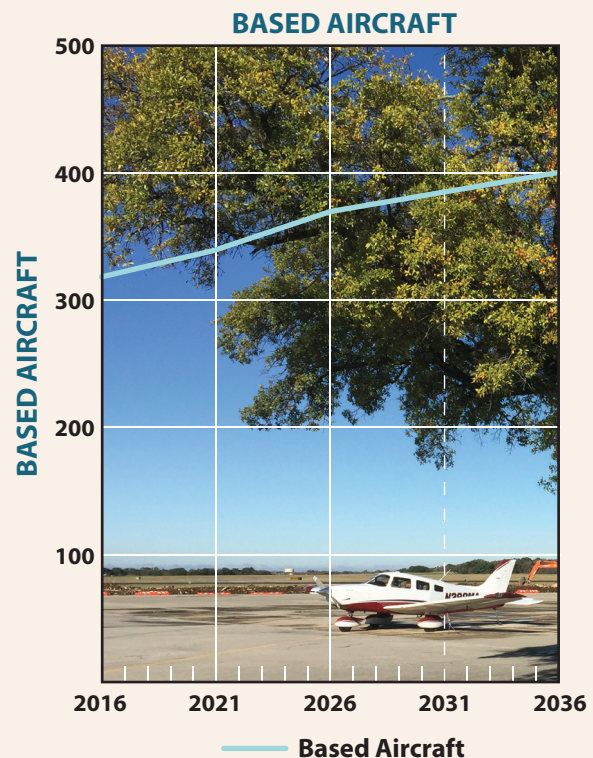
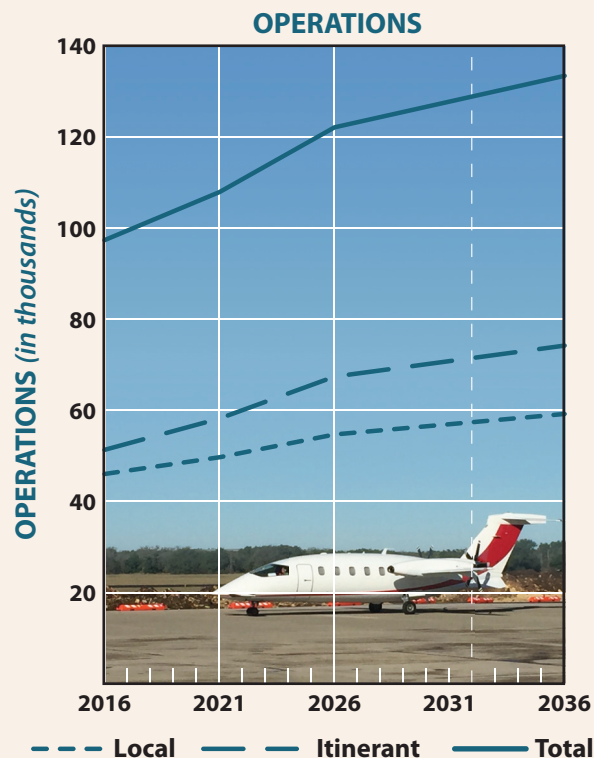
The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft type or a composite aircraft representing a collection of aircraft with similar characteristics. The design aircraft is classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13A,





	BASE YEAR 2016	FORECAST			
		2021	2026	2036	CAGR* 2016-2036
ANNUAL OPERATIONS					
Itinerant Operations					
Air Taxi	811	800	1,100	1,500	3.12%
General Aviation	45,006	48,700	53,400	57,500	1.23%
Military	207	200	200	200	-0.17%
Total Itinerant Operations	46,024	49,700	54,700	59,200	1.27%
Local Operations					
General Aviation	50,972	58,000	67,200	74,000	1.88%
Military	350	200	200	200	-2.76%
Total Local Operations	51,322	58,200	67,400	74,200	1.86%
TOTAL OPERATIONS (rounded)	97,346	107,900	122,100	133,400	1.59%
BASED AIRCRAFT					
Single Engine	251	267	290	311	1.08%
Multi-engine	24	25	26	26	0.40%
Turboprop	20	22	24	28	1.70%
Business Jet	15	17	19	22	1.93%
Helicopter	8	9	11	13	2.46%
TOTAL BASED AIRCRAFT	318	340	370	400	1.15%
PEAKING CHARACTERISTICS					
Peak Month	9,868	13,833	15,653	17,102	2.79%
Design Day	329	461	522	570	2.79%
Design Hour	34	47	54	59	2.79%
ANNUAL INSTRUMENT APPROACHES	2,301	2,485	2,735	2,960	1.27%

\*CAGR - Compound Average Growth Rate





*Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2G**.

**Aircraft Approach Category (AAC):** A grouping of aircraft based on a reference landing speed ( $V_{REF}$ ), if specified, or if  $V_{REF}$  is not specified, 1.3 times stall speed ( $V_{SO}$ ) at the maximum certificated landing weight.  $V_{REF}$ ,  $V_{SO}$ , and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristics). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.

**Airplane Design Group (ADG):** The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristics). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free (TOFA), taxilane object free area, apron wingtip clearance, and various separation distances.

**Taxiway Design Group (TDG):** A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the design aircraft. The TDG is classified by an alphanumeric system: 1A, 1B, 2, 3, 4, 5, 6, and 7. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the taxiway safety area (TSA), taxiway/taxilane object free area (TOFA), taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances, are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

**Exhibit 2H** summarizes the classification of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC A and B and ADG I and II. Business jets typically fall in AAC B and C, while the larger commercial aircraft will fall in AAC C and D.

## AIRPORT AND RUNWAY CLASSIFICATIONS

Airport and runway classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.



### AIRCRAFT APPROACH CATEGORY (AAC)

Category	Approach Speed
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

### AIRPLANE DESIGN GROUP (ADG)

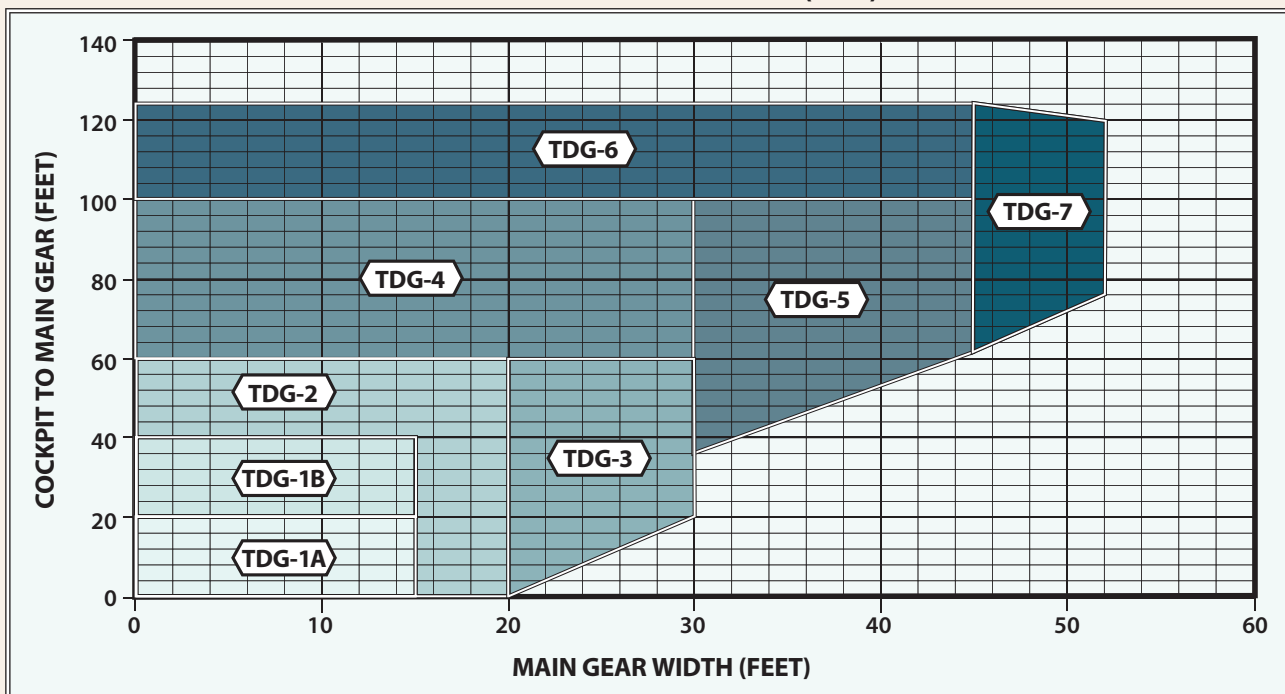
Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20-<30	49-<79
III	30-<45	70-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

### VISIBILITY MINIMUMS

RVR* (ft)	Flight Visibility Category (statute miles)
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

\*RVR: Runway Visual Range

### TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13A, Airport Design



## A-I



- Beech Baron 55
- **Beech Bonanza**
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- Eclipse 500/550
- Piper Archer
- Piper Seneca

## C-II, D-II



- **Cessna Citation X (750)**
- Gulfstream 100, 200, 300
- Challenger 300/600
- ERJ-135, 140, 145
- CRJ-200/700
- Embraer Regional Jet
- Lockheed JetStar
- Hawker 800

## B-I



- Beech Baron 58
- Beech King Air A90/100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I (525)

## C-III, D-III *less than 100,000 lbs.*



- ERJ-170
- CRJ 705, 900
- Falcon 7X
- **Gulfstream 500, 550, 650**
- Global Express, Global 5000
- Q-400

## B-II



- Super King Air 200
- Cessna 441
- DHC Twin Otter
- Super King Air 350
- Beech 1900
- Citation Excel (560), Sovereign (680)
- Falcon 50, 900, 2000
- **Citation Bravo (550)**
- Embraer 120

## C-III, D-III *over 100,000 lbs.*



- ERJ-90
- Boeing Business Jet
- B-727
- **B-737-300, 700, 800**
- MD-80, DC-9
- A319, A320

## A-III, B-III



- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

## C-IV, D-IV



- **B-757**
- B-767
- C-130 Hercules
- DC-8-70
- MD-11

## C-I, D-I



- Beech 400
- **Lear 31, 35, 45, 60**
- Israeli Westwind

## D-V



- **B-747-400**
- B-777
- B-787
- A-330, A-340





**Runway Design Code (RDC):** A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component.

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the available instrument approach visibility minimums expressed by RVR values in feet of 1,200 ( $\frac{1}{8}$ -mile), 1,600 ( $\frac{1}{4}$ -mile), 2,400 ( $\frac{1}{2}$ -mile), 4,000 ( $\frac{3}{4}$ -mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component reads "VIS" for runways designed for visual approach use only.

**Approach Reference Code (APRC):** A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component. The APRC for a runway is established based upon the minimum runway to taxiway centerline separation.

**Departure Reference Code (DPRC):** A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to takeoff operations. The DPRC represents those aircraft that can takeoff from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC, but is composed of two components, ACC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

**Airport Reference Code (ARC):** An airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The current Airport Layout Plan (ALP) for the Airport, which will be updated as part of this master planning effort, identifies an ARC of C-III currently and in the future.

## CRITICAL DESIGN AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use an airport. The critical design aircraft is used to define the design parameters for an airport. The design aircraft may be a single aircraft or a composite aircraft representing a collection of aircraft classified by the three parameters: AAC, ADG, and TDG. In the case of an airport with multiple runways, a design aircraft is selected for each runway.



The first consideration is the safe operation of aircraft likely to use an airport. Any operation of an aircraft that exceeds design criteria of an airport may result in a lesser safety margin; however, it is not the usual practice to base the airport design on an aircraft that uses the airport infrequently.

**The design aircraft is defined as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, excluding touch-and-go operations.** Planning for future aircraft use is of particular importance since the design standards are used to plan separation distances between facilities. These future standards must be considered now to ensure that short term development does not preclude the reasonable long range potential needs of the airport.

According to FAA AC 150/5300-13A, *Airport Design*, “airport designs based only on existing aircraft can severely limit the ability to expand the airport to meet future requirements for larger, more demanding aircraft. Airport designs that are based on large aircraft never likely to be served by the airport are not economical.” Selection of the current and future critical design aircraft must be realistic in nature and supported by current data and realistic projections.

## AIRPORT DESIGN AIRCRAFT

The FAA maintains the Traffic Flow Management System Count (TFMSC) database which documents certain aircraft operations at airports. Information is added to the TFMS database when pilots file flight plans and/or when flights are detected by the National Airspace System, usually via radar. It includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to factors such as incomplete flight plans, limited radar coverage, and VFR operations, TFMS data does not account for all aircraft activity at an airport by a given aircraft type. Georgetown does have overhead radar coverage; thus, most flight plans that are closed prior to landing will still be captured. Therefore, the TFMS does provide a reasonably accurate reflection of IFR activity by those operators most likely to file an IFR flight plan (turboprops and jets).

**Exhibit 2J** presents the TFMS annual activity for jets from 2006 through 2015. Each year from 2006 through 2011, aircraft in AAC C exceeded the 500 operations threshold. From 2012 through 2015, operations in AAC C were below the 500 operations threshold. This was a common trend at similar general aviation airports and can be attributed to the relatively slow economic recovery following the national recession in 2008-2009.

Operations by aircraft in ADG II have consistently been above the 500 operations threshold. Aircraft classified in AAC D/E and in ADG III/IV do occasionally operate at the Airport, but total combined operations by these aircraft have not reached the FAA’s critical aircraft threshold for the past ten years.

The previous airport layout plan identifies the Falcon 50 business jet, a C-II aircraft, as being representative of the critical design aircraft. Airfield facilities have historically been designed and constructed to C-II standards. It is typical to maintain the existing design standards unless there has been a prolonged change in the nature of operations at an airport that is not expected to reverse. A primary reason is to



ARC	Description	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A-I	Cessna Citation Mustang	0	0	8	70	116	102	110	74	30	12
	Eclipse 400/500	0	0	18	38	22	22	8	12	10	24
	Total	0	0	26	108	138	124	118	86	40	36
B-I	Beechjet 400	38	56	78	28	78	56	44	138	168	108
	Cessna Citation I/SP	110	84	46	174	154	86	12	16	6	24
	Cessna CJ1	62	64	50	106	86	74	78	84	132	72
	Dassault Falcon 10	6	8	6	2	0	18	6	6	0	28
	Embraer Phenom 100	0	0	0	6	12	10	2	14	14	20
	Hawker 400/MU-300	52	34	8	78	64	40	34	18	8	4
	Raytheon Premier I	48	48	22	32	26	14	22	10	38	18
	Other B-II	2	6	2	0	0	4	2	2	2	0
	Total	318	300	212	426	420	302	200	288	368	274
B-II	Cessna Citation Bravo/SP	124	180	96	66	80	72	88	88	112	126
	Cessna Citation Excel/XLS	116	200	218	172	146	280	90	42	58	62
	Cessna Citation III/VI/VII	24	32	26	30	36	30	24	50	108	102
	Cessna Citation Sovereign	18	18	32	2	28	16	20	14	20	20
	Cessna Citation V/Encore/Ultra	208	290	196	128	98	90	120	150	130	170
	Cessna CJ2, CJ3, CJ4	16	34	64	34	40	72	112	192	280	232
	Dassault Falcon 20/50	88	52	88	68	18	22	6	26	10	22
	Embraer Phenom 300	0	0	0	0	4	2	12	14	28	28
	Other	22	12	12	6	16	10	18	10	4	10
	Total	616	818	732	506	466	594	490	586	750	772
C-I	BAE HS 125-1/2/3/125/400/600	84	70	152	194	244	342	222	74	54	22
	IAI 1124/1125 Westwind	64	82	90	42	114	44	8	0	30	18
	Learjet 20 Series	54	10	10	8	80	44	2	42	4	46
	Learjet 30 Series	132	150	146	80	84	106	36	70	42	110
	Learjet 40/45/60	78	64	198	242	66	54	40	36	58	92
	Learjet 55	14	6	6	0	22	32	6	2	10	0
	Total	426	382	602	566	610	622	314	224	198	288
C-II	Bombardier CRJ All Series	2	0	2	0	0	0	0	0	0	0
	Cessna Citation X	14	22	28	20	16	12	2	6	14	8
	Challenger 300/600	66	56	58	18	42	42	16	30	42	16
	Embraer ERJ 135/140/145/Legacy	0	2	2	0	8	16	20	0	0	0
	Gulfstream 300	0	18	2	0	0	6	2	14	46	0
	Hawker 800/1000/4000	0	4	68	8	0	0	0	2	0	0
	IAI 1126 Galaxy	4	2	2	6	12	2	4	0	14	0
	Total	86	104	162	52	78	78	44	52	116	24
C-III	Bombardier Global 5000	8	22	14	12	18	4	0	0	0	0
	Dassault Falcon 7X	0	0	0	0	0	0	0	2	0	0
	Embraer 170/190 Series	0	0	0	0	0	0	0	0	2	0
	Gulfstream G550/650	4	0	0	0	0	2	0	10	12	6
	Total	12	22	14	12	18	6	0	12	14	6

ARC	Description	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
D-I	Learjet 70 Series	0	0	4	0	0	0	0	0	0	0
	Military Fighters and Trainers	0	2	6	2	0	0	2	0	0	0
	Total	0	2	10	2	0	0	2	0	0	0
D-II	Gulfstream 200	0	0	0	0	0	0	0	6	6	2
	Gulfstream 200/400	20	8	22	22	36	24	8	8	2	8
	Gulfstream G-150	0	6	8	2	12	14	2	14	8	8
	Total	20	14	30	24	48	38	10	28	16	18
D-III and larger	Example: Gulfstream V	2	0	2	6	2	0	0	0	0	0
	Total	2	0	2	6	2	0	0	0	0	0

ARC SUMMARY

ARC	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A-I	0	0	26	108	138	124	118	86	40	36
B-I	318	300	212	426	420	302	200	288	368	274
B-II	616	818	732	506	466	594	490	586	750	772
C-I	426	382	602	566	610	622	314	224	198	288
C-II	86	104	162	52	78	78	44	52	116	24
C-III	12	22	14	12	18	6	0	12	14	6
D-I	0	2	10	2	0	0	2	0	0	0
D-II	20	14	30	24	48	38	10	28	16	18
D-III	2	0	2	6	2	0	0	0	0	0
TOTAL	1,480	1,642	1,790	1,702	1,780	1,764	1,178	1,276	1,502	1,418

APPROACH CATEGORY

ARC	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A	0	0	26	108	138	124	118	86	40	36
B	934	1,118	944	932	886	896	690	874	1,118	1,046
C	524	508	778	630	706	706	358	288	328	318
D	22	16	42	32	50	38	12	28	16	18
TOTAL	1,480	1,642	1,790	1,702	1,780	1,764	1,178	1,276	1,502	1,418

DESIGN GROUP

ARC	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
I	744	684	850	1,102	1,168	1,048	634	598	606	598
II	722	936	924	582	592	710	544	666	882	814
III	14	22	16	18	20	6	0	12	14	6
TOTAL	1,480	1,642	1,790	1,702	1,780	1,764	1,178	1,276	1,502	1,418

ARC: Aircraft Reference Code  
DG: Design Group  
TFMSC: Traffic Flow Management System Count (FAA database)

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preserve investments already made in the Airport and to be in a position to accommodate more restrictive design standards once the activity in the design category returns. A decision on physical changes to the runway and taxiway systems becomes necessary when reconstruction is needed. There is not a compelling interest in pursuing changes in advance of that based on short-term fluctuations.

**NOTE: In the spring of 2018, FAA Headquarters reviewed the critical aircraft determination in this Master Plan. They determined that the critical aircraft are those that fall in ARC B-II because the number of operations by C-II aircraft had fallen below the 500 operations threshold for several consecutive years. Therefore, the current critical aircraft and airport reference code is B-II. This is a change from the current ALP that identifies C-II as the current ARC.**

### Fleet Mix by ARC

The operational fleet mix for an airport can also be categorized by aircraft reference code for use in helping to identify the future design standards to be applied to the airport. **Table 2AA** presents the forecast operational fleet mix by ARC. Over the past four years, the airport has had fewer than 500 operations by aircraft in AAC C. However, the six years prior to that there more than 500 AAC C operations. The fleet mix presented below indicates that the airport could transition back to a C-II critical aircraft within the 20-year planning period; however, that transition is not forecast until the long-term planning period.

**TABLE 2AA**  
**Civilian Jet Operations Forecast by Design Category**  
**Georgetown Municipal Airport**

Design Categories	HISTORICAL JET OPERATIONS <sup>1</sup>				FORECAST JET OPERATIONS			
	2006	Percent	2015	Percent	Short Term	Inter. Term	Long Term	Long Term Percent
Approach Category A/B	934	63%	1,082	76%	1,400	1,550	1,850	77%
Approach Category C/D	546	37%	336	24%	400	450	550	23%
<b>Total</b>	<b>1,480</b>	<b>100%</b>	<b>1,418</b>	<b>100%</b>	<b>1,800</b>	<b>2,000</b>	<b>2,400</b>	<b>100%</b>
Airplane Design Group I	744	51%	598	42%	720	760	864	36%
Airplane Design Group II	722	49%	814	58%	1,080	1,240	1,536	64%
<b>Total</b>	<b>1,466</b>	<b>100%</b>	<b>1,412</b>	<b>100%</b>	<b>1,800</b>	<b>2,000</b>	<b>2,400</b>	<b>100%</b>

<sup>1</sup>Traffic Flow Management System Count (TFMSC) - FAA activity database.

**The current design aircraft for the airport is characterized as B-II-2.** Business jet operations in B-II exceed the 500 operations threshold. A representative aircraft would be the Cessna Citation 560XL. The TDG of this business jet is 1B. To determine if '1B' is the critical TDG for the airport, the TFMSC data was examined for turboprop operations because many turboprops have wider wheel bases. The King Air 200, with a TDG of '2', currently operates more than 500 times annually. Therefore, the B-II-2 critical aircraft is a composite of these two aircraft.



The future critical aircraft considers the possibility of C-II business jets once again exceeding the 500 operations threshold. A representative aircraft is the Challenger 300. The Challenger 300 has a TDG of 1B; therefore, the King Air 200 will still represent the critical TDG. **The future critical aircraft designation is C-II-2 and is a composite of the Challenger 300 (C-II-1B) and the King Air 200 (B-II-2).**

## RUNWAY DESIGN CODE

Each runway is assigned an RDC. The RDC relates to specific FAA design standards that should be met in relation to each runway. The RDC takes into consideration the AAC, ADG, and the RVR. In most cases, the critical design aircraft will also be the RDC for the primary runway.

### Current RDC

Runway 18-36 is the primary runway and should be designed to accommodate the current and future critical design aircraft. This runway is 5,004 feet long and 100 feet wide and has instrument approaches with visibility minimums as low as 1-mile to both ends. Based on the current ALP and forecast of operations by aircraft type, the applicable RDC is **B-II-5000**.

Runway 11-29 is the crosswind runway measuring 4,099 feet long and 75 feet wide. Both ends of the runway have a non-precision instrument approach with visibility minimums of 1-mile. The current ALP for the airport classifies this as a B-I runway. This is the appropriate designation for a crosswind runway at Georgetown Municipal Airport because this runway is primarily intended for small aircraft. **The RDC for Runway 11-29 is B-I(s)-5000.** The (s) designation indicates that this runway is planned for aircraft weighing 12,500 pounds or less.

### Future RDC

The RDC for Runway 18-36 could transition back to C-II within the 20-year planning period. Therefore, the future RDC for this runway is C-II-5000.

The operational mix utilizing crosswind Runway 11-29 is not planned to change over the next 20 years; therefore, the future RDC is B-I(s)-5000.

## APPROACH AND DEPARTURE REFERENCE CODES

The approach and departure reference codes (APRC and DPRC) describe the current operational capabilities of each runway and the adjacent parallel taxiways, where no special operating procedures are



necessary. Essentially, the APRC and DPRC describe the current conditions at an airport in runway classification terms when considering the parallel taxiway.

Taxiway A is 300 feet from Runway 18-36 and Taxiway J is 375 feet from the Runway 11-29, centerline to centerline. Both ends of Runway 18-36 have non-precision instrument approaches with 1-mile visibility minimums. Both ends of Runway 11-29 have visibility minimums of 1-mile. The APRC for Runway 18-36 is B-III-5000/D-II-5000. The DPRC for Runway 18-36 is B-III/D-II. The APRC for Runway 11-29 is B-III-5000. The DPRC for Runway 11-29 is B-III/D-II.

## CRITICAL AIRCRAFT SUMMARY

**Table 2BB** summarizes the airport and runway classification currently and in the future. Operations at the airport by aircraft in ARC C-II have dropped below 500 annually since 2012. Therefore, the critical aircraft is now defined by those aircraft in ARC B-II-5000. In the future, the airport could transition back to ARC C-II, and the long-term plan will consider those design standards. The RDC of crosswind Runway 11-29 is planned to remain B-I(s)-5000. The RVR value for both runways may change in the future based on subsequent analysis in this Master Plan or by determination of FAA Flight Procedures.

**TABLE 2BB**

**Airport and Runway Classifications  
Georgetown Municipal Airport**

	Current	Future
Airport Reference Code (ARC)	B-II	C-II
Airport Design Aircraft	B-II-2	C-II-2
Composite Aircraft	Cessna Citation 560XL/King Air 200	Challenger 300/King Air 200
<b>Runway Design Code (RDC)</b>		
Runway 18-36	B-II-5000	C-II-5000
Runway 11-29	B-I(s)-5000	Same
<b>Approach Reference Code (APRC)</b>		
Runway 18-36	B-III-5000/D-II-5000	Same
Runway 11-29	B-III-5000	Same
<b>Departure Reference Code (DPRC)</b>		
Runway 18-36	B-III/D-II	Same
Runway 11-29	B-III/D-II	Same

Source: FAA AC 150/5300-13A, Airport Design

## SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical design aircraft for the Airport. Based aircraft are forecast to grow from



318 in 2016 to 400 by 2036 for an annual compound growth rate of 1.15 percent. Operations are forecast to grow from 97,346 in 2016 to 133,400 by 2036 for an annual compound growth rate of 1.51 percent.

It is typical to examine aviation demand in an unconstrained environment so that airport management understands the type of growth that may be possible and how to plan for it. However, the constraints at Georgetown are significant enough to warrant limiting the demand in the intermediate to long term. The primary constraint is the current cost to develop facilities, hangars in particular. As a result, the forecasts for both based aircraft and operations follow statistical growth curves in the short term and then have been tempered for the outlying years.

The critical design aircraft for the Airport was determined by examining the FAA TFMSC database of flight plans to and from the Airport. The current critical design aircraft is described as B-II-2 and is best represented by a small-sized business jets, such as the Cessna Citation 560XL and the King Air 200. The future design aircraft is planned transition to C-II-2 and is best represented by the Challenger 300 and King Air 200.

The next step in the planning process is to assess the capabilities of the existing facilities to determine what upgrades may be necessary to meet future demands. The range of forecasts developed here will be taken forward in the next chapter as planning horizon activity levels that will serve as milestones or activity benchmarks in evaluating facility requirements.