
# Chapter Two

# Aviation Activity Forecasts

This chapter contains aviation activity forecasts for St. Cloud Regional Airport over a 20-year planning horizon. Aviation demand forecasts are an important step in the master planning process. Ultimately, they form the basis for future demand-driven improvements at the Airport, they provide data from which to estimate future off airport impacts such as noise and traffic, and they are often incorporated by reference into other studies and policy decisions. This chapter presents aviation activity forecasts for the 20-year planning period for this Master Plan, which use 2011 as the base year because the forecasts were prepared during 2012. This chapter is organized as follows:

- Passenger Demand Analysis
- Forecasting Approaches
- Airline Passenger Forecasts
- Commercial Operations and Fleet Mix Forecasts
- Based Aircraft Forecasts
- Based Aircraft Fleet Mix Forecasts
- General Aviation Operations Forecasts
- Local/Itinerant Operations Forecasts
- Military Operations Forecasts
- Instrument Operations Forecasts
- Peak Operations Forecasts
- Forecast Summary and TAF Comparison

The Federal Aviation Administration's (FAA) 2011-2015 *National Plan of Integrated Airport Systems* (NPIAS) categorized St. Cloud Regional Airport as a "Primary Non-Hub Airport." The NPIAS identifies existing and proposed airports that are significant to the national air transportation system. It contains estimates of costs of airport development projects eligible for federal aid that are needed to meet aviation demand over the next five years.

Master Plan forecasts must be approved by the FAA. It is the FAA's policy, listed in AC 150/5070-6B, *Airport Master Plans*, that FAA approval of forecasts at non-hub airports should be consistent with its Terminal Area Forecast (TAF). The TAF is the annual report of historical aviation data and forecasts for all airports included in the NPIAS (see sidebar for definition). The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements, and to provide information for use by state and local authorities, the aviation industry, and the public. Master plan forecasts for aircraft operations, based aircraft, and passenger enplanements are considered to be consistent with the TAF if they meet the following criteria:

a) Differ by less than 10 percent in the five-year forecast period and less than 15 percent in the 10-year or 20-year period, or
b) Do not affect the timing or scale of an airport project, or
c) 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*.

Since they will impact the timing and/or scale of projects, the forecasts contained in this chapter will be compared to TAF forecasts at the 5, 10, and 20 year time periods.

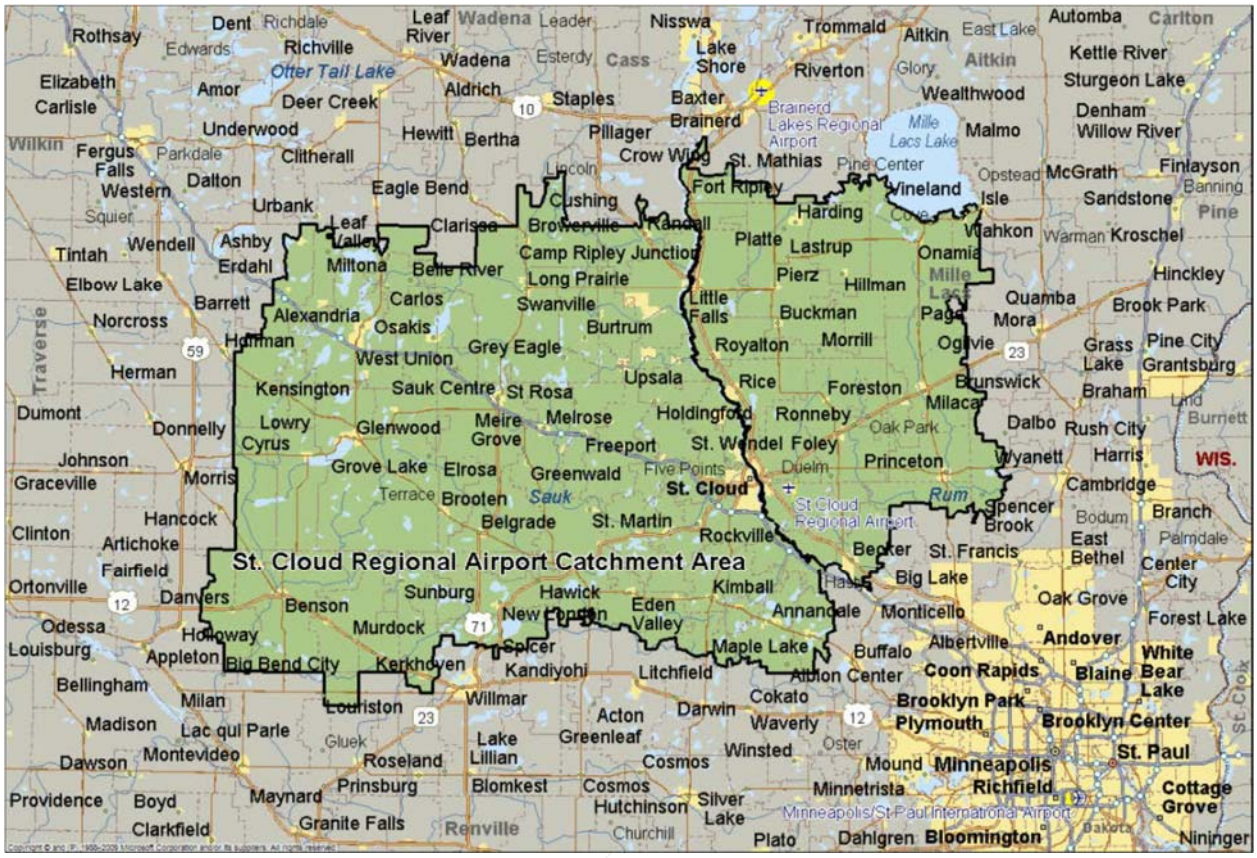
## 2.1 Passenger Demand Analysis

Scheduled air service was discontinued at St. Cloud Regional Airport beginning in January of 2010. In 2011, Mead & Hunt conducted a Passenger Demand Analysis for the Airport with the objective of developing information on the travel patterns of local airline passengers who reside in the Airport's geographic vicinity. The report provides an understanding of the air service situation at the Airport and formulates strategies for potential renewal of scheduled air service. Specifically, this analysis examined:

- The originating airports used by air travelers
- An estimate of total airline passengers in the catchment area on a destination basis
- Airlines used by local air travelers
- Average airfares by origin and destination airport
- Service opportunities in the St. Cloud Regional Airport market

An airport catchment area, or service area, is a geographic area surrounding an airport where it can reasonably expect to draw passenger traffic. The catchment area represents the area which STC can reasonably serve when comparing drive times to surrounding airports. STC's true market size was determined for the catchment area identified in **Exhibit 2-1**. The catchment area has 76 zip codes and an estimated population of 379,166 in 2011. Overall, 98 percent of STC catchment area travelers used Minneapolis-St. Paul International Airport (MSP), one percent used Brainerd Lakes Regional Airport (BRD) and one percent used Fargo's Hector International Airport (FAR). The STC catchment area is bordered to the southeast by MSP (approximately 80 miles away from the City of St. Cloud), to the north by BRD (approximately 70 miles away), and to the northwest by FAR (approximately 180 miles).

**Exhibit 2-1: Airport Catchment Area**




In 2011, domestic travelers accounted for 91 percent (477,801 passenger boardings) of the catchment area's total true market, while international travelers made up the remaining 47,833 (nine percent) of air travelers.

In 2011, 55 percent of travelers were destined for one of the top 25 markets in the United States. Orlando was the number one market with approximately four percent of all travel, followed by Phoenix, Chicago, Las Vegas, and Dallas. The top three international destinations were: Cancun, Mexico; Toronto, Canada; and Vancouver, Canada.

Regardless of the originating airport, Delta Air Lines served 73 percent of catchment area passengers in 2011, US Airways served seven percent, United Airlines/Continental Airlines and American Airlines each flew six percent, Sun Country flew three percent, Frontier Airlines/Midwest Airlines and Southwest Airlines/AirTran Airways each served two percent, and various other airlines carried the remaining one percent of catchment area passengers.

The Passenger Demand Analysis notes that replacement service to MSP is unlikely. However, with 240 passengers daily each way among the top 50 STC markets destined for Chicago or other eastern points and 60 passengers daily each way destined for St. Louis, Memphis, New Orleans, and Texas points, regional jet service to Chicago should be economically viable. This would require 30 to 40 percent of the catchment area potential in these markets to support scheduled air service at STC.

## 2.2 Forecasting Approaches

The goal of this chapter is to expand upon and evaluate the suitability of the FAA TAF forecasts for the St. Cloud Regional Airport. To do this, new forecasts need to be created. There is no one "correct" or "best" way to create forecasts for a given airport. Just as historic trends, national activity levels, and local demographics all play a role in determining current Airport activity levels, all of these factors will play a role in determining future activity. Given the many different factors that influence aviation activity, variations of three broad forecasting methodologies were used to create a series of scenarios for the Airport. The three methodologies are:

- Time-Series (assumes that historic trends will continue into the future)
- Market Share (assumes that the local share of national aviation activity will remain largely constant)
- Socioeconomic (assumes that aviation activity will change at the same rate as population and/or personal income)

### 2.2.1 Time-Series Methodologies

Time-series methodologies create forecasts by assuming patterns that have occurred in the past will continue into the future. These methodologies are most useful for a pattern of demand that demonstrates a historical relationship with time, as they assume that future trends will continue to mimic past trends and that the factors that affected those trends in the past will continue to do so in the future.

### 2.2.2 Market Share Methodology

Market share methodologies look at the national or regional quantity of a given activity (enplanements, operations, etc.) and determine what percentage of this activity occurs at the St. Cloud Regional Airport. This percentage is the Airport's "market share" of the activity in question. The methodology then assumes that this market share will remain constant throughout the forecast period. The market share analysis implies the local proportion of activity is regular and predictable. Because many aspects of an airport (location, type of facilities, and appeal for travelers) remain relatively constant over time, market share methodologies are used extensively in the aviation industry.

### 2.2.3 Socioeconomic Methodologies

Though time series and market share analysis may provide mathematical and formulaic justification for demand forecasts, there are other factors that may impact local aviation demand. The socioeconomic factors examined in this chapter are population and per capita income trends. Based upon the observed and projected correlation between historical aviation activity and socioeconomic data sets, future aviation activity forecasts can be developed. Local population and per capita income can be a strong indicator of commercial aviation demand, particularly at small hub and non-hub airports. The socioeconomic methodologies compare historical population and per capita income figures to passenger enplanements and based aircraft at the St. Cloud Regional Airport.

## 2.3 Airline Passenger Forecasts

Enplanements are defined as the activity of passengers boarding commercial service aircraft that depart an airport. Enplanements include passengers on all sizes of scheduled commercial service aircraft, and un-scheduled charter aircraft with more than 60 passenger seats, but do not include the airline crew. Forecasting passenger enplanements is an important part of the Master Planning process. Passenger enplanements are the driver for many internal terminal and external Airport improvements such as interior spaces and ground transportation infrastructure, and also impact overall airport finances.

Historical passenger enplanement data has been assessed in conjunction with the potential for new commercial service to identify forecasts of future passenger demand. It should be noted that while the passenger enplanement projections contained in the most recent FAA TAF do not anticipate a return of scheduled passenger service to STC in the future, the forecasts in this Master Plan consider several scenarios for returned scheduled service. As a result, the enplanement forecasts in this Master Plan do not fall in line with the TAF consistency guidelines described in AC 150/5070-6B. This section examines data that pertains to passenger enplanements and describes enplanement projections in the following subsections:

- Enplanement history
- FAA TAF enplanement data and projections
- Method comparison and preferred projection methodology

### 2.3.1 Recent Enplanement History

National trends in aviation demand have been volatile in recent years. The events that occurred on September 11, 2001 had a significant impact on collective national travel behavior. The economic recession that began in 2008 has also resulted in fewer passenger enplanements at several airports in the U.S. As mentioned previously, scheduled commercial service was halted at St. Cloud Regional Airport in 2010.

Passenger enplanement data is provided to Airport management on a periodic basis by commercial passenger airlines. Historic passenger enplanements at St. Cloud Regional Airport are presented in **Table 2-1**. The Airport saw passenger enplanements at the Airport hold relatively steady from 2001 to 2008, with a peak of 26,724 enplanements occurring in 2007. Enplanements then declined to 219 in 2011.

| Table 2-1: Passenger Enplanement History | |
|---|---|
| **Year** | **Passenger Enplanements** |
| 2001 | 23,113 |
| 2002 | 22,739 |
| 2003 | 20,375 |
| 2004 | 22,073 |
| 2005 | 26,064 |
| 2006 | 26,070 |
| 2007 | 26,724 |
| 2008 | 21,254 |
| 2009 | 15,331 |
| 2010 | 1,207 |
| 2011 | 219 |
| *CAGR (2001-2011)* | *-37.24%* |

*Source: Airport Records*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.3.2 Federal Aviation Administration Terminal Area Forecast (TAF)

The FAA records passenger enplanements for all commercial service airports and releases its TAF annually. It should be noted that annual data is based on the Federal fiscal year (October through September) rather than the calendar year, so historical figures differ slightly from the Airport's records.

As shown in **Table 2-2**, the FAA projects that passenger enplanements at St. Cloud Regional Airport will remain constant through 2031. This forecast assumes that scheduled commercial service will not return to the Airport at any time within the next 20 years.

| Table 2-2: FAA Passenger Enplanements - TAF | |
|---|---|
| **Year** | **Passenger Enplanements** |
| 2001 | 22,044 |
| 2002 | 21,631 |
| 2003 | 19,825 |
| 2004 | 21,641 |
| 2005 | 23,041 |
| 2006 | 25,215 |
| 2007 | 26,422 |
| 2008 | 21,587 |
| 2009 | 15,725 |
| 2010 | 3,616 |
| 2011 | 372 |
| *CAGR (2001-2011)* | *-33.51%* |
| 2016 | 372 |
| 2021 | 372 |
| 2026 | 372 |
| *2031* | 372 |
| *CAGR (2011-2031)* | *0.00%* |

*Source: FAA Terminal Area Forecast, January 2012*
*Note: CAGR=Compounded Annual Growth Rate*
**Estimated*

### 2.3.3 Passenger Enplanement Projections, Short Term (1-5 years)

Based on an assessment of potential re-emergence of commercial air service to St. Cloud Regional Airport as well as other factors such as socioeconomic data, projections of passenger enplanements have been developed based upon establishment of several viable routes identified by the Passenger Demand Analysis.

**Table 2-3** identifies six different types of feasible air service routes that could occur at STC. They are classified into two groups: leisure and business. Leisure routes include non-stop, scheduled service offered by a low-cost carrier to destinations such as Las Vegas (LAS), Phoenix (IWA) and Orlando (SFB) on a weekly basis. Low-cost carriers often fly routes with higher-capacity (150 seat and larger) aircraft at least twice per week. Business routes include daily, non-stop service to major hub airports such as Chicago-O'Hare (ORD), Denver (DEN) and Dallas-Fort Worth (DFW). Regional jets, of both 50 and 70 seat capacities, are typically utilized for providing service from regional non-hub airports like STC to major hubs.

**Table 2-3: Feasible Air Service Routes**

| # | Route Type | Typical Destinations | Flights | Frequency | Aircraft Type | Seats | Load Factor | Annual Enplanements |
|---|---|---|---|---|---|---|---|---|
| 1 | Business | ORD, DEN, DFW | 2 | Daily | Regional Jet | 50 | 75% | 27,375 |
| 2 | Business | ORD, DEN, DFW | 2 | Daily | Regional Jet | 70 | 70% | 35,770 |
| 3 | Business | ORD, DEN, DFW | 3 | Daily | Regional Jet | 50 | 75% | 41,063 |
| 4 | Business | ORD, DEN, DFW | 3 | Daily | Regional Jet | 70 | 70% | 53,655 |
| 5 | Leisure | LAS, SFB, IWA | 2 | Weekly | Large Jet | 166 | 90% | 15,538 |
| 6 | Leisure | LAS, SFB, IWA | 3 | Weekly | Large Jet | 166 | 90% | 23,306 |

The addition and development of aforementioned routes can vary greatly, so both moderate growth and rapid growth scenarios are considered when developing enplanement forecasts in the near term (2012 – 2016). It is important to note that these scenarios and forecasts were developed prior to the re-initiation of regular passenger service at STC in December 2012.

Moderate Growth Forecast

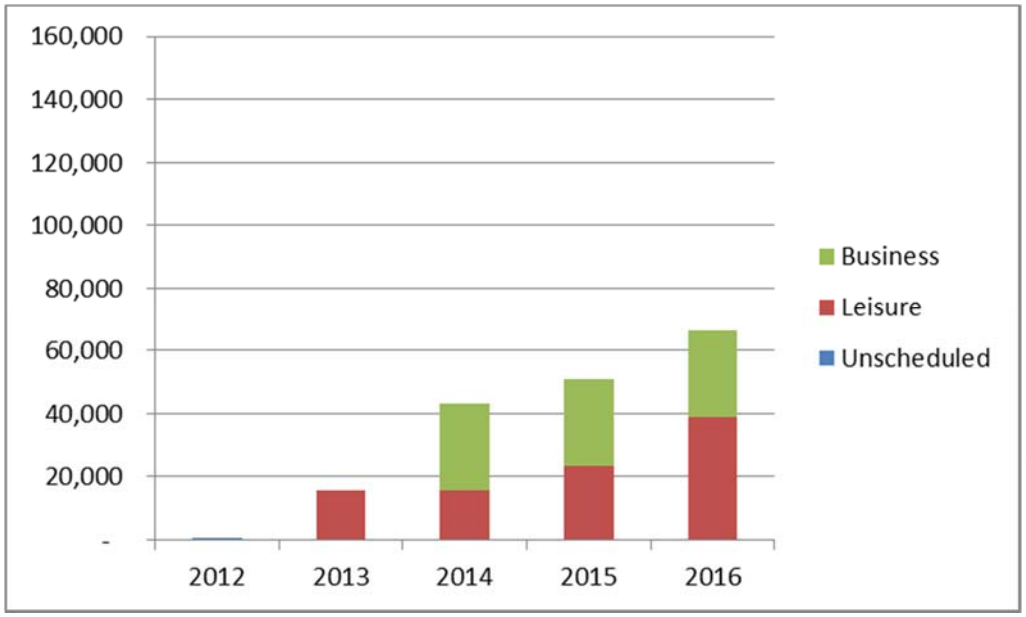
In the moderate-growth scenario, a leisure route is first established by a low-cost carrier at the frequency of two times per week. A third weekly flight is added after about one year and a second leisure route is added within 5 years, assuming the initial service proves successful. This scenario also assumes that a business route (hub connection) is provided by the third year of the near term projections. Provisions are not provided for a phased shift to a larger, 70-seat regional jet in this scenario.

The moderate growth scenario is represented in **Table 2-4** and **Chart 2-1** below.

**Table 2-4: Passenger Enplanements, Moderate Growth**

| Year | Unscheduled | Leisure | Business | Total | Scenario |
|---|---|---|---|---|---|
| 2012 | 219 | 0 | 0 | 219 | |
| 2013 | 219 | 15,538 | 0 | 15,757 | 5 |
| 2014 | 219 | 15,538 | 27,375 | 43,132 | 1 and 5 |
| 2015 | 219 | 23,306 | 27,375 | 50,900 | 1 and 6 |
| 2016 | 219 | 38,844 | 27,375 | 66,438 | 1,5, and 6 |

**Chart 2-1: Passenger Enplanements, Moderate Growth**




Rapid Growth Forecast

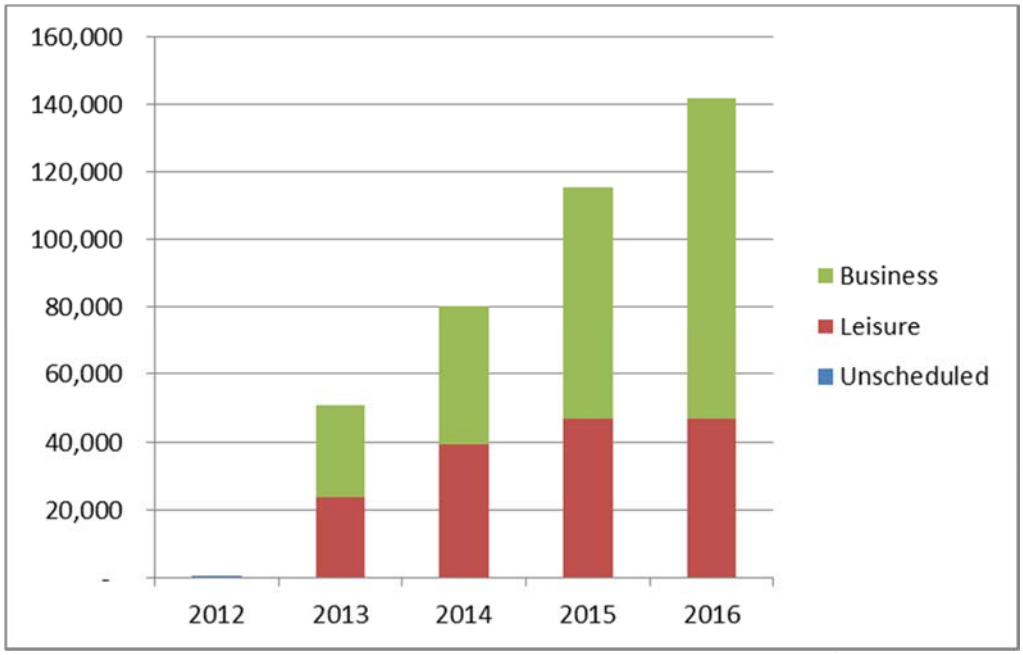
The rapid growth forecast assumes that both business and leisure air carriers establish service at STC in 2013. In addition, it is assumed that both categories of service prove successful at the beginning and that the airlines have capacity to expand service frequency, add routes and incorporate larger regional jets into their schedules. By 2016, STC would offer service to two leisure destinations and two business destinations in this scenario. While this forecast assumes faster growth than the moderate growth forecast, it does not include a third route for either type of air service.

The rapid growth scenario is presented in **Table 2-5** and **Chart 2-2**.

**Table 2-5: Passenger Enplanements, Rapid Growth**

| Year | Unscheduled | Leisure | Business | Total | Scenario |
|---|---|---|---|---|---|
| 2012 | 219 | 0 | 0 | 219 | |
| 2013 | 219 | 23,306 | 27,375 | 50,900 | 1 and 6 |
| 2014 | 219 | 38,844 | 41,063 | 80,126 | 3,5, and 6 |
| 2015 | 219 | 46,612 | 68,438 | 115,269 | 1,3,6, and 6 |
| 2016 | 219 | 46,612 | 94,718 | 141,549 | 3,4,6, and 6 |

**Chart 2-2: Passenger Enplanements, Rapid Growth**




### 2.3.4 Passenger Enplanement Projections, Intermediate- and Long-Term Forecasts (6-20 years)

Because it is difficult to anticipate demand for feasible air service routes in the long term, STC enplanements are expected to follow national trends of the Total Air Carrier and Air Taxi Operations as projected by the FAA in its Aerospace Forecasts 2011-2031, at a minimum. The national trend CAGR of 2.01% is applied to both the moderate and rapid growth forecasts using base year 2016 to determine anticipated enplanement values for the remainder of the planning period. Intermediate and long term forecasts are shown in **Table 2-6** below.

**Table 2-6: Passenger Enplanement Comparison**

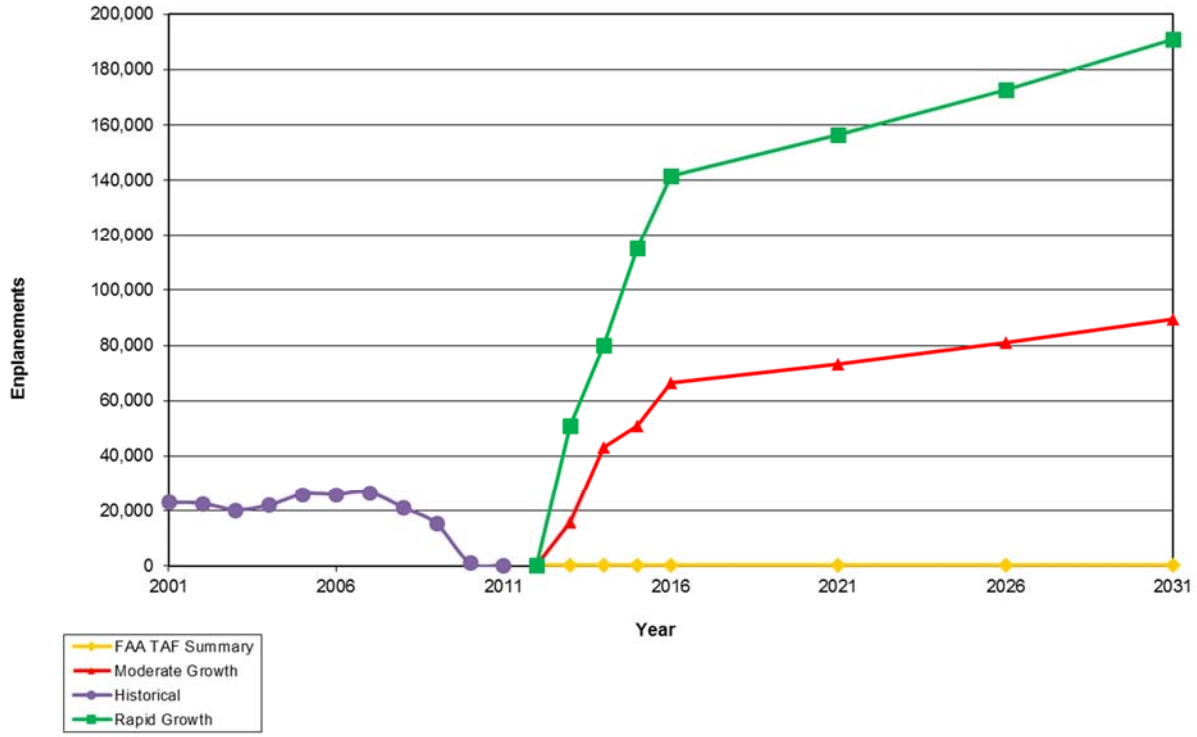
| Year | Historical | FAA TAF Summary | Moderate Growth | Rapid Growth |
|---|---|---|---|---|
| **Historical** | | | | |
| 2001 | 23,113 | | | |
| 2002 | 22,739 | | | |
| 2003 | 20,375 | | | |
| 2004 | 22,073 | | | |
| 2005 | 26,064 | | | |
| 2006 | 26,070 | | | |
| 2007 | 26,724 | | | |
| 2008 | 21,254 | | | |
| 2009 | 15,331 | | | |
| 2010 | 1,207 | | | |
| 2011 | 219 | | | |
| *CAGR (2001-2011)* | *-37.24%* | | | |
| **Projected:** | | | | |
| 2012 | | 372 | 219 | 219 |
| 2013 | | 372 | 15,757 | 50,900 |
| 2014 | | 372 | 43,132 | 80,126 |
| 2015 | | 372 | 50,900 | 115,269 |
| 2016 | | 372 | 66,438 | 141,549 |
| *CAGR (2011-2016)* | | *11.18%* | *213.61%* | *264.83%* |
| 2021 | | 372 | 73,389 | 156,358 |
| 2026 | | 372 | 81,067 | 172,717 |
| 2031 | | 372 | 89,548 | 190,787 |
| *CAGR (2011-2031)* | | *2.68%* | *35.08%* | *40.28%* |
| *CAGR (2016-2031)* | | *0.00%* | *2.01%* | *2.01%* |

Notes: CAGR = Compounded annual growth rate.
Sources: Historical Enplanements - Airport Records
Projections - Mead & Hunt, Inc., FAA Terminal Area Forecast

Table 2-6 illustrates historical enplanements and projected TAF enplanements, as well as moderate and rapid growth 20-year enplanement projections.

**Chart 2-3** provides a graphical comparison of the historical, FAA Terminal Area Forecasts, and enplanement projections for STC.

**Chart 2-3: Passenger Enplanement Forecasts**




## 2.4 Aircraft Operations and Fleet Mix Forecasts

Aircraft operations comprise both aircraft takeoffs and landings, and fleet mix refers to the various types and sizes of aircraft operating at an Airport. Aircraft operations and fleet mix forecasts are directly tied to the expected demand for overall aviation activity at an Airport, and have implications for whether the Airport has adequate capacity in place to accommodate this activity. The following sections describe aircraft operation and fleet mix forecasts. As with passenger enplanements, several factors are taken into account when assessing demand in both commercial and non-commercial operations. Forecasts have been developed for the following categories:

- Commercial Operations
- Air Carrier Fleet Mix
- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Local/Itinerant General Aviation Operations
- Military Operations
- Instrument Operations

### 2.4.1 Commercial Operations and Fleet Mix

This section presents commercial operations and fleet mix forecasts for the Airport. Commercial operation projections were developed for both passenger enplanement forecast scenarios described in the previous section. In 2011, there were 391 commercial operations at the Airport; however these were mostly unscheduled air taxi operations for which enplanements are not reported. In the short-term (2012-2016), annual aircraft operations were calculated using the aircraft types and assumed load factors for the airline route scenarios associated with each forecast year. In the long-term (2017-2031), commercial operations are anticipated to proportionally increase at the same rate as passenger enplanements. A summary of the passenger enplanement and commercial operations forecasts is presented in **Table 2-7**. The moderate growth forecast predicts commercial operations at the Airport will grow to 3,410 in 2031, while the rapid growth forecast predicts that commercial operations will grow to 8,605 in 2031.

**Table 2-7: Commercial Operations Projection**

| Year | Passenger Enplanements (Moderate) | Commercial Operations (Moderate) | Passenger Enplanements (Rapid) | Commercial Operations (Rapid) |
|---|---|---|---|---|
| 2011 | 219 | 391 | 219 | 391 |
| 2016 | 66,438 | 1,980 | 141,549 | 5,004 |
| 2021 | 73,389 | 3,088 | 156,358 | 7,042 |
| 2026 | 81,067 | 3,410 | 172,717 | 7,777 |
| 2031 | 89,548 | 3,773 | 190,787 | 8,605 |

*Source: Airport Records, FAA Aerospace Forecasts FY2011-2031, Woods & Poole, Inc. Mead & Hunt, Inc.*
*Note: CAGR=Compounded Annual Growth Rate*

**Tables 2-8** and **2-9** present the projected commercial passenger fleets based on both the moderate and rapid growth enplanement scenarios. Although the commercial fleet mix may change over time, for the purposes of this Master Plan Update, the short term mix is held constant throughout the projection period. The moderate growth forecast predicts 73.7 percent of operations will be conducted with 40 to 60 seat aircraft like the CRJ-200 in each forecast year, with the remainder of operations conducted by aircraft with more than 131 seats, like the Boeing 737. The rapid growth forecast predicts a more varied commercial fleet, with 43.8 percent of operations conducted by 40 to 60 seat aircraft, 43.8 percent conducted by 61 to 99 seat aircraft, and 12.5 percent conducted by aircraft with more than 131 seats.

| Table 2-8: Commercial Passenger Departures and Fleet Mix Projections – Moderate Growth | | | | | | |
|---|---|---|---|---|---|---|
| | | Historical Departures | Projected Departures | | | |
| **Seat Range** | **Typical Aircraft** | **2011** | **2016** | **2021** | **2026** | **2031** |
| Less than 40 | Saab 340, 328Jet, ERJ 135 | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* |
| 40-60 | CRJ 200, ERJ145 | 0<br>*0.0%* | 730<br>*73.7%* | 1,138<br>*73.7%* | 1,257<br>*73.7%* | 1,391<br>*73.7%* |
| 61-99 | Avro RJ, CRJ 700, CRJ 900, EMB 170 | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* |
| 100-130 | B717, DC9, EMB 190, EMB 195 | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* |
| 131 or more | A319, A320, MD80, B737 | 0<br>*0.0%* | 260<br>*26.3%* | 405<br>*26.3%* | 448<br>*26.3%* | 495<br>*26.3%* |
| **Total Commercial Passenger Departures** | | **0** | **990** | **1,544** | **1,705** | **1,887** |

*Source: Mead & Hunt, Inc.*

| Table 2-9: Commercial Passenger Departures and Fleet Mix Projections – Rapid Growth | | | | | | |
|---|---|---|---|---|---|---|
| | | Historical Departures | Projected Departures | | | |
| **Seat Range** | **Typical Aircraft** | **2011** | **2016** | **2021** | **2026** | **2031** |
| Less than 40 | Saab 340, 328Jet, ERJ 135 | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* |
| 40-60 | CRJ 200, ERJ145 | 0<br>*0.0%* | 1,095<br>*43.8%* | 1,541<br>*43.8%* | 1,702<br>*43.8%* | 1,883<br>*43.8%* |
| 61-99 | Avro RJ, CRJ 700, CRJ 900, EMB 170 | 0<br>*0.0 %* | 1,095<br>*43.8%* | 1,541<br>*43.8%* | 1,702<br>*43.8%* | 1,883<br>*43.8%* |
| 100-130 | B717, DC9, EMB 190, EMB 195 | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* | 0<br>*0.0 %* |
| 131 or more | A319, A320, MD80, B737 | 0<br>*0.0%* | 312<br>*12.5%* | 439<br>*12.5%* | 485<br>*12.5%* | 537<br>*12.5%* |
| **Total Commercial Passenger Departures** | | **0** | **2,502** | **3,521** | **3,889** | **4,303** |

*Source: Mead & Hunt, Inc.*

### 2.4.2 Based Aircraft

This Master Plan also reviews based aircraft statistics in order to forecast future based aircraft at St. Cloud Regional Airport. Based aircraft forecasts are used to determine future needs for items including, but not limited to, hangars, tie-downs, and FBO services. These based aircraft forecasts will also be used in one of the methodologies that will forecast general aviation operations.

There are several factors that affect the number of aircraft based at an airport. The overall cost to own and operate an aircraft has increased significantly in recent years, which has contributed to a slight decline the U.S. general aviation fleet since 2007. Based aircraft at St. Cloud Regional Airport have increased despite this national trend, rising from 85 in 2001 to 106 in 2011. Several methodologies have been employed in the development of based aircraft projections.

#### 2.4.2.1 Linear Trend Line Methodology

The linear trend line methodology – which assumes that historic trends will continue in the future but that more heavily weights variations than the growth rate methodology – projects an increase in based aircraft from 106 in 2011 to 159 in 2031, a CAGR of 2.06 percent (see **Table 2-10**).

**Table 2-10: Based Aircraft Forecasts – Trend Line Methodology**

| Year | Based Aircraft |
|---|---|
| 2001 | 85 |
| 2002 | 85 |
| 2003 | 85 |
| 2004 | 95 |
| 2005 | 103 |
| 2006 | 105 |
| 2007 | 105 |
| 2008 | 105 |
| 2009 | 105 |
| 2010 | 105 |
| 2011 | 106 |
| *CAGR (2001-2011)* | *2.23%* |
| 2016 | 123 |
| 2021 | 135 |
| 2026 | 147 |
| 2031 | 159 |
| *CAGR (2011-2031)* | *2.06%* |

*Source: FAA TAF, Mead & Hunt, Inc.*

### 2.4.2.2. Market Share Methodology

St. Cloud Regional Airport's market share of the total U.S. general aviation fleet has increased steadily from 0.039 percent in 2001 to 0.047 percent in 2011. This market share methodology assumes that the Airport's market share 2011 market share of 0.047 percent of total active U.S. aircraft will remain constant throughout the forecast period. This percentage was applied to the total number of aircraft in the U.S. fleet forecasted by the FAA Aerospace Forecasts FY2011-2031 (see **Table 2-11**). This methodology predicts a slow but steady increase in based aircraft, rising from 106 in 2011 to 128 in 2031, a CAGR of 0.94 percent.

**Table 2-11: Based Aircraft Forecasts – Market Share Methodology**

| Year | STC Based Aircraft | Total U.S. Active Aircraft | STC Market Share |
|---|---|---|---|
| 2001 | 85 | 217,533 | 0.03907% |
| 2002 | 85 | 211,446 | 0.04020% |
| 2003 | 85 | 211,244 | 0.04024% |
| 2004 | 95 | 209,606 | 0.04532% |
| 2005 | 103 | 224,350 | 0.04591% |
| 2006 | 105 | 221,939 | 0.04731% |
| 2007 | 105 | 231,606 | 0.04534% |
| 2008 | 105 | 228,668 | 0.04592% |
| 2009 | 105 | 223,920 | 0.04689% |
| 2010 | 105 | 224,172 | 0.04684% |
| 2011 | 106 | 224,475 | 0.04722% |
| *Average (2001-2011)* | | | *0.04457%* |
| 2016 | 109 | 230,650 | 0.04722% |
| 2021 | 113 | 240,045 | 0.04722% |
| 2026 | 120 | 253,490 | 0.04722% |
| 2031 | 128 | 270,920 | 0.04722% |
| *CAGR (2011-2031)* | *0.94%* | *0.94%* | |

*Source: FAA TAF, FAA Aerospace Forecasts 2011-2031, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.2.3. Socioeconomic Methodology – Income Variable

Income can often be a strong indicator of one's ability to own an aircraft. The socioeconomic income variable methodology compares historical based aircraft at St. Cloud Regional Airport to average per capita income in Benton, Stearns, and Sherburne Counties. According to data obtained by Woods & Poole, Inc., an economic forecasting firm, per capita income within these counties has remained relatively consistent between 2001 and 2011. Income is identified using 2004 dollars in order to adjust for inflation. Between 2001 and 2011, based aircraft per $100 income increased from 0.308 to 0.386. The average number of based aircraft per $100 of income within Benton, Stearns, and Sherburne Counties from 2001-2011 at the Airport was 0.35835. This figure is applied to Woods & Poole projections of per capita income as shown in **Table 2-12**. This method predicts slow but steady growth in based aircraft, rising from 106 in 2011 to 129 in 2031, a CAGR of 0.97 percent.

**Table 2-12: Based Aircraft Forecasts – Socioeconomic Methodology-Income Variable**

| Year | Based Aircraft | Per Capita Income ($2004) | Based Aircraft Per $100 Income |
|---|---|---|---|
| 2001 | 85 | $27,568 | 0.30833 |
| 2002 | 85 | $27,613 | 0.30783 |
| 2003 | 85 | $27,835 | 0.30537 |
| 2004 | 95 | $27,798 | 0.34176 |
| 2005 | 103 | $27,234 | 0.37820 |
| 2006 | 105 | $27,506 | 0.38173 |
| 2007 | 105 | $27,799 | 0.37771 |
| 2008 | 105 | $27,667 | 0.37951 |
| 2009 | 105 | $27,002 | 0.38886 |
| 2010 | 105 | $27,181 | 0.38630 |
| 2011 | 106 | $27,440 | 0.38630 |
| *Average (2001-2011)* | | | *0.35835* |
| 2016 | 104 | $28,945 | 0.35835 |
| 2021 | 112 | $31,196 | 0.35835 |
| 2026 | 120 | $33,380 | 0.35835 |
| 2031 | 129 | $35,873 | 0.35835 |
| *CAGR (2001-2031)* | *0.97%* | *1.35%* | |

*Source: FAA TAF, Mead & Hunt, Inc., Woods & Poole, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.2.4. Socioeconomic Methodology – Population Variable

The socioeconomic population variable methodology is another way to forecast based aircraft at an airport. This methodology compares historical based aircraft at St. Cloud Regional Airport with the total population of Benton, Stearns, and Sherburne Counties. Between 2001 and 2011, the population of these counties increased from 239,904 to 289,905. During that same timeframe, based aircraft per capita increased slightly from 0.00035 to 0.00037. The 2011 figure of 0.00037 based aircraft per capita is applied to population projections of the Airport's catchment area as shown in **Table 2-13**. This methodology predicts strong growth in based aircraft, rising from 106 in 2011 to 148 in 2031, a CAGR of 1.69 percent.

**Table 2-13: Based Aircraft Forecasts – Socioeconomic Methodology – Population Variable**

| Year | Based Aircraft | Population | Based Aircraft Per Capita |
|---|---|---|---|
| 2001 | 85 | 239,904 | 0.00035 |
| 2002 | 85 | 247,049 | 0.00034 |
| 2003 | 85 | 252,821 | 0.00034 |
| 2004 | 95 | 257,501 | 0.00037 |
| 2005 | 103 | 262,528 | 0.00039 |
| 2006 | 105 | 267,465 | 0.00039 |
| 2007 | 105 | 271,596 | 0.00039 |
| 2008 | 105 | 274,614 | 0.00038 |
| 2009 | 105 | 279,703 | 0.00038 |
| 2010 | 105 | 284,808 | 0.00037 |
| 2011 | 106 | 289,905 | 0.00037 |
| *Average (2001-2011)* | | | *0.00037* |
| 2016 | 117 | 315,789 | 0.00037 |
| 2021 | 129 | 347,467 | 0.00037 |
| 2026 | 139 | 374,099 | 0.00037 |
| 2031 | 148 | 400,858 | 0.00037 |
| *CAGR (2011-2031)* | *1.69%* | *1.63%* | |

*Source: FAA TAF, Mead & Hunt, Inc., Woods & Poole, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.2.5. Preferred Projection Methodology

A comparison of the based aircraft forecasts created using the methodologies described in previous sections is shown in **Table 2-14** and **Chart 2-4**. All of the methodologies anticipate that there will be an increase in based aircraft over the next 30 years.

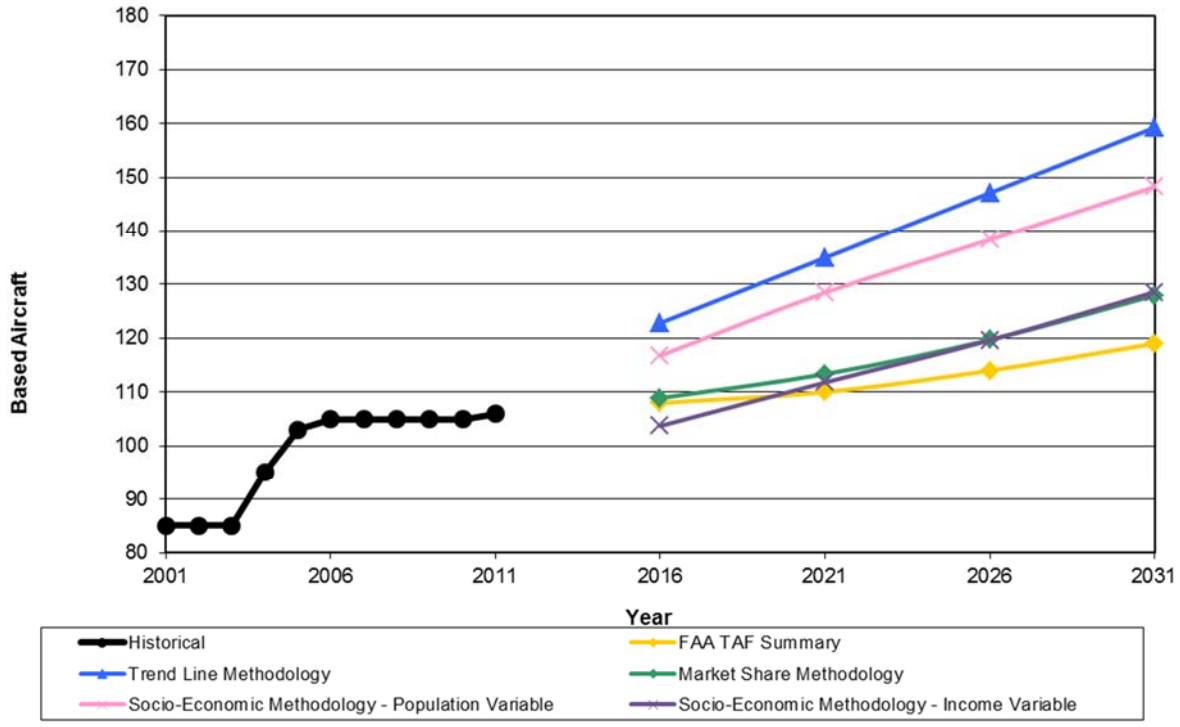
**Table 2-14: Based Aircraft Forecasts – Projection Comparison and Preferred Methodology**

| Year | FAA TAF Summary | Linear Trend Line Methodology | Market Share Methodology | Socioeconomic Methodology – Population Variable | Socioeconomic Methodology – Income Variable |
|---|---|---|---|---|---|
| 2011 | 107 | 107 | 107 | 107 | 107 |
| 2016 | 108 | 123 | 109 | 117 | 104 |
| 2021 | 111 | 135 | 113 | 128 | 112 |
| 2026 | 115 | 147 | 120 | 138 | 120 |
| 2031 | 120 | 159 | 128 | 148 | 129 |
| *CAGR (2011-2031)* | *0.57%* | *2.06%* | *0.94%* | *1.69%* | *0.97%* |

*Source: FAA TAF, FAA Aerospace Forecasts, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

**Chart 2-4: Based Aircraft Forecast Comparison**



The linear trend line methodology results in a variation of more than 10 percent from the TAF during the 5-year period. Both the linear trend line methodology and the socioeconomic population variable methodology result in variations of more than 15 percent from the TAF during both the 10-year and 20-year periods. As a result, these two forecasts are considered inconsistent with the TAF according to FAA definitions.

The remaining methodologies are the market share methodology and the socioeconomic income variable methodology. Neither of these methodologies results in forecasts that are inconsistent with the TAF, and both methodologies result in similar forecasts of based aircraft throughout the planning period. As discussed previously, the St. Cloud Regional Airport's market share of the total U.S. general aviation fleet increased from 0.039 percent in 2001 to 0.048 percent in 2011. It is assumed that the 2011 market share figure of 0.048 based aircraft at the Airport compared with the total U.S. fleet will remain constant throughout the projection period. As such, the market share methodology is the preferred forecast for based aircraft.

### 2.4.3 Based Aircraft Fleet Mix

The FAA TAF distinguishes between five categories of based aircraft: single-engine, multi-engine, jet, helicopter, and other aircraft (such as gliders or military aircraft). In general, these aircraft categories have different dimensions and performance characteristics, and as a result have different requirements in terms of airport facilities. Therefore, it is important to determine the breakdown of aircraft within these categories for the based aircraft forecast.

Historical based aircraft by type and the projected based aircraft fleet mix at St. Cloud Regional Airport is shown in Table 2-15. In 2011, 83 percent of the local fleet was comprised of single engine aircraft, 5 percent multi-engine aircraft, 8 percent jet aircraft, and 9 percent other.

From 2001 to 2011, the proportion of jet aircraft in the based fleet increased steadily from 2 percent to 8 percent. The FAA Aerospace Forecasts FY2011-2031 projects that jet aircraft will see the most significant growth of any type of aircraft through 2031. This is a trend that is also anticipated to occur locally as jet aircraft are expected to proportionally increase by an additional 3 percent by 2031. Conversely, single engine aircraft are expected to lose four percent of the local fleet by 2031.

| Table 2-15: Based Aircraft Fleet Mix Forecasts | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Single Engine | | Multi Engine | | Jet | | Helicopter | | Other | | |
| Year | # | % | # | % | # | % | # | % | # | % | Total |
| 2001 | 73 | 86% | 8 | 9% | 2 | 2% | 2 | 2% | 0 | 0% | 85 |
| 2002 | 73 | 86% | 8 | 9% | 2 | 2% | 2 | 2% | 0 | 0% | 85 |
| 2003 | 73 | 86% | 8 | 9% | 2 | 2% | 2 | 2% | 0 | 0% | 85 |
| 2004 | 78 | 82% | 10 | 11% | 5 | 5% | 2 | 2% | 0 | 0% | 95 |
| 2005 | 87 | 84% | 10 | 10% | 4 | 4% | 2 | 2% | 0 | 0% | 103 |
| 2006 | 87 | 83% | 10 | 10% | 6 | 6% | 2 | 2% | 0 | 0% | 105 |
| 2007 | 87 | 83% | 10 | 10% | 6 | 6% | 2 | 2% | 0 | 0% | 105 |
| 2008 | 87 | 83% | 10 | 10% | 6 | 6% | 2 | 2% | 0 | 0% | 105 |
| 2009 | 87 | 83% | 10 | 10% | 6 | 6% | 2 | 2% | 0 | 0% | 105 |
| 2010 | 82 | 78% | 5 | 5% | 8 | 8% | 0 | 0% | 10 | 10% | 106 |
| 2011 | 83 | 78% | 5 | 5% | 8 | 8% | 0 | 0% | 10 | 9% | 107 |
| *Projected* | | | | | | | | | | | |
| 2016 | 83 | 76% | 5 | 5% | 11 | 10% | 0 | 0% | 10 | 9% | 109 |
| 2021 | 84 | 74% | 6 | 5% | 14 | 12% | 0 | 0% | 11 | 9% | 113 |
| 2026 | 86 | 72% | 7 | 6% | 16 | 13% | 0 | 0% | 11 | 9% | 120 |
| 2031 | 90 | 70% | 8 | 6% | 19 | 15% | 0 | 0% | 12 | 9% | 128 |
| *CAGR (2011-2031)* | *2.19%* | | *2.17%* | | *4.47%* | | *0.00%* | | *0.00%* | | *0.94%* |

*Source: FAA TAF, FAA Aerospace Forecasts, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.4 General Aviation Operations

General aviation operations are those which are not categorized as commercial or military. General aviation includes a variety of users and activities, including corporate and business operators, cargo operators, recreational users, flight training, agricultural applications, and law enforcement and other government uses. Based on historical ATCT data, general aviation operations account for approximately 94 percent of total aircraft operations at St. Cloud Regional Airport. General aviation activity at the Airport declined significantly between 2001 and 2009, a trend that occurred nationally due primarily to the increase in the cost of aircraft ownership and operation. However, it appears that general aviation operations stabilized at STC between 2009 and 2011. Two methodologies were examined in determining projections of general aviation demand, the operations per based aircraft methodology and the market share methodology. These are industry standard general aviation operations methodologies, for reasons described in the following sections.

#### 2.4.4.1. Operations per Based Aircraft Methodology

The operations per based aircraft methodology is a common way to calculate general aviation operations because the majority of general aviation operations are typically conducted by based aircraft. As mentioned previously, between 2001 and 2011 the number of based aircraft at St. Cloud Regional Airport increased. However, the number of general aviation operations decreased from 74,750 to 32,188 (see **Table 2-16**). In 2011, the number of general aviation operations per based aircraft was 304. This ratio was applied to the preferred based aircraft forecast described in Section 2.4.3. This forecast predicts a steady rise in general aviation operations, increasing from 32,188 in 2011 to 38,848 in 2031, a CAGR of 0.94 percent.

**Table 2-16. General Aviation Operations Forecasts - Operations Per Based Aircraft Methodology**

| Year | Based Aircraft | GA Operations | Operations Per Based Aircraft |
|---|---|---|---|
| 2001 | 85 | 74,750 | 879 |
| 2002 | 85 | 65,462 | 770 |
| 2003 | 85 | 67,564 | 795 |
| 2004 | 95 | 68,370 | 720 |
| 2005 | 103 | 53,755 | 522 |
| 2006 | 105 | 48,127 | 458 |
| 2007 | 105 | 47,790 | 455 |
| 2008 | 105 | 35,876 | 342 |
| 2009 | 105 | 30,021 | 286 |
| 2010 | 105 | 32,089 | 306 |
| 2011 | 106 | 32,188 | 304 |
| *Average (2001-2011)* | | | *531* |
| 2016 | 109 | 33,073 | 304 |
| 2021 | 113 | 34,421 | 304 |
| 2026 | 120 | 36,349 | 304 |
| 2031 | 128 | 38,848 | 304 |
| *CAGR (2011-2031)* | *0.94%* | *0.94%* | |

*Source: Airport Records, FAA TAF, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.4.2. Market Share Methodology

The second methodology examined is the market share methodology. The market share methodology compares the trend in GA operations at a particular airport to the trend in national or regional general aviation operations. In general, this share is consistent over time for airports serving mostly general aviation operations. Between 2001 and 2011, St. Cloud Regional Airport's market share of total U.S. general aviation operations declined from 0.1874 percent to 0.1250 percent. It is anticipated that the Airport's 2011 market share of 0.1250 percent will remain constant throughout the projection period. This figure is applied to total the number of projected total U.S. general aviation operations described in the FAA Aerospace Forecasts 2011-2031 and shown in **Table 2-17**. This methodology predicts a steady increase in general aviation operations, rising from 32,188 in 2011 to 43,832 in 2031, a CAGR of 1.56 percent.

**Table 2-17: General Aviation Operations Forecasts - Market Share Methodology**

| Year | STC GA Operations | Total U.S. Operations | Market Share |
|---|---|---|---|
| 2001 | 74,750 | 39,878,536 | 0.1874% |
| 2002 | 65,462 | 37,626,472 | 0.1740% |
| 2003 | 67,564 | 37,652,701 | 0.1794% |
| 2004 | 68,370 | 35,524,020 | 0.1925% |
| 2005 | 53,755 | 34,146,800 | 0.1574% |
| 2006 | 48,127 | 33,072,500 | 0.1455% |
| 2007 | 47,790 | 33,132,000 | 0.1442% |
| 2008 | 35,876 | 31,573,800 | 0.1136% |
| 2009 | 30,021 | 27,999,600 | 0.1072% |
| 2010 | 32,089 | 26,571,400 | 0.1208% |
| 2011 | 32,188 | 25,749,500 | 0.1250% |
| *Average (2001-2011)* | | | *0.15%* |
| 2016 | 36,043 | 28,833,363 | 0.1250% |
| 2021 | 38,412 | 30,728,860 | 0.1250% |
| 2026 | 41,008 | 32,804,953 | 0.1250% |
| 2031 | 43,832 | 35,064,533 | 0.1250% |
| *CAGR (2011-2031)* | *1.56%* | *1.56%* | |

*Source: Airport Records, FAA Aerospace Forecast 2011-2031, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

#### 2.4.4.3. Preferred Forecast Methodology

Both the operations per based aircraft and the market share methodologies were examined to predict future general aviation operations. The operations per based aircraft methodology draws on the low end of the significant decline in operations per based aircraft from 2001 to 2011, and the market share methodology is based on the significant decline in the Airport's market share over the same period. It is expected that the Airport's market share will remain relatively stable in the future with additional based aircraft operating at the Airport. As a result, the market share methodology is the preferred methodology (see **Table 2-18**).

**Table 2-18: General Aviation Operations Forecasts - Forecast Comparison and Preferred Methodology**

| Year | FAA TAF Summary | Operations Per Based Aircraft Methodology | Market Share Methodology |
|---|---|---|---|
| 2011 | 32,188 | 32,188 | 32,188 |
| 2016 | 33,760 | 33,073 | 36,043 |
| 2021 | 34,874 | 34,421 | 38,412 |
| 2026 | 36,027 | 36,349 | 41,088 |
| 2031 | 37,226 | 38,848 | 43,832 |
| *CAGR (2011-2030)* | *0.73%* | *0.94%* | *1.56%* |

*Source: Airport Records, FAA TAF, (ATADS), FAA Aerospace Forecasts 2011-2031, Mead & Hunt, Inc.*
*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.5 Local/Itinerant General Aviation Operations

The TAF distinguishes between two categories of general aviation operations, local and itinerant. Local operations are conducted by aircraft operating in the traffic pattern within sight of the air traffic control tower; aircraft departing or arriving from flight in local practice areas; or aircraft executing practice instrument operations at the Airport. All general aviation operations other than local operations are defined as itinerant operations. Local operations are typically conducted by users based at the Airport, while itinerant operations are conducted by both based and transient users. As a result, the two types of general aviation operations have different implications for required airport facilities.

Historically, local general aviation operations have represented a slight majority of total general aviation operations at St. Cloud Regional Airport. Between 2005 and 2011, itinerant general aviation operations comprised approximately 49 percent of total general aviation operations at St. Cloud Regional Airport, while local operations have accounted for approximately 51 percent of total general aviation operations. It is anticipated that this split will remain constant throughout the forecast period. A summary of projected local and itinerant general aviation is shown in Table 2-19.

| Table 2-19: Local/Itinerant Operations Forecasts | | | | | |
|---|---|---|---|---|---|
| | | Itinerant GA | | Local GA | |
| Year | Total GA Operations | Operations | % | Operations | % |
| 2005 | 53,755 | 22,848 | 43% | 30,907 | 57% |
| 2006 | 48,127 | 24,839 | 52% | 23,288 | 48% |
| 2007 | 47,790 | 24,161 | 51% | 23,629 | 49% |
| 2008 | 35,876 | 17,570 | 49% | 18,306 | 51% |
| 2009 | 30,021 | 15,671 | 52% | 14,350 | 48% |
| 2010 | 32,089 | 16,510 | 51% | 15,579 | 49% |
| 2011 | 32,188 | 15,242 | 47% | 16,946 | 53% |
| *Average (2005-2011)* | | | *49%* | | *51%* |
| 2016 | 36,043 | 17,746 | 49% | 18,297 | 51% |
| 2021 | 38,412 | 18,913 | 49% | 19,500 | 51% |
| 2026 | 41,008 | 20,190 | 49% | 20,817 | 51% |
| 2031 | 43,832 | 21,581 | 49% | 22,251 | 51% |
| *CAGR (2011-2031)* | | *2.05%* | | *1.38%* | |

*Source: Air Traffic Activity Data System, (ATADS), Mead & Hunt, Inc.*

*Notes: Historical records differ slightly as the ATADS database records calendar year operations.*

*CAGR=Compounded Annual Growth Rate*

Using the average local/itinerant split from 2005 to 2011, it is expected that both local and itinerant general aviation operations at St. Cloud Regional Airport will experience a gradual increase over the 20-year planning period. This forecast will be considered in Chapter 3, Facility Requirements, to ensure that future planning needs will be met.

### 2.4.6 Military Operations

Military operations are also important to forecast, although to a lesser extent than other operations at St. Cloud Regional Airport. Historically, military operations have contributed less than one percent to the total number of operations at St. Cloud Regional Airport, though this number has increased in recent years. Between 2001 and 2011, the number of annual military operations that occurred at the Airport increased from 300 to 2,439. This increase can be attributed to the establishment of the Army Aviation Support Facility that opened at the Airport in March, 2009. However, military operations are driven more by policy decisions than by economic conditions, therefore military operations have been projected to remain consistent with their 2011 levels as recorded by FAA (see **Table 2-20**). The number of military operations at the Airport is anticipated to remain flat throughout the projection period.

**Table 2-20: Military Operations Forecasts**

| Year | Total Military Operations | Itinerant | | Local | |
|---|---|---|---|---|---|
| | | Operations | % | Operations | % |
| 2001 | 300 | 300 | 100% | 0 | 0% |
| 2002 | 300 | 300 | 100% | 0 | 0% |
| 2003 | 300 | 300 | 100% | 0 | 0% |
| 2004 | 300 | 300 | 100% | 0 | 0% |
| 2005 | 236 | 110 | 47% | 126 | 53% |
| 2006 | 366 | 144 | 39% | 222 | 61% |
| 2007 | 391 | 211 | 54% | 180 | 46% |
| 2008 | 373 | 297 | 80% | 76 | 20% |
| 2009 | 856 | 652 | 76% | 204 | 24% |
| 2010 | 2,886 | 2,160 | 75% | 726 | 25% |
| 2011 | 2,439 | 1,472 | 75% | 967 | 25% |
| *Average (2001-2011)* | | | *77%* | | *23%* |
| 2016 | 2,439 | 1,472 | 75% | 967 | 25% |
| 2021 | 2,439 | 1,472 | 75% | 967 | 25% |
| 2026 | 2,439 | 1,472 | 75% | 967 | 25% |
| 2031 | 2,439 | 1,472 | 75% | 967 | 25% |
| *CAGR (2011-2031)* | *0.00%* | *0.00%* | | *0.00%* | |

*Source: FAA TAF, Mead & Hunt, Inc.*

*Note: CAGR=Compounded Annual Growth Rate*

### 2.4.7 Instrument Operations

Instrument flight rules (IFR) apply in the airspace surrounding the Airport when visibility is less than 3 miles and/or the cloud ceiling is less than 1,000 feet. Pilots conducting operations during IFR conditions must have an instrument rating and file an IFR flight plan. Instrument operations can be conducted in any type of aircraft equipped with appropriate instruments, whether commercial, general aviation, or military. Commercial operators typically require that flight crews file IFR flight plans for operations in all weather conditions. Any operations conducted under an IFR flight plan are considered instrument operations. Forecasting instrument operations will help the Airport ensure that future airport facilities comply with equipment needs and standards associated with instrument approach and departure procedures.

Accurate data for instrument operations at the Airport is available dating to 2005 when the ATCT was opened. Between 2005 and 2011, approximately 24 percent of all operations at St. Cloud Regional Airport were instrument operations. It is assumed that this figure will remain constant throughout the projection period. Projected instrument operations for moderate and rapid growth scenarios are shown in **Table 2-21** and **2-22**.

**Table 2-21: Instrument Operations Forecasts – Moderate Growth**

| Year | Total Operations | Instrument Operations | | Visual Operations | |
|---|---|---|---|---|---|
| | | Operations | % | Operations | % |
| 2005 | 57,020 | 15,538 | 27% | 41,482 | 73% |
| 2006 | 52,245 | 12,786 | 24% | 39,459 | 76% |
| 2007 | 52,942 | 13,718 | 26% | 39,224 | 74% |
| 2008 | 39,991 | 11,883 | 30% | 28,108 | 70% |
| 2009 | 33,906 | 9,905 | 29% | 24,001 | 71% |
| 2010 | 35,955 | 6,019 | 17% | 29,936 | 83% |
| 2011 | 35,018 | 5,816 | 17% | 29,202 | 83% |
| *CAGR (2005-2011)* | *-8.41%* | *-15.66%* | | *-6.30%* | |
| 2016 | 40,462 | 9,821 | 24.3% | 30,223 | 74.7% |
| 2021 | 43,939 | 10,665 | 24.3% | 32,821 | 74.7% |
| 2026 | 46,857 | 11,374 | 24.3% | 35,000 | 74.7% |
| 2031 | 50,044 | 12,147 | 24.3% | 37,381 | 74.7% |
| *CAGR (2011-2031)* | *1.59%* | *3.40%* | | *1.06%* | |

*Source: Air Traffic Activity Data System, (ATADS), Mead & Hunt, Inc.*
*Note: Historical records differ slightly as the ATADS database records calendar year operations.*
*CAGR=Compounded Annual Growth Rate*

| Table 2-22: Instrument Operations Forecasts – Rapid Growth | | | | | |
|---|---|---|---|---|---|
| | | Instrument Operations | | Visual Operations | |
| Year | Total Operations | Operations | % | Operations | % |
| 2005 | 57,020 | 15,538 | 27% | 41,482 | 73% |
| 2006 | 52,245 | 12,786 | 24% | 39,459 | 76% |
| 2007 | 52,942 | 13,718 | 26% | 39,224 | 74% |
| 2008 | 39,991 | 11,883 | 30% | 28,108 | 70% |
| 2009 | 33,906 | 9,905 | 29% | 24,001 | 71% |
| 2010 | 35,955 | 6,019 | 17% | 29,936 | 83% |
| 2011 | 35,018 | 5,816 | 17% | 29,202 | 83% |
| *CAGR (2005-2011)* | *-8.41%* | *-15.66%* | | *-6.30%* | |
| 2016 | 43,486 | 10,555 | 24.3% | 32,931 | 75.7% |
| 2021 | 47,894 | 11,625 | 24.3% | 36,268 | 75.7% |
| 2026 | 51,224 | 12,434 | 24.3% | 38,790 | 75.7% |
| 2031 | 54,877 | 13,320 | 24.3% | 41,556 | 75.7% |
| *CAGR (2011-2031)* | *2.03%* | *3.85%* | | *1.57%* | |

*Source: Air Traffic Activity Data System, (ATADS), Mead & Hunt, Inc.*
*Note: Historical records differ slightly as the ATADS database records calendar year operations.*
*CAGR=Compounded Annual Growth Rate*

## 2.5 Peak Operations Forecasts

Forecasts of annual aircraft operations may not adequately describe the complex needs of airport facilities. Annual metrics are only useful when activity tends to be evenly distributed over the hours, days, and months of the year. However, most airports have peak periods when demand surpasses annual averages. As a result, it is important to identify peak period activity levels, and forecast future peak period activity levels. This section identifies monthly, daily, and hourly peaking characteristics for passenger and aircraft activity at St. Cloud Regional Airport. These forecasts will allow the Airport to assess the expected peak demand for airside facilities, such as runways and aircraft parking aprons, and to compare these demands to existing facility capacities.

The typical approach to developing peak activity forecasts is to identify the “design hour” flows of aircraft. The design hour is the estimate of the peak hour of the average day of the busiest month at the airport. This approach provides sufficient facility capacity for most days of the year, but recognizes that facilities should neither be underbuilt nor overbuilt. Historical monthly operations are shown in Table 2-23.

| Table 2-23: Historical Peak Month – Aircraft Operations | | |
|---|---|---|
| **Month** | **2011 Aircraft Operations** | **% Annual** |
| Jan | 1,801 | 5.22% |
| Feb | 2,849 | 8.26% |
| Mar | 2,878 | 8.34% |
| Apr | 2,463 | 7.14% |
| May | 2,980 | 8.64% |
| Jun | 2,546 | 7.38% |
| Jul | 3,486 | 10.11% |
| Aug | 3,081 | 8.93% |
| Sep | 3,217 | 9.33% |
| Oct | 5,112 | 14.82% |
| Nov | 2,053 | 5.95% |
| Dec | 2,027 | 5.88% |

*Source: Air Traffic Activity Data System, (ATADS), Mead & Hunt, Inc.*

This analysis indicates that the peak month for aircraft operations at St. Cloud Regional Airport is October. In 2011, the peak month accounted for approximately 14.82 percent of total operations at the Airport. It should be noted that total operations differ slightly from the TAF because they are based on the calendar year rather than the fiscal year. To forecast peak month operations, the 14.82 percent 2011 peak month average of total operations is applied to annual operations projections described in previous sections of this document. This peak month aircraft operations forecast was then divided by the number of days in the peak month (31 days) to determine the average number of daily operations during the peak month. The FAA Enhanced Traffic Management System Counts (ETMSC) notes that the average number of aircraft operations in the peak hour of October 2011 totaled approximately 28 percent of the total daily operations, which is held constant throughout the projection period for both the moderate growth and rapid growth operations forecasts (see Tables 2-24 and 2-25). Both forecasts predict an increase in peak hour aircraft operations, with the moderate growth peak hour operations forecast rising from 46 in 2011 to 69 in 2031, and the rapid growth peak hour operations forecast rising to 76 in 2031.

| Table 2-24: Peak Aircraft Operations Forecasts – Moderate Growth | | | | | |
|---|---|---|---|---|---|
| **Year** | **Annual Operations** | **Peak Month %** | **Peak Month Operations** | **Peak Month Avg. Day Operations** | **Peak Hour Operations** |
| 2011 | 35,018 | 14.82% | 5,190 | 167 | 47 |
| 2016 | 40,462 | 14.82% | 5,997 | 200 | 56 |
| 2021 | 43,939 | 14.82% | 6,512 | 217 | 61 |
| 2026 | 46,857 | 14.82% | 6,944 | 231 | 65 |
| 2031 | 50,044 | 14.82% | 7,417 | 247 | 69 |
| *CAGR (2011-2031)* | *1.88%* | | *1.88%* | *2.05%* | *2.05%* |

*Sources: Airport Records, FAA Enhanced Traffic Management Systems Counts (ETMSC), Mead & Hunt, Inc.*

| Table 2-25: Peak Aircraft Operations Forecasts – Rapid Growth | | | | | |
|---|---|---|---|---|---|
| Year | Annual Operations | Peak Month % | Peak Month Operations | Peak Month Avg. Day Operations | Peak Hour Operations |
| 2011 | 35,018 | 14.82% | 5,190 | 167 | 47 |
| 2016 | 43,486 | 14.82% | 6,445 | 215 | 60 |
| 2021 | 47,894 | 14.82% | 7,098 | 237 | 66 |
| 2026 | 51,224 | 14.82% | 7,592 | 253 | 71 |
| 2031 | 54,877 | 14.82% | 8,133 | 271 | 76 |
| *CAGR (2011-2031)* | *2.35%* | | *2.35%* | *2.52%* | *2.52%* |

*Sources: Airport Records, FAA Enhanced Traffic Management Systems Counts (ETMSC), Mead & Hunt, Inc.*

## 2.6 Forecast Summary and FAA TAF Comparison

Based on the historic aviation activity information presented in this chapter, it is clear that passenger and aircraft activity at St. Cloud Regional Airport has fluctuated in recent years. However, this has not been uncommon at airports throughout the U.S., as economic uncertainty and increased travel costs have impacted travel behavior. Despite rapid increases in fuel cost, airline bankruptcies, system-wide route restructuring, and aircraft fleet overhauls, the forecasts developed for this Master Plan Update suggest positive growth in passenger enplanements, the number of based aircraft, and total aircraft operations at the Airport over the next 20 years. The following forecasts were identified in this chapter as the preferred forecasts for facility planning at St. Cloud Regional Airport.

- For passenger enplanements, both moderate growth and rapid growth forecasts were developed based on an assessment of potential re-emergence of scheduled commercial air service. This assessment considered several viable routes identified by a Passenger Demand Analysis completed for the Airport. The moderate growth forecast predicts that enplanements at Airport will grow to 96,996 in 2031, and the rapid growth forecast predicts that enplanements will grow to 198,228 in 2031.
- Commercial operations and fleet mix projections were developed for both passenger enplanement forecast. The moderate growth forecast predicts commercial operations at the Airport will grow to 3,773 in 2031, while the rapid growth forecast predicts that commercial operations will grow to 8,605 in 2031. For commercial fleet mix, the moderate growth forecast predicts that most operations will be conducted with 40 to 60 seat regional jet aircraft, while the rapid growth forecast predicts a more varied commercial fleet with more operations by regional jets in the 61 to 99 seat range.
- For based aircraft, the market share methodology was chosen as the preferred forecast methodology. This preferred forecast predicts moderate growth in based aircraft, rising from 107 in 2011 to 128 in 2031.
- The market share methodology was also chosen as the preferred methodology for forecasting general aviation operations. This methodology assumes that the Airport's share of national general aviation operations in 2011 (0.125 percent) will remain constant throughout the planning period. This preferred forecast projects steady growth in general aviation operations, rising from 32,188 in 2011 to 43,832 in 2031.

- For peak aircraft activity, the "design hour" flows of aircraft were identified for both the moderate growth and the rapid growth operations forecasts. These are estimates of the peak hour of the average day of the busiest month. The design hour would increase from 46 in 2011 to 69 in 2031 for the moderate growth forecast, while the design hour would increase to 76 in 2031 for the rapid growth forecast.

The Master Plan forecasts presented in this chapter are summarized in **Table 2-26**. These forecasts are used in the next chapter to determine facility requirements at the Airport. For the purposes of this Master Plan Update, the Moderate Growth Scenario projections are shown. Rapid Growth Scenario projections presented throughout this Chapter are intended to provide an upper range of aviation-related activity that may occur.

As mentioned previously, the Master Plan forecasts were developed in 2012. Following FAA review of the final Master Plan in 2015, FAA requested that this chapter be updated to recognize that the Airport had recently accepted the FAA's 2015 Terminal Area Forecast (TAF). The 2015 TAF for STC is summarized in **Table 2-27**. While the Master Plan forecasts presented in this chapter provide a good base for understanding potential future activity scenarios at STC, these forecasts were developed under different conditions than exist in 2015. The Master Plan forecasts are not consistent with the 2015 TAF, and the Airport will not be requesting FAA Headquarters approval of the Master Plan forecasts.

**Table 2-26: Master Plan Forecast Summary**

| | 2011 | 2016 | 2021 | 2026 | 2031 | Average CAGR | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Base Yr. Level | Base Yr. + 5yr. | Base Yr. + 10yrs. | Base Yr. + 15yrs. | Base Yr. + 20yrs. | Base Yr. + 5yr. | Base Yr. + 10yrs. | Base Yr. + 15yrs. | Base Yr. + 20yrs. |
| **Passenger Enplanements** | | | | | | | | | |
| TOTAL Air Carrier & Commuter | 219 | 66,438 | 73,389 | 81,067 | 89,548 | 159.2% | 69.7% | 44.7% | 33.2% |
| **Operations** | | | | | | | | | |
| Itinerant | | | | | | | | | |
| Air carrier | 8 | 520 | 811 | 896 | 991 | 100.5% | 52.2% | 34.3% | 25.8% |
| Commuter/air taxi | 383 | 1,460 | 2,277 | 2,514 | 2,782 | 25.0% | 17.6% | 12.5% | 9.9% |
| Total Commercial Operations | 391 | 1,980 | 3,088 | 3,410 | 3,773 | 31.0% | 20.7% | 14.5% | 11.4% |
| General aviation | 15,242 | 17,746 | 18,913 | 20,190 | 21,581 | 2.6% | 2.0% | 1.8% | 1.7% |
| Military | 1,472 | 1,472 | 1,472 | 1,472 | 1,472 | 0.0% | 0.0% | 0.0% | 0.0% |
| Local | | | | | | | | | |
| General aviation | 16,946 | 18,297 | 19,500 | 20,817 | 22,251 | 1.3% | 1.3% | 1.3% | 1.3% |
| Military | 967 | 967 | 967 | 967 | 967 | 0.0% | 0.0% | 0.0% | 0.0% |
| TOTAL OPERATIONS | 35,018 | 40,462 | 43,939 | 46,857 | 50,044 | 2.4% | 2.1% | 1.8% | 1.7% |
| **Instrument Operations** | 5,816 | 9,821 | 10,447 | 11,132 | 11,879 | 9.1% | 5.5% | 4.1% | 3.5% |
| **Peak Hour Operations** | 47 | 56 | 61 | 65 | 69 | 3.0% | 2.4% | 2.0% | 1.8% |
| **Based Aircraft** | | | | | | | | | |
| Single Engine (Nonjet) | 83 | 83 | 84 | 86 | 90 | 0.0% | 0.1% | 0.2% | 0.4% |
| Multi Engine (Nonjet) | 5 | 5 | 6 | 7 | 8 | 1.4% | 1.1% | 2.3% | 2.1% |
| Jet Engine | 8 | 11 | 14 | 16 | 19 | 5.3% | 4.9% | 4.2% | 4.3% |
| Helicopter | 0 | 0 | 0 | 0 | 0 | 0.0% | 0.0% | 0.0% | 0.0% |
| Other | 10 | 10 | 11 | 11 | 12 | 0.0% | 0.0% | 0.0% | 0.0% |
| TOTAL | 106 | 109 | 114 | 120 | 128 | 0.5% | 0.7% | 0.8% | 0.9% |

CAGR = Compound Annual Growth Rate

**Table 2-27: 2015 Terminal Area Forecast Summary**

| | 2011 | 2016 | 2021 | 2026 | 2031 | Average CAGR | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Base Yr. Level | Base Yr. + 5yr. | Base Yr. + 10yrs. | Base Yr. + 15yrs. | Base Yr. + 20yrs. | Base Yr. + 5yr. | Base Yr. + 10yrs. | Base Yr. + 15yrs. | Base Yr. + 20yrs. |
| **Passenger Enplanements** | | | | | | | | | |
| TOTAL Air Carrier & Commuter | 292 | 33,379 | 36,110 | 39,122 | 42,452 | 120.3% | 55.0% | 35.8% | 26.8% |
| **Operations** | | | | | | | | | |
| Itinerant | | | | | | | | | |
| Air carrier | 8 | 1,039 | 1,140 | 1,248 | 1,370 | 125.0% | 57.0% | 37.1% | 27.8% |
| Commuter/air taxi | 383 | 284 | 299 | 314 | 329 | -4.9% | -2.2% | -1.2% | -0.7% |
| Total Commercial Operations | 391 | 1,323 | 1,439 | 1,562 | 1,699 | 22.5% | 12.6% | 9.0% | 7.2% |
| General aviation | 15,242 | 12,141 | 12,448 | 12,763 | 13,086 | -3.7% | -1.8% | -1.1% | -0.7% |
| Military | 1,472 | 2,220 | 2,220 | 2,220 | 2,220 | 7.1% | 3.8% | 2.6% | 2.0% |
| Local | | | | | | | | | |
| General aviation | 16,946 | 9,061 | 9,289 | 9,522 | 9,761 | -9.9% | -5.3% | -3.5% | -2.6% |
| Military | 967 | 1,248 | 1,248 | 1,248 | 1,248 | 4.3% | 2.3% | 1.6% | 1.2% |
| TOTAL OPERATIONS | 35,018 | 25,993 | 26,644 | 27,315 | 28,014 | -4.8% | -2.5% | -1.5% | -1.1% |
| **Based Aircraft** | | | | | | | | | |
| Single Engine (Nonjet) | 82 | 61 | 63 | 67 | 72 | -4.8% | -2.4% | -1.3% | -0.6% |
| Multi Engine (Nonjet) | 5 | 2 | 2 | 2 | 2 | -14.2% | -8.0% | -5.6% | -4.3% |
| Jet Engine | 8 | 4 | 4 | 4 | 4 | -10.9% | -6.1% | -4.2% | -3.2% |
| Helicopter | 0 | 1 | 1 | 1 | 1 | 0.0% | 0.0% | 0.0% | 0.0% |
| Other | 12 | 12 | 12 | 12 | 12 | 0.0% | 0.0% | 0.0% | 0.0% |
| TOTAL | 107 | 80 | 82 | 86 | 91 | -4.7% | -2.4% | -1.4% | -0.8% |

CAGR = Compound Annual Growth Rate