# CHAPTER

# 2

# FORECASTS OF AVIATION ACTIVITY

COCHISE COLLEGE AIRPORT
AIRPORT MASTER PLAN

ARMSTRONG

# Chapter Two
# Forecasts of Aviation Activity

## 2.1 INTRODUCTION

Forecasts of aviation activity serve as a guideline for the timing required for implementation of airport improvement programs. While such information is necessary for successful comprehensive airport planning, it is important to recognize that forecasts are only approximations of future activity, based upon historical data and viewed through present situations. They must therefore, be used with careful consideration, as they may lose their validity with the passage of time.

For this reason, an ongoing program of examination of local airport needs and national and regional trends is recommended and encouraged in order to promote the orderly development of aviation facilities at Cochise College Airport.

At airports not served by air traffic control towers, estimates of existing aviation activity are necessary in order to form a basis for the development of realistic forecasts. Unlike towered airports, non-towered general aviation airports have historically not tracked or maintained comprehensive logs of aircraft operations. Estimates of existing aviation activity are based upon a review of based aircraft, available historical data, available local information and regional, state and national data that form the baseline to which forecasted aviation activity trends are applied. ADOT requires the use of the *FAA Model for Estimating General Aviation Operations at Non Towered Airports using Towered and Non Towered Airport Data.* The model is further discussed in Section 2.5 Existing Aviation Activity.

Activity projections are made based upon estimated growth rates, area demographics, industry trends and other indicators. Forecasts are prepared for the Initial-Term (0-5 years), the Intermediate-Term (6-10 years) and the Long-Term (11-20 years) time frames. Utilizing forecasts within these time frames will allow airport improvements to be timed to meet demand, but not so early as to remain idle for an unreasonable length of time.

There are four types of aircraft operations considered in the planning process. These are termed “local, based, itinerant and transient.” They are defined as follows:

<u>Local operations</u> are defined as aircraft movements (departures or arrivals) for the purpose of training, pilot currency or pleasure flying within the immediate area of the local airport. These operations typically consist of touch-and-go operations, practice instrument approaches, flights to and within local practice areas and pleasure flights that originate and terminate at the airport under study.

<u>Based aircraft operations</u> are defined as the total operations made by aircraft based (stored at the airport on a permanent, seasonal or long-term basis) with no attempt to classify the operations as to purpose.

<u>Itinerant operations</u> are defined as arrivals and departures other than local operations and generally originate or terminate at another airport. These types of operations are closely tied to local demographic indicators, such as local industry and business use of aircraft and usage of the facility for recreational purposes.

Transient operations are defined as the total operations made by aircraft other than those based at the airport under study. These operations typically consist of business or pleasure flights originating at other airports, with termination or a stopover at the study airport.

The terms transient and itinerant are sometimes erroneously used interchangeably. This study will confine analysis to local and itinerant operations.

## 2.2 NATIONAL AND REGIONAL TRENDS

According to factors such as aircraft production, pilot activity and hours flown, general aviation reached a peak in the late 1970s. This peak was followed by a long downturn that persisted through most of the 1980s and the early 1990s and has been attributed to high manufacturing costs associated with product liability issues as well as other factors. The General Aviation Revitalization Act (GARA) of 1994 was enacted with the goal of revitalizing the industry by limiting product liability costs. The Act established an 18-year statute of repose on liability related to the manufacture of all general aviation aircraft and their components. According to a 2001 report to Congress by the General Accounting Office (GAO), trends in general aviation since GARA was enacted suggest that liability costs have been less burdensome to manufacturers, shipments of new aircraft have increased and technological advances have been made. Indicators of general aviation activity, such as the numbers of hours flown and active pilots, have also increased in the years since GARA, but their growth has not been as substantial as the growth in manufacturing.

The FAA annually convenes expert panels in aviation and develops forecasts for future activity in all areas of aviation, including general aviation. According to the *FAA Aerospace Forecast Fiscal Years 2011-2031* forecast, the demand for business jets has grown over the past several years due to new product offerings, the introduction of the very light jets (VLJ), and increasing foreign demand have all contributed in driving this growth; additionally, the current forecast assumes that business use of general aviation aircraft will expand at a more rapid pace than that for personal/sport use. In addition, corporate safety/security concerns for corporate staff, combined with increasing flight delays at some U.S. airports have made fractional, corporate, and on-demand charter flights practical alternatives to travel on commercial flights.

The active general aviation fleet is projected to increase at an average annual rate of 0.9 percent during the 20-year forecast period, growing from 224,172 aircraft in 2011 to 270,920 aircraft to 2031. The fleet of jet turbine aircraft is expected to increase at a greater rate than the fleet of piston aircraft; as a result, the number of piston aircraft, while continuing to increase, is expected to represent a smaller percentage of the total general aviation fleet. **Figures 2-1** and **2-2** illustrate this forecasted change to the general aviation fleet that is forecast to occur over the 20-year period.

In 2005 the category of "light sport" aircraft was created. At the end of 2006 a total of 1,273 aircraft were included in this category. In 2010 the number of sport aircraft increased to 7,711. By 2031 a total of 16,311 light sport aircraft are projected to be in the fleet.

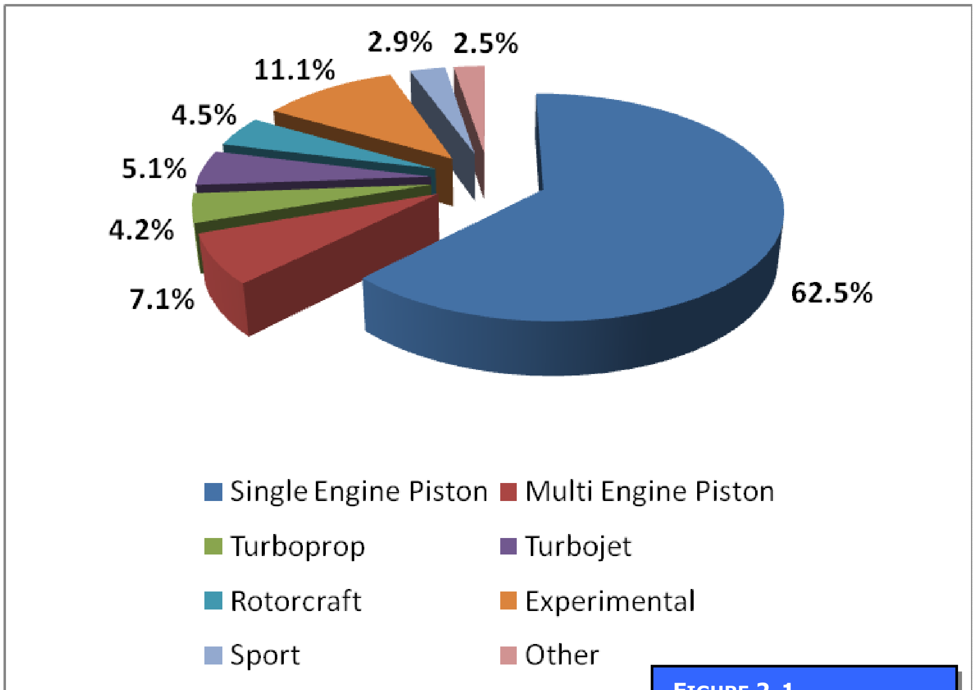



**FIGURE 2-1**
**EXISTING GA FLEET MIX**

Source: FAA Aerospace Forecast Fiscal Years 2011-2031

**2011**

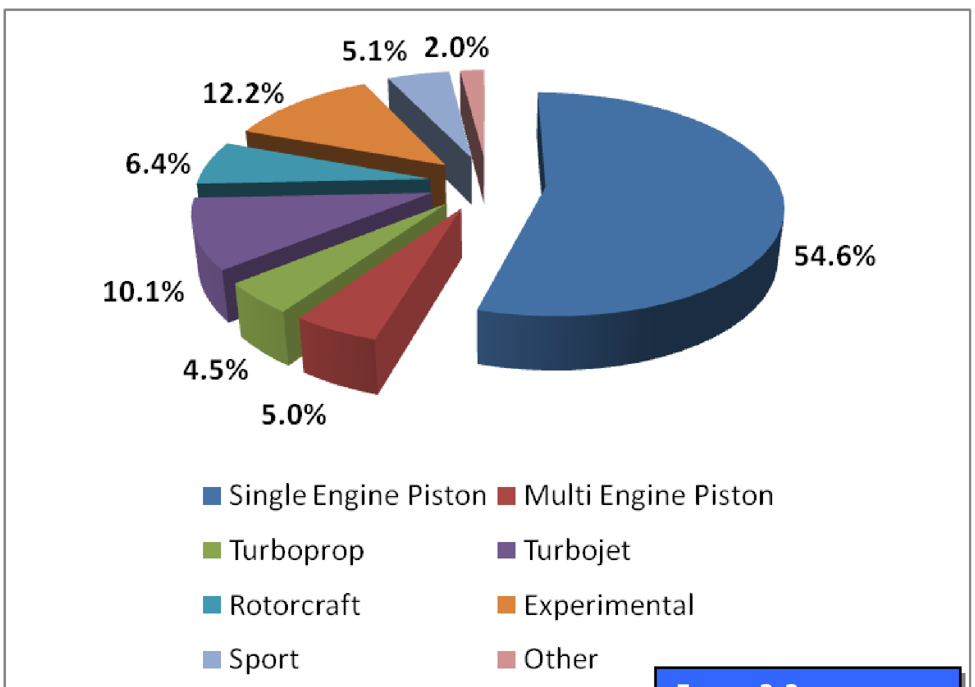



**FIGURE 2-2**
**FUTURE GA FLEET MIX**

Source: FAA Aerospace Forecast Fiscal Years 2011-2031

**2031**

The General Aviation Manufacturer's Association (GAMA) produces activity forecasts based on general aviation hours flown. As shown in **Table 2-1**, the number of turbojet (TJ) hours is forecast to increase by an average annual growth rate of 5.3 percent between 2011 and 2031. The number of light sport (Sport) hours is forecast to increase at 5.4 percent while the number of multiengine (ME) hours flown will decrease at 0.6 percent.

TABLE 2-1 NATIONAL GENERAL AVIATION FORECAST

Hours Flown (in millions)

| Year | SE | ME | TP | TJ | Sport | Total |
|---|---|---|---|---|---|---|
| **2011** | **11.4** | **1.8** | **2.5** | **3.6** | **0.3** | **24.3** |
| 2012 | 11.4 | 1.8 | 2.6 | 4.2 | 0.4 | 25.1 |
| **2013** | **11.2** | **1.8** | **2.6** | **4.8** | **0.4** | **25.8** |
| 2014 | 11.1 | 1.8 | 2.7 | 5.0 | 0.4 | 26.1 |
| **2015** | **10.9** | **1.7** | **2.7** | **5.3** | **0.4** | **26.4** |
| 2016 | 10.8 | 1.7 | 2.7 | 5.5 | 0.5 | 26.7 |
| **2017** | **10.8** | **1.7** | **2.7** | **5.8** | **0.5** | **27.1** |
| 2018 | 10.8 | 1.6 | 2.7 | 6.0 | 0.5 | 27.6 |
| **2019** | **10.8** | **1.6** | **2.8** | **6.3** | **0.5** | **28.0** |
| 2020 | 10.9 | 1.6 | 2.8 | 6.5 | 0.6 | 28.6 |
| **2021** | **11.0** | **1.6** | **2.8** | **6.8** | **0.6** | **29.2** |
| 2022 | 11.2 | 1.6 | 2.9 | 7.1 | 0.6 | 29.9 |
| **2023** | **11.4** | **1.6** | **2.9** | **7.4** | **0.6** | **30.6** |
| 2024 | 11.6 | 1.6 | 2.9 | 7.7 | 0.7 | 31.4 |
| **2025** | **11.9** | **1.6** | **3.0** | **8.0** | **0.7** | **32.3** |
| 2026 | 12.2 | 1.6 | 3.0 | 8.3 | 0.7 | 33.1 |
| **2027** | **12.5** | **1.6** | **3.1** | **8.7** | **0.8** | **34.1** |
| 2028 | 12.8 | 1.7 | 3.1 | 9.0 | 0.8 | 35.0 |
| **2029** | **13.1** | **1.7** | **3.2** | **9.4** | **0.8** | **35.9** |
| 2030 | 13.4 | 1.7 | 3.2 | 9.8 | 0.9 | 36.9 |
| **2031** | **13.7** | **1.7** | **3.2** | **10.2** | **0.9** | **37.8** |
| **Avg. Annual Growth** | **0.8%** | **-0.6%** | **1.3%** | **5.3%** | **5.4%** | **2.2%** |

Source: 2011 General Aviation Manufacturer's Association Statistical Databook & Industry Outlook

Another industry trend is the increasing amount of research funding for programs like the Small Aircraft Transportation System (SATS). The National Aeronautics and Space Administration (NASA), Federal Aviation Administration, States, industry and academic partners have joined forces to pursue the NASA National General Aviation Roadmap leading to a Small Aircraft Transportation System. This long-term strategic undertaking seeks to bring next-generation technologies and improved air access to small communities. The envisioned outcome is to improve travel between remote communities and transportation centers in urban areas by utilizing a new generation of single-pilot light aircraft for personal and business transportation between the nation's 5,400 public use general aviation airports. Current NASA investments in aircraft technologies are enabling industry to bring affordable, safe and easy-to-use features to the marketplace, including "Highway in the Sky" glass cockpit operating capabilities, affordable crashworthy composite airframes, more efficient IFR flight training and revolutionary aircraft engines. To facilitate this initiative, a comprehensive upgrade of public infrastructure must be planned, coordinated and implemented within the framework of the national air transportation system. State partnerships are proposed to coordinate research support in key public infrastructure areas. Ultimately, SATS (**Figure 2-3**) may permit more than tripling aviation system throughput capacity by tapping the under-utilized

**FIGURE 2-3 SATS CONCEPTUALIZATION**

Source: NASA Nebraska Space Grant & EPSCoR general aviation facilities to achieve the national goal of doorstep-to-destination travel at four times the speed of highways for the nation's suburban, rural and remote communities.

The relatively inexpensive twin-engine VLJs (priced between $1 and $2 million) were believed by many to have the potential to redefine the business jet segment by expanding business jet flying and offering performance that could support a true on-demand air-taxi business service. However events since that time have dampened expectations for a rapid penetration of VLJs (**Figure 2-4**) into the market, most notably the bankruptcy of Eclipse and the demise of DayJet. In 2008, VLJ deliveries fell short of assumptions (262 vs. 400). Despite the challenging economy and the uncertainty surrounding the future of Eclipse, the forecast assumes that about 440 VLJs will enter the active fleet in the U.S. over the next 3 years, with an average of 216 aircraft a year for the balance of the forecast period.

The number of active general aviation pilots (excluding air transport pilots) is projected to be 501,875 in 2030, an increase of almost 59,000 (up 0.5 percent yearly) over the forecast period. Commercial pilots are projected to increase from 124,950 in 2010 to 139,100 in 2031, an average annual increase of 0.5 percent. The number of student pilots is forecast to increase at an average annual rate of 0.8 percent over the forecast period, growing from 70,700 in 2010 to 86,050 in 2031. In addition, FAA is projecting that by the end of the forecast period a total of 14,100 sport pilots will be certified. As of December 31, 2009, the estimated number of sport pilot certificates issued was 3,248 reflecting a growing interest in this new “entry level” pilot certificate that was only created in 2005. The number of private pilots is projected to remain steady over the forecast period to total 219,050 in 2030.

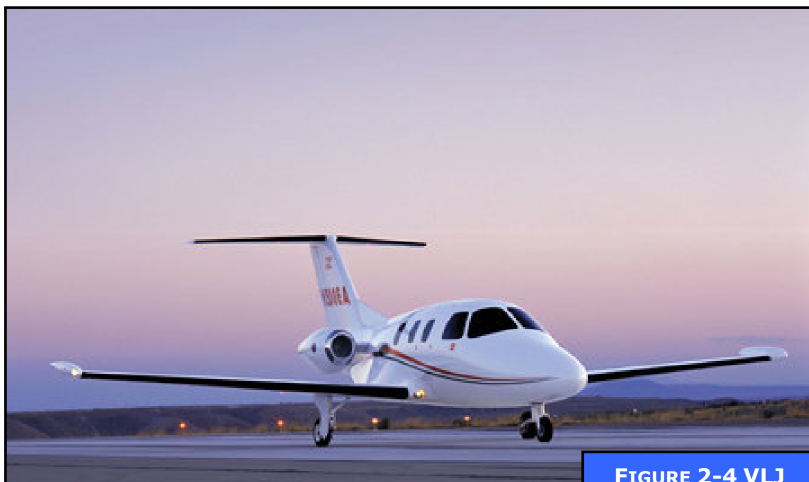


**FIGURE 2-4 VLJ**

## 2.3 EXISTING AVAILABLE ACTIVITY ESTIMATES

The first step in preparing aviation forecasts is to examine historical and existing activity levels. There is no FAA Terminal Area Forecasts (TAF) for Cochise College Airport because the airport is not included in the NPIAS. The Arizona State Airports System Plan (ASASP) (2009) indicated 15 based aircraft and 55,180 annual operations in 2008. The airport manager reported 16 based aircraft and 47,000 annual operations in 2010. The ASASP projects 20 based aircraft and 71,100 annual operations in 2030.

## 2.4 FAA RECORDS OF BASED AIRCRAFT AND OPERATIONS

FAA Form 5010-1, Airport Master Record, is the official record kept by the Federal Aviation Administration to document airport physical conditions and other pertinent information. The record normally includes an annual estimate of aircraft activity as well as the number of based aircraft. This information is normally obtained from the airport sponsor. The accuracy of these documents varies directly with the sponsor’s record keeping system. The FAA Form 5010-1 for

Cochise College Airport indicates 15 based aircraft and 47,050 annual aircraft operations. An operation is defined as a takeoff or a landing. A touch-and-go is considered two operations. This form also breaks down operations to 0 Air Carrier, 0 Air Taxi, 45,000 GA Local, 2,000 GA Itinerant operations and 50 military operations.

## 2.5 EXISTING AVIATION ACTIVITY

As discussed in Chapter 1 the FAA Statistics and Forecast Branch has developed a *Model for Estimating General Aviation Operations at Non-Towered Airports using Towered and Non-Towered Airport Data.* This model was created using data from towered and non-towered general aviation airports. A dummy variable is used to differentiate between those airports having an air traffic control tower and those that do not. The model was used to estimate the number of operations at 2,789 non-towered general aviation airports included in the FAA *Terminal Area Forecasts*. The equation for estimating operations at Cochise College Airport is #15 pertaining to non-towered airports. Local factors such as the number of based aircraft, population, location and the number of flight schools is applied to the equation resulting in an estimated number of annual operations. Cochise College Airport is unique given all the based aircraft are used for flight training. Listed below is the equation 15 calculated for Cochise College. Since the Cochise College Airport does not fulfill the role of a traditional general aviation airport, since it is utilized almost exclusively for flight training by the college, the equation is not considered to be valid and is not carried forward for further evaluation. The 5,577 operations per flight school does not accurately reflect the actual activity levels of Cochise College Aviation Program, which is considerably higher. A factor of 34,900 versus 5,577 would more accurately reflect activity at Cochise College.

Equation #15 Model for Estimating General Aviation Operations at Non-Towered Airports

Operations = 775 + 241(Based Aircraft) – 0.14(Based Aircraft)$^2$ + 31,478(Based Aircraft/Total Number of Based Aircraft within 100 miles of Airport) + 5,577(Number of Flight Schools at Airport) + 0.001(Population with 100 miles) – 3,736(multiply by 1 if Airport is Located in WA, CA, OR or AK; multiply by zero if not) + 12,121(Population within 25 miles/population within 100 miles)

$775 + 241(16) – 0.14(16)^2 + 31,478(.15) + 5,577(1) + 117 – 0 + 12,121(.22) = 17,717$

For the purposes of this study, existing based aircraft and operations at Cochise College Airport will be 16 aircraft and 47,050 operations as reported by Airport Management. These totals result in approximately 2,940 operations per based aircraft (OBPA). This represents the total annual operations divided by the number of based aircraft and includes operations by both based and transient aircraft.

Cochise College Airport is currently an Airport Reference Code (ARC) B-I (small) airport serving single engine and multi-engine piston aircraft, turbo prop aircraft and Unmanned Aerial Vehicles (UAV). Uses include:

1) Flight Training – These users conduct local and itinerant flights in order to meet flight proficiency requirements for obtaining FAA pilot certifications. These flights include touch-and-goes, day and night local and cross-country flights and simulated approaches. Pilot certifications include Sport, Private, Instrument, Commercial, Instructor and Airline Transport ratings.
The Cochise College Professional Flight Training Program offers; Private Pilot Certification, Instrument Rating, Commercial Pilot Certification, Multi-Engine Rating, Initial Flight Instructor

Certification (CFI), Flight Instructor Instrument Certification (CFII) and Flight Instructor – Multi-Engine Rating (MEI). All courses meet or exceed pertinent FAA regulation requirements. The primary role of the Cochise College Airport is to support the College's flight training programs.

2) Flight Testing – Northrop Grumman conducts flight testing of the RQ-5 "Hunter" unmanned aerial vehicle (UAV) at Cochise College Airport. The flight testing program is an extension of the Army's Unmanned Aircraft Systems Training Battalion at Fort Huachuca that trains soldiers and civilians in the operation and maintenance of the Hunter UAV. The Hunter has fixed landing gear to allow it to takeoff and land on the runway.

3) Business Transportation – Business aviation users benefit by being able to travel to or from business centers to conduct business activities in a single day, without requiring an overnight stay or extensive ground travel time. Local and other small businesses generally utilize single-engine and multi-engine piston aircraft. This user category also includes state and federal agencies and travel by government officials.

4) Personal Transportation – These users desire the utility and flexibility offered by general aviation aircraft. The types of aircraft utilized for personal transportation vary with individual preference and resources and generally include a mix of single-engine, multi-engine and in some cases turbojet aircraft.

5) Recreational and Tourism – These users include transient pilots flying into the region to visit recreational and tourist attractions. These users mostly utilize single-engine piston aircraft; however, a small percentage may operate multi-engine piston aircraft. Other types of aircraft in this category include home-built, experimental aircraft, gliders and ultralights.

### 2.5.1 HISTORICAL BASED AIRCRAFT AND OPERATIONS

The last Airport Master Plan (2001) for the Cochise College Airport reported 55,180 annual operations and 15 based aircraft at the airport. Aircraft operation statistics at Cochise College Airport are not precise due to the absence of an air traffic control tower. There are currently no commercial service or air cargo operations at Cochise College Airport.

### 2.5.2 FACTORS INFLUENCING AVIATION DEMAND

Factors influencing aviation demand at Cochise College Airport are directly related to the enrollment in the College's flight training program and the potential development of other flight testing and training programs. The historical enrollment of the flight training program shows an average of 40 students have been enrolled over the last five semesters. Flight testing associated with the Northrop Grumman UAV program is expected to continue to be a factor in the utilization of the airport. The College has expressed interest in starting a UAV training program that could potentially increase aviation demand further.

## 2.6 EXISTING AVAILABLE FORECASTS

### 2.6.1 ARIZONA STATE AIRPORTS SYSTEM PLAN FORECAST

The Arizona State Airports System Plan (ASASP) 2009 forecast of based aircraft for Cochise College Airport was evaluated (**Table 2-2**). The ASASP projected an average growth rate of 6.3 percent every five years between 2010-2030. This method results in a forecast of 20 based aircraft at Cochise College Airport in the year 2030.

TABLE 2-2 ARIZONA STATE AIRPORTS SYSTEM PLAN

| Year | Average Growth Rate | Aircraft |
|---|---|---|
| 2010 | 6.3% | **16** |
| 2015 | 6.3% | **17** |
| 2020 | 6.3% | **18** |
| 2025 | 6.3% | **19** |
| 2030 | 6.3% | **20** |

### 2.6.2 2001 COCHISE COLLEGE AIRPORT MASTER PLAN

The 2001 Cochise College Airport Master Plan forecast of based aircraft indicated that the number of light training aircraft would increase at an average rate of 3.6 percent over the 20 year planning period from 2000 to 2020. **Table 2-3** shows the projected growth from the 2001 Airport Master Plan.

TABLE 2-3 2001 COCHISE COLLEGE AIRPORT MASTER PLAN

| Year | Average Growth Rate | Aircraft |
|---|---|---|
| 2000 | 3.6% | **15** |
| 2005 | 3.6% | **20** |
| 2010 | 3.6% | **22** |
| 2020 | 3.6% | **27** |

## 2.7 FORECASTS OF AVIATION ACTIVITY

### 2.7.1 BASED AIRCRAFT FORECASTS

According to FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), when forecast data is not available, a satisfactory procedure is to forecast based aircraft using the statewide based aircraft growth rate from the December 2010 TAF and to develop activity statistics by estimating annual operations per based aircraft. The first forecasting method for based aircraft utilized the FAA's Terminal Area Forecast annual growth rate for the State of Arizona of 0.9 percent per year (**Table 2-4**). The TAF projected an average growth rate of 6.9 percent every five years between 2010-2030. This method results in a forecast of 22 based aircraft at Cochise College Airport in 2030.

TABLE 2-4 FAA TAF METHOD

| Year | TAF Arizona Based Aircraft | Average Growth Rate | Based Aircraft |
|---|---|---|---|
| 2010 | 6,115 | 6.9% | **16**[1] |
| 2015 | 6,596 | 6.9% | **17** |
| 2020 | 7,121 | 6.9% | **19** |
| 2025 | 7,701 | 6.9% | **20** |
| 2030 | 8,341 | 6.9% | **22** |

[1]Based Aircraft per Airport Manager August 2011

The second forecasting method for based aircraft utilized a market share analysis based on the number of based aircraft within the U.S. general aviation fleet mix and the number of based aircraft at Cochise College Airport (**Table 2-5**). This market share was then applied to the general aviation fleet mix aircraft projections provided by the 2010 General Aviation

Manufacturer's Association Statistical Databook & Industry Outlook. This resulted in 19 based aircraft at Cochise College Airport in 2030.

TABLE 2-5 MARKET SHARE METHOD

| Year | Total U.S. General Aviation Fleet Mix | Cochise College Market Share Aircraft |
|---|---|---|
| 2010 | 229,699 | **16**[1] |
| 2015 | 239,522 | **17** |
| 2020 | 249,440 | **17** |
| 2025 | 262,772 | **18** |
| 2030 | 278,723 | **19** |

[1]Based Aircraft per Airport Manager August 2011

The third method utilized a bottom-up per capita approach that projects the number of based aircraft in direct proportion to the projected population of Cochise County (**Table 2-6**). This resulted in 23 based aircraft at Cochise College Airport in 2030.

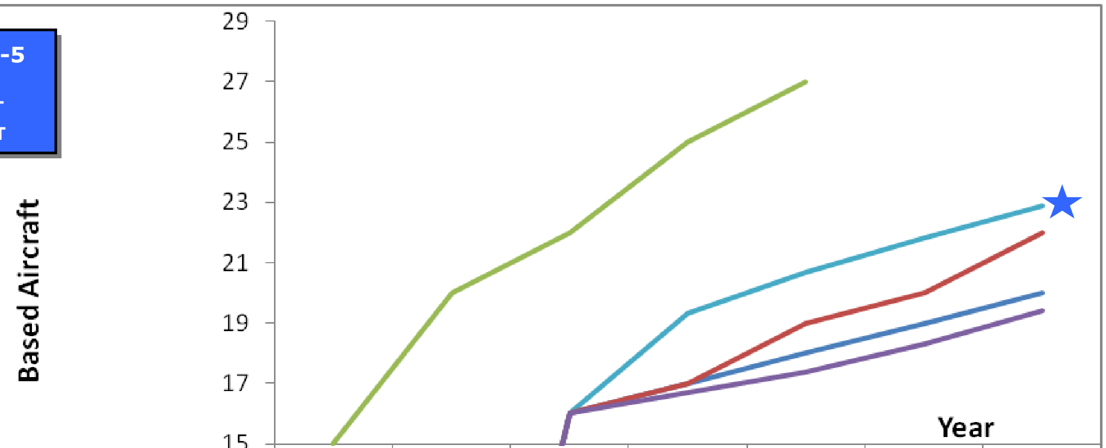
TABLE 2-6 PER CAPITA METHOD

| Year | Population | Aircraft |
|---|---|---|
| 2010 | 131,346 | **16**[1] |
| 2015 | 158,650 | **19** |
| 2020 | 169,717 | **21** |
| 2025 | 179,317 | **22** |
| 2030 | 187,725 | **23** |

[1]Based Aircraft per Airport Manager August 2011

It is anticipated that Cochise College Airport based aircraft growth rate will trend closer to the Per Capita Method. The methods do not vary significantly (4 based aircraft). As a result, the Per Capita Method was selected as the preferred based aircraft forecast (**Figure 2-5**).

**FIGURE 2-5 BASED AIRCRAFT FORECAST**




| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Arizona System Plan | 0 | 0 | 16 | 17 | 18 | 19 | 20 |
| Per Capita Method | 0 | 0 | 16 | 19 | 21 | 22 | 23 |
| TAF Method | 0 | 0 | 16 | 17 | 19 | 20 | 22 |
| Market Share Method | 0 | 0 | 16 | 17 | 17 | 18 | 19 |
| 2001 Cochise College Airport Master Plan | 15 | 20 | 22 | 25 | 27 | | |

### 2.7.2 ANNUAL AIRCRAFT OPERATIONS FORECAST

In order to develop a preferred method of forecasting aircraft operations at Cochise College Airport, a number of methods were analyzed. Each method utilizes the preferred based aircraft forecast of 22 based aircraft in 2030, and then applies an OPBA to the based aircraft forecast. The methods are summarized as follows:

Method 1: Existing operations and based aircraft (2,941 OPBA)

Method 2: FAA Order 5090.3C (750 OPBA)

Method 3: FAA Advisory Circular 150/5300-13 (538 OPBA)

Method 4: Arizona State System Plan and existing based aircraft (3,386 OPBA)

1. For the first method, the base year level of operations per based aircraft of 2,941 was applied to the preferred based aircraft forecast. Applying 2,941 OPBA to the preferred (22) based aircraft forecast results in 64,702 annual operations in 2030.

2. For the second method, a general guideline from FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) of 750 OPBA for airports with "unusual circumstances" was applied to the based aircraft forecast. Applying 750 OPBA to the preferred (22) based aircraft forecast results in 16,500 forecast operations in 2030.

3. The third method, as outlined in FAA Advisory Circular 150/5300-13, Airport Design, applied 538 OPBA (for Non-NPIAS Public Use Airports) to the preferred (22) based aircraft forecast. This method results in a forecast of 11,836 operations in 2030.

4. The fourth method, the Arizona State System Plan level of operations forecast for 2030 (71,100) was divided by the forecast number of based aircraft (22). Applying 3,232 OPBA to the preferred based aircraft forecast for 2010, 2015 and 2020 results in the forecast operations in those given years.

These estimates provide a likely range of activity for future operations at Cochise College Airport and are shown in **Figure 2-6**. Aircraft operations are expected to increase with the additional based aircraft and additional students in the college flight training program. Therefore it is reasonable to anticipate that the OPBA will remain fairly constant over the planning period.

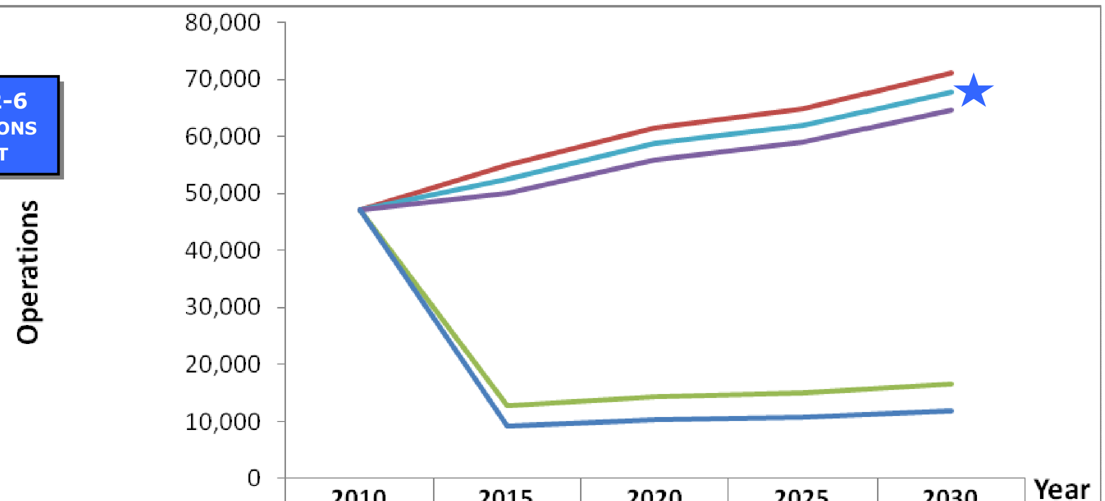
Method 2 and method 3 do not reflect the extensive flight training and flight testing activities at the airport. These methods were derived from FAA planning standards; however, the Cochise College Airport is unique in the operating characteristics not typical of a non-NPIAS rural airport.

Method 1 assumes the utilization of the based aircraft will remain constant over the planning period. Method 4 shows an increase of OPBA increase from 2,941 (Method 1) to 3,232. The average of method 1 and method 4 was used to result in a more conservative increase in OPBA. Therefore the average of method 1 and method 4 has been selected as the preferred operations forecast.

### 2.7.3 Itinerant and Local Operations

Local operations consist primarily of training and testing flights in the area. The remaining itinerant flights primarily consist of personal transportation, business transportation and recreational flights to and from other airports. The existing split of 90 percent local operations and 10 percent itinerant operations is expected to remain constant over the 20 year planning period. This is due to the extensive flight training and flight testing activities at the airport.

**Figure 2-6 Operations Forecast**




| | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| FAA Order 5090.3C | 47,050 | 12,750 | 14,268 | 15,055 | 16,500 |
| State System Plan | 47,050 | 54,944 | 61,488 | 64,878 | 71,100 |
| Preferred | 47,050 | 52,471 | 58,720 | 61,957 | 67,901 |
| Base Year Level of Operations | 47,050 | 49,997 | 55,951 | 59,037 | 64,702 |
| FAA Advisory Circular | 47,050 | 9,146 | 10,235 | 10,800 | 11,836 |

### 2.7.4 Fleet Mix

The future based aircraft fleet mix is anticipated to remain mostly single-engine aircraft with the possible addition of an additional multi-engine aircraft and additional UAVs. A detailed based aircraft forecast by aircraft type is shown in **Table 2-7**.

Table 2-7 Detailed Based Aircraft Forecast by Aircraft Type

| | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| Single Engine Aircraft | 14 | 15 | 16 | 17 | 18 |
| Operations | 44,698 | 49,847 | 55,784 | 58,859 | 64,505 |
| Multi Engine Piston | 1 | 2 | 2 | 2 | 2 |
| Operations | 1,000 | 1,119 | 1,251 | 1,320 | 1,447 |
| Unmanned Aerial Vehicle (UAV) | 1 | 2 | 3 | 3 | 3 |
| Operations | 1,352 | 1,505 | 1,685 | 1,778 | 1,949 |
| Total Based Aircraft | 16 | 19 | 21 | 22 | 23 |
| Total Operations | 47,050 | 52,471 | 58,720 | 61,957 | 67,901 |

Based on the forecasted types of uses for the airport, local and itinerant operations are expected to be conducted by light single and multi-engine aircraft and UAVs.

## 2.8 Instrument Operations

According to the FAA TAF, 21 percent of the total aircraft operations in Arizona are instrument operations. This number is forecasted to increase to 26 percent by 2030. Since virtually all commercial and business jet flights and most military aircraft flights are IFR (since they fly at or above 18,000 feet MSL), the number of instrument operations does not reflect the occurrence of instrument weather or the provision of instrument approaches at airports. At most general aviation airports with an instrument approach and little or no commercial service or military activity, instrument operations will comprise approximately 2.5 percent of total operations. The majority of general aviation operations are under VFR. Students seeking an instrument rating are the most likely users of an instrument approach at Cochise College Airport. Given most of the traffic at Cochise College Airport consists of light single and multi-engine aircraft, a moderate volume of training instrument operations could be expected. An increasing number of single-engine aircraft are being equipped for known-icing conditions and approach certified GPS receivers. Most turbo-props and VLJs are certified for known-icing. A future instrument approach at Cochise College Airport would be expected to be used approximately 5 percent of the time. The high projected utilization of the future instrument approach is based on the high level of flight training conducted at the airport. The instrument approach utilization would be primarily based on practice instrument approach procedures.

## 2.9 PREFERRED FORECAST OF AVIATION ACTIVITY

**Table 2-8** shows the preferred forecast of aviation activity for Cochise College Airport.

TABLE 2-8 PREFERRED FORECAST OF AVIATION ACTIVITY

| Year | Based Aircraft | Local Operations | Itinerant Operations | Total Operations | Instrument Operations |
|---|---|---|---|---|---|
| 2010 | 16 | 44,698 | 2,353 | 47,050 | 0[1] |
| 2015 | 19 | 49,847 | 2,624 | 52,471 | 2,624[2] |
| 2020 | 21 | 55,784 | 2,936 | 58,720 | 2,936[2] |
| 2025 | 22 | 58,859 | 3,098 | 61,957 | 3,098[2] |
| 2030 | 23 | 64,506 | 3,395 | 67,901 | 3,395[2] |

[1]No Existing Instrument Approach Procedure. Aircraft operating in VMC under IFR flight plan.
[2]Assumes an Instrument Approach Procedure for Cochise College Airport.

## 2.10 AIRPORT SEASONAL USE DETERMINATION

A seasonal fluctuation in aircraft operations may be expected at any airport. This fluctuation is most apparent in regions with severe winter weather patterns and at non-towered general aviation airports. The fluctuation is less pronounced at major airports, with a high percentage of commercial and scheduled airline activity.

Non-towered airports generally experience a substantially higher number of operations in summer months than off-season months. The average seasonal use trend for FAA towered airports from the 1979-1984 records (total aircraft operations handled by tower facilities nationally from FAA Statistical Handbook of Aviation) was used as a baseline for determining seasonal use trends. As discussed above, the seasonal fluctuation is more pronounced at non-towered airports than towered airports. The seasonal use trend for towered airports was adjusted to approximate seasonal use trends at non-towered airports. The activity at the Cochise College Airport is based primarily on flight training activity from the College, therefore the typical non-towered seasonal use trend would not apply. A seasonal use trend was developed for Cochise College based on student flight activity. The high activity levels are during the spring and fall semesters and the low is during the summer time. This is presented in **Table 2-9** and in **Figure 2-7**.

TABLE 2-9 SEASONAL USE TREND

| Month | Non-towered | Towered | Cochise College |
|---|---|---|---|
| January | 3.5% | 7.2% | 4.2% |
| February | 4.0% | 8.2% | 12.7% |
| **March** | 4.8% | 8.6% | **13.1%** |
| April | 7.5% | 9.0% | 12.5% |
| May | 11.3% | 9.1% | 8.8% |
| **June** | 13.5% | **9.4%** | 3.2% |
| **July** | **14.8%** | 9.1% | 2.1% |
| August | 13.0% | 8.7% | 3.2% |
| September | 10.0% | 8.7% | 10.9% |
| October | 8.0% | 7.8% | 12.5% |
| November | 5.8% | 7.1% | 12.6% |
| December | 3.8% | 7.1% | 4.2% |

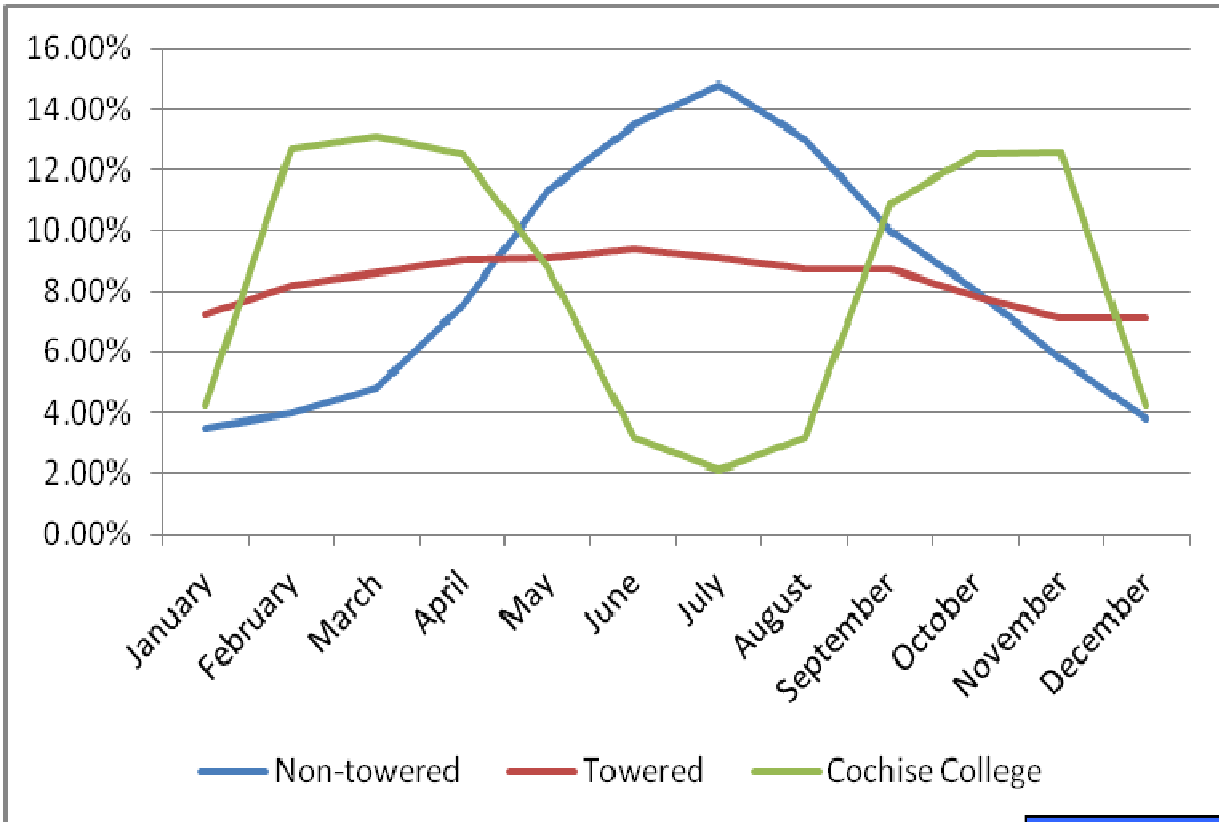



**FIGURE 2-7**
**SEASONAL USE TREND**

## 2.11 HOURLY DEMAND AND PEAKING TENDENCIES

In order to arrive at a reasonable estimate of demand at the airport facilities, it was necessary to develop a method to calculate the levels of activity during peak periods. The periods normally used to determine peaking characteristics are defined below:

<u>Peak Month</u>: The calendar month when peak enplanements or operations occur.

<u>Design Day</u>: The average day in the peak month derived by dividing the peak month enplanements or operations by the number of days in the month.

<u>Busy Day</u>: The Busy Day of a typical week in the peak month. In this case, the Busy Day is equal to the Design Day.
<u>Design Hour</u>: The peak hour within the Design Day. This descriptor is used in airfield demand/capacity analysis, as well as in determining terminal building, parking apron and access road requirements.

<u>Busy Hour</u>: The peak hour within the Busy Day. In this case, the Busy Hour is equal to the Design Hour.

The Seasonal Use Trend Curve, as presented in **Figure 2-7**, was used as a tool to determine the peaking characteristics for the Cochise College Airport. Using the Seasonal Use information, a formula was derived which will calculate the average daily operations in a given month, based on the percentage of the total annual operations for that month, as determined by the curve. The formula is as follows:

$$M = A(T/100)$$
$$D = M/(365/12)$$

*Where* T = Monthly percent of use (from curve)
M = Average monthly operations
A = Total annual operations
D = Average Daily Operations in a given month

Approximately 90 percent of total daily operations occur between the hours of 7:00 AM and 7:00 PM (12 hours) at a typical general aviation airport, meaning the maximum peak hourly occurrence may be 50 percent greater than the average of the hourly operations calculated for this time period.

The Estimated Peak Hourly Demand (P) in a given month was, consequently, determined by compressing 90 percent of the Average Daily Operations (D) in a given month into the 12-hour peak use period, reducing that number to an hourly average for the peak use period and increasing the result by 50 percent as follows:

$$P = 1.5(0.90D/12)$$

*Where* D = Average Daily Operations in a given month.
P = Peak Hourly Demand in a given month.

The calculations were made for each month of each phase of the planning period. The results of the calculations are shown in **Table 2-10**. As is evident in the Table, the Design Day and Design Hour peak demand in the planning year occurs under VFR weather conditions in the month of July (highlighted in bold in each Table), with 324 daily operations and approximately 27 operations per hour in 2030.

TABLE 2-10 ESTIMATED HOURLY DEMAND/MONTH
MONTHLY/DAILY/HOURLY DEMAND

Planning Year: 2015
Operations: 52,471

| Month | % Use | Operations Monthly | Daily | Hourly |
|---|---|---|---|---|
| January | 4.2 | 2,204 | 71 | 6 |
| February | 12.7 | 6,664 | 238 | 20 |
| March | **13.1** | **6,874** | **222** | **18** |
| April | 12.5 | 6,559 | 219 | 18 |
| May | 8.8 | 4,617 | 149 | 12 |
| June | 3.2 | 1,679 | 56 | 5 |
| **July** | 2.1 | 1,102 | 36 | 3 |
| August | 3.2 | 1,679 | 54 | 5 |
| September | 10.9 | 5,719 | 191 | 16 |
| October | 12.5 | 6,559 | 212 | 18 |
| November | 12.6 | 6,611 | 220 | 18 |
| December | 4.2 | 2,204 | 71 | 6 |

Planning Year: 2020
Operations: 58,720

| Month | % Use | Operations Monthly | Daily | Hourly |
|---|---|---|---|---|
| January | 4.2 | 2,466 | 80 | 7 |
| February | 12.7 | 7,457 | 266 | 22 |
| **March** | **13.1** | **7,692** | **248** | **21** |
| April | 12.5 | 7,340 | 245 | 20 |
| May | 8.8 | 5,167 | 167 | 14 |
| June | 3.2 | 1,879 | 63 | 5 |
| July | 2.1 | 1,233 | 40 | 3 |
| August | 3.2 | 1,879 | 61 | 5 |
| September | 10.9 | 6,400 | 213 | 18 |
| October | 12.5 | 7,340 | 237 | 20 |
| November | 12.6 | 7,399 | 247 | 21 |
| December | 4.2 | 2,466 | 80 | 7 |

Planning Year: 2025
Operations: 61,957

| Month | % Use | Operations Monthly | Daily | Hourly |
|---|---|---|---|---|
| January | 4.2 | 2,602 | 84 | 7 |
| February | 12.7 | 7,869 | 281 | 23 |
| March | **13.1** | **8,116** | **262** | **22** |
| April | 12.5 | 7,745 | 258 | 22 |
| May | 8.8 | 5,452 | 176 | 15 |
| June | 3.2 | 1,983 | 66 | 6 |
| **July** | 2.1 | 1,301 | 42 | 3 |
| August | 3.2 | 1,983 | 64 | 5 |
| September | 10.9 | 6,753 | 225 | 19 |
| October | 12.5 | 7,745 | 250 | 21 |
| November | 12.6 | 7,807 | 260 | 22 |
| December | 4.2 | 2,602 | 84 | 7 |

Planning Year: 2030
Operations: 67,901

| Month | % Use | Operations Monthly | Daily | Hourly |
|---|---|---|---|---|
| January | 4.2 | 2,852 | 92 | 8 |
| February | 12.7 | 8,623 | 308 | 26 |
| March | **13.1** | **8,895** | **287** | **24** |
| April | 12.5 | 8,488 | 283 | 24 |
| May | 8.8 | 5,975 | 193 | 16 |
| June | 3.2 | 2,173 | 72 | 6 |
| **July** | 2.1 | 1,426 | 46 | 4 |
| August | 3.2 | 2,173 | 70 | 6 |
| September | 10.9 | 7,401 | 247 | 21 |
| October | 12.5 | 8,488 | 274 | 23 |
| November | 12.6 | 8,556 | 285 | 24 |
| December | 4.2 | 2,852 | 92 | 8 |

## 2.12 FORECAST SUMMARY

The recommended forecasts for Cochise College Airport are summarized below in **Table 2-11**. The forecast as presented in this chapter will be used throughout the remainder of the Airport Master Plan. The next in the Airport Master Plan process is to determine the capacity of the existing facilities and to determine what facilities will be needed to meet future demand.

TABLE 2-11 FORECAST SUMMARY

**Itinerant Operations**

| Year | Air Carrier | Air Taxi | General Aviation | Military | TOTAL |
|---|---|---|---|---|---|
| 2010 | 0 | 0 | 2,303 | 50 | 2,353 |
| 2015 | 0 | 0 | 2,574 | 50 | 2,624 |
| 2020 | 0 | 0 | 2,886 | 50 | 2,936 |
| 2025 | 0 | 0 | 3,048 | 50 | 3,098 |
| 2030 | 0 | 0 | 3,345 | 50 | 3,395 |

Local Operations

| Year | General Aviation | Military | TOTAL |
|---|---|---|---|
| 2010 | 44,698 | 0 | 44,698 |
| 2015 | 49,847 | 0 | 49,847 |
| 2020 | 55,784 | 0 | 55,784 |
| 2025 | 58,859 | 0 | 58,859 |
| 2030 | 64,506 | 0 | 64,506 |

Totals

| Year | Total Operations | Instrument Operations | Based Aircraft |
|---|---|---|---|
| 2010 | 47,050 | 0 | 16 |
| 2015 | 52,471 | 2,624 | 19 |
| 2020 | 58,720 | 2,936 | 21 |
| 2025 | 61,957 | 3,098 | 22 |
| 2030 | 67,901 | 3,395 | 23 |

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