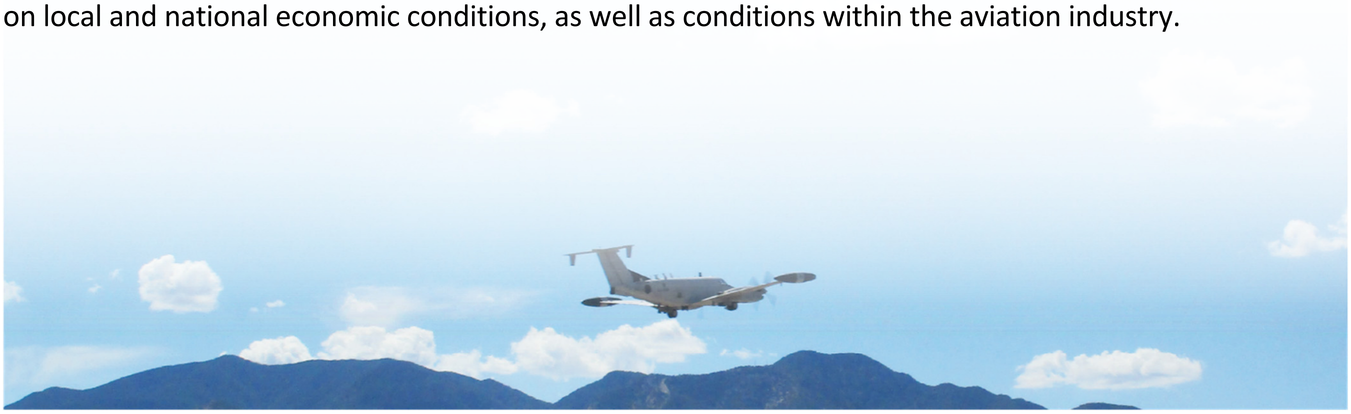
CHAPTER 2
FORECASTS

In airport master planning, proper facility planning begins with identifying the demand that may be expected to occur at an airport. This involves projecting potential aviation activity for at least a 20-year timeframe. Aviation demand forecasting for Sierra Vista Municipal Airport (FHU) will focus on demand indicators, including annual aircraft operations for general aviation, air taxi, and military, as well as general aviation based aircraft, based aircraft fleet mix, and overall operational peaking periods.

The Federal Aviation Administration (FAA) has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. In addition, aviation activity forecasts are often an important input to future benefit-cost analyses associated with airport development, and the FAA reviews these analyses when federal funding requests are submitted.

The FAA will review individual airport forecasts with the objective of comparing them to its *Terminal Area Forecast* (TAF) and the *National Plan of Integrated Airport Systems* (NPIAS). Even though the TAF is updated annually, it is developed by FAA personnel in Washington, D.C., and it is common to encounter a disparity between the TAF and more localized master planning forecast efforts. Historically, the disparity is primarily due to the TAF forecasters' lack of knowledge about local conditions or recent trends. In recent years, however, the FAA improved its forecast model to be a demand-driven forecast for aviation services, based on local and national economic conditions, as well as conditions within the aviation industry.



When reviewing a sponsor's forecast (from the master plan), the FAA must ensure that the forecast is based on reasonable planning assumptions, uses current data, and is developed using appropriate forecast methods. According to the FAA, forecasts should be:

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

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

1) **Identify Aviation Activity Measures**: Determine the levels and types of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations.

2) **Review Previous Airport Forecasts**: These may include the FAA's TAF, state or regional system plans, and previous master plans.

3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.

4) **Select Forecast Methods**: Several appropriate methodologies and techniques are available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.

5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.

6) **Summarize and Document Results**: Provide supporting text and tables, as necessary.

7) **Compare Forecast Results with the FAA's TAF**: Based aircraft and total operations are considered consistent with the TAF if they meet the following criteria:
    - Forecasts differ by less than 10 percent in the five-year forecast period and less than 15 percent in the 10-year forecast period;
    - Forecasts do not affect the timing or scale of an airport project; and
    - Forecasts do not affect the role of the airport, as defined in the current version of FAA Order 5090.5, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) and the Airports Capital Improvement Plan (ACIP)*.

There are many factors that can influence aviation activity, and these can occur at local, regional, and national levels; the COVID-19 pandemic is one recent example. It is virtually impossible to predict year-to-year fluctuations of activity over 20 years with any certainty, and it is important to remember that forecasts should serve only as guidelines. Long-term planning must remain flexible enough to respond to a range of unforeseen developments.

The following forecast analysis for the airport was produced following the guidelines outlined above. Existing forecasts are examined and compared against current and historical activity. The historical aviation activity is then examined, along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation demand projections for the airport that will permit airport management to make planning adjustments, as necessary, to maintain a viable, efficient, and cost-effective facility.

The forecasts for this master plan will utilize a base year of 2023 with a long-range forecast out to 2043.

NATIONAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for large air carriers, regional/commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet the budget and planning needs of the FAA and provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition upon preparation of this chapter was *FAA Aerospace Forecast – Fiscal Years 2023-2043*, which was published in May 2023. The FAA primarily uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets. The following discussion is summarized from the *FAA Aerospace Forecast*.

Since its deregulation in 1978 and the Great Recession of 2007-2009, the U.S. commercial air carrier industry has been characterized by boom-to-bust cycles. The volatility associated with these cycles was thought by many to be a structural feature of an industry that was capital intensive but cash poor; however, the Great Recession of 2007-2009 marked a fundamental change in the operations and finances of U.S. airlines. Since the end of the recession in 2009, U.S. airlines have revamped their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry experienced an unprecedented period of consolidation, with three major mergers occurring within five years. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The COVID-19 pandemic in 2020 effectively ended those boom years, with airline activity and profitability plummeting almost overnight. In response, airlines cut capacity and costs, and most were able to weather the storm. Although some small regional carriers ceased operations as a result of the pandemic, no mainline carriers did. Some segments of aviation were less impacted. Cargo activity surged, boosted by consumer purchases, and general aviation generally maintained pre-pandemic levels of activity.

By the middle of 2021, leisure travel began to rebound with the introduction of vaccines and the lifting of some local restrictions. Two new low-cost carriers were formed and one regional carrier that ceased operations in 2020 was revived. By the third quarter of 2021, industry profitability neared the breakeven point, and by the end of 2022, U.S. airlines reported that business demand had recovered to 70-80 percent of pre-pandemic levels. Higher fares accompanied the strong rebound in leisure demand, leading to positive financial results. The top nine U.S. passenger carriers posted operating and net profits, proving strong success for the new business models air carriers utilized to weather the pandemic.

The business changes airlines implemented due to the pandemic will shape the industry long after recovery is complete. Airlines retired older, less fuel-efficient aircraft and encouraged voluntary employee separations. This led to airlines seeking newer aircraft investments while meeting the current demand for the rebuilding of business and international travel, which lagged behind leisure travel during the recovery. There is confidence that U.S. airlines can generate solid returns on capital and sustained profits; however, over the long term, aviation demand will be driven by economic activity as the growing U.S. and world economies provide the basis for aviation growth.

ECONOMIC ENVIRONMENT

According to the FAA forecast, the annual gross domestic product (GDP) of the U.S. is expected to increase by 1.8 percent over the next 20 years. U.S. carriers posted an unexpected profit in 2022, and the FAA expects carriers to remain profitable over the next few years as demand rises, despite higher fares, which offset the raised labor and fuel costs. As yields stabilize and carriers return to levels of capacity consistent with their fixed costs and shed excess debt, consistent profitability should continue. Over the long term, a competitive and profitable aviation industry is anticipated, characterized by increasing demand for air travel. Airfares are expected to grow more slowly than overall inflation, reflecting growing U.S. and global economies.

Prior to the COVID-19 pandemic, the U.S. economy was recovering from the most serious economic downturn and slow recovery since the Great Depression. Demand for aviation is fundamentally driven by economic activity; as economic growth picks up, so will growth in aviation activity. Overall, the FAA forecast calls for annual passenger growth over the next 20 years to average 2.7 percent. Oil prices surged to $93 per barrel in 2022 – largely due to the Russian invasion of Ukraine – after averaging $55 per barrel over the five-year period from 2016 to 2021. Prices are expected to ease over the next two years before slowly climbing to $113 per barrel by the end of the forecast period in 2043.

FAA GENERAL AVIATION FORECASTS

The long-term outlook for general aviation (GA) is promising, as growth at the high end of the segment offsets continuing retirements at the traditional low end. The active general aviation fleet is forecast to remain relatively stable between 2023 and 2043, increasing by just 0.2 percent. While steady growth in both GDP and corporate profits result in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period.

The FAA forecasts the fleet mix and hours flown for single-engine piston (SEP) aircraft; multi-engine piston (MEP) aircraft; turboprops; business jets; piston and turbine helicopters; and light sport, experimental, and other aircraft (e.g., gliders and balloons). The FAA forecasts active aircraft, not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category. **Table 2A** shows the primary general aviation demand indicators, as forecast by the FAA.

TABLE 2A | FAA General Aviation Forecast

Demand Indicator	2023	2043	CAGR
GENERAL AVIATION FLEET			
Total Fixed-Wing Piston	136,290	118,975	-0.7%
Total Fixed-Wing Turbine	26,645	39,740	2.0%
Total Helicopters	10,320	13,870	1.5%
Total Other (experimental, light sport, etc.)	35,840	43,810	1.0%
Total GA Fleet	**209,095**	**216,395**	**0.2%**
GENERAL AVIATION OPERATIONS			
Local	14,801,816	16,622,293	0.6%
Itinerant	15,077,947	16,704,132	0.5%
Total General Aviation Operations	**29,879,763**	**33,326,425**	**0.5%**

CAGR = compound annual growth rate (2023-2043)

Source: FAA Aerospace Forecast – FY 2023-2043

General Aviation Fleet Mix

For 2023, the FAA estimates there are 136,290 piston-powered fixed-wing aircraft in the national fleet. That number is forecast to decline by 0.7 percent by 2043, resulting in 118,975 aircraft. This includes a decline of 0.7 percent in SEP aircraft and a decline of 0.2 percent in MEP aircraft.

Total turbine aircraft are forecast to grow at an annual rate of 2.0 percent through 2043. The FAA estimates there are 26,645 turbine-powered fixed-wing aircraft in the national fleet in 2023, which will grow to 39,740 by 2043. Turboprops are forecast to grow by 0.8 percent annually, while business jets are projected to grow by 2.7 percent annually through 2043.

Total helicopters are projected to grow by 1.5 percent annually in the forecast period. There are an estimated 10,320 total helicopters in the national fleet in 2023, and that number is expected to grow to a total of 13,870 by 2043. This includes annual growth rates of 0.5 percent for piston helicopters and 1.8 percent for turbine helicopters.

Additionally, the FAA forecasts experimental aircraft, light sport aircraft (LSA), and others. Combined, there are an estimated 35,840 other aircraft in 2023, which are forecast to grow to 43,810 by 2043, for an annual growth rate of 1.0 percent.

General Aviation Operations

The FAA also forecasts total operations based on activity at control towers across the United States. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 29.9 million in 2023 to 33.3 million in 2043, with an average increase of 0.5 percent per year due to growth in turbine, rotorcraft, and experimental hours offsetting a decline in fixed-wing piston hours. This includes annual growth rates of 0.6 percent for local general aviation operations and 0.5 percent for itinerant general aviation operations. **Exhibit 2A** presents the historical and forecast U.S. active general aviation aircraft and operations.

General Aviation Aircraft Shipments and Revenue

On an annual basis, the General Aviation Manufacturers Association (GAMA) publishes an aviation industry outlook, which documents past and current trends and provides an assessment of the future condition of the general aviation industry. **Table 2B** presents historical data related to general aviation aircraft shipments.

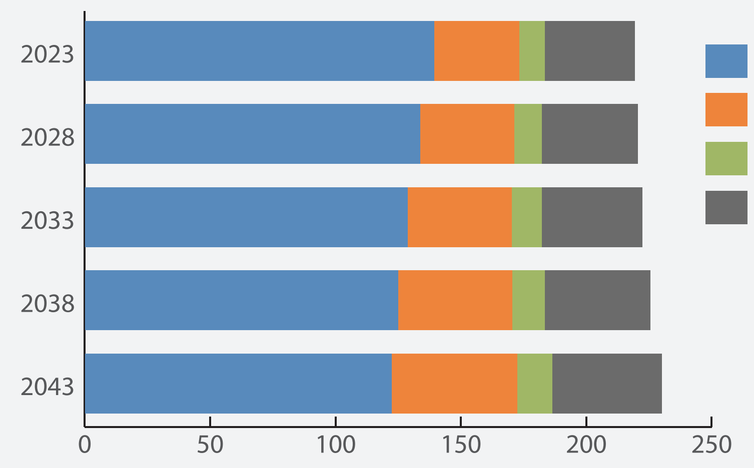
Worldwide shipments of general aviation airplanes increased in the year 2022, with a total of 2,818 units delivered around the globe, compared to 2,646 units in 2021. This made 2022 the second year in a row to experience an increase after the drop during 2020, when only 2,408 units were delivered. Worldwide general aviation billings were the highest in 2014. In 2022, an increase in new aircraft shipments generated more than $22 billion, compared to $21.6 billion in the previous year. North America continues to be the largest market for general aviation aircraft and leads in the manufacturing of piston, turboprop, and jet aircraft. The Asia-Pacific region is the second largest market for piston-powered aircraft, while Latin America is second leading in the turboprop market and Europe leads in business jet deliveries.

Business Jets | Business jet deliveries increased from 710 units in 2021 to 712 units in 2022. The North American market accounted for 67.6 percent of business jet deliveries, which is a 1.7 percent increase in market share compared to 2021.

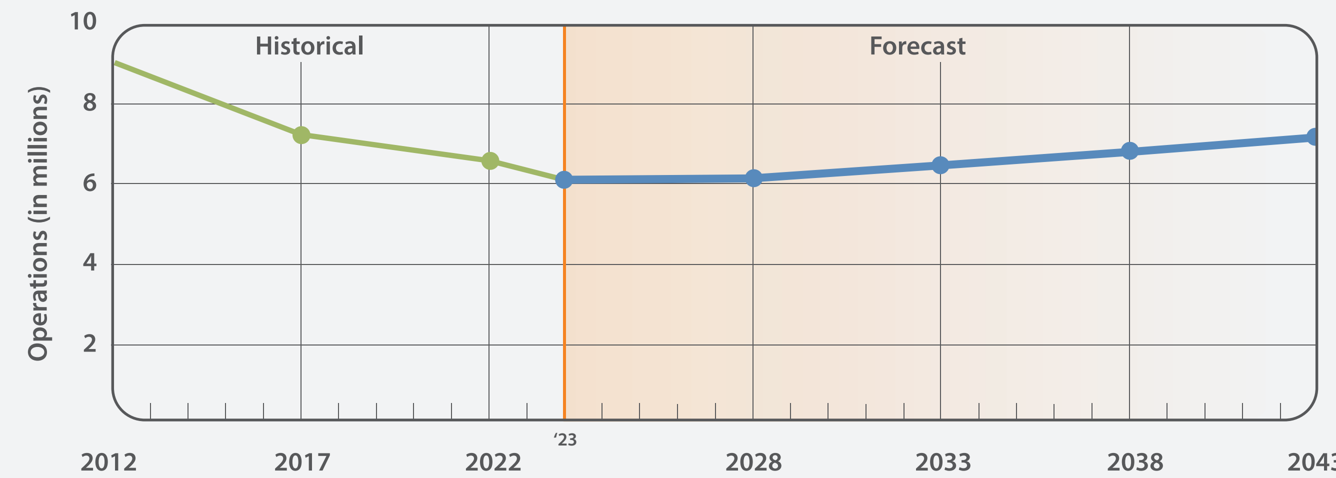
Turboprops | Turboprop shipments increased from 527 in 2021 to 582 in 2022. North America's market share of turboprop aircraft increased by 3.1 percent in the last year. The Europe, Middle East and Africa, and Asia-Pacific market shares decreased, while the Latin America market share increased.

Pistons | In 2022, piston airplane shipments increased to 1,524 units from 1,409 units in the prior year. North America's market share of piston aircraft deliveries rose 1.2 percent from 2021. The Europe, Latin America, and Middle East and Africa regions experienced a positive rate in market shares during the past year, while the Asia-Pacific market saw a decline.

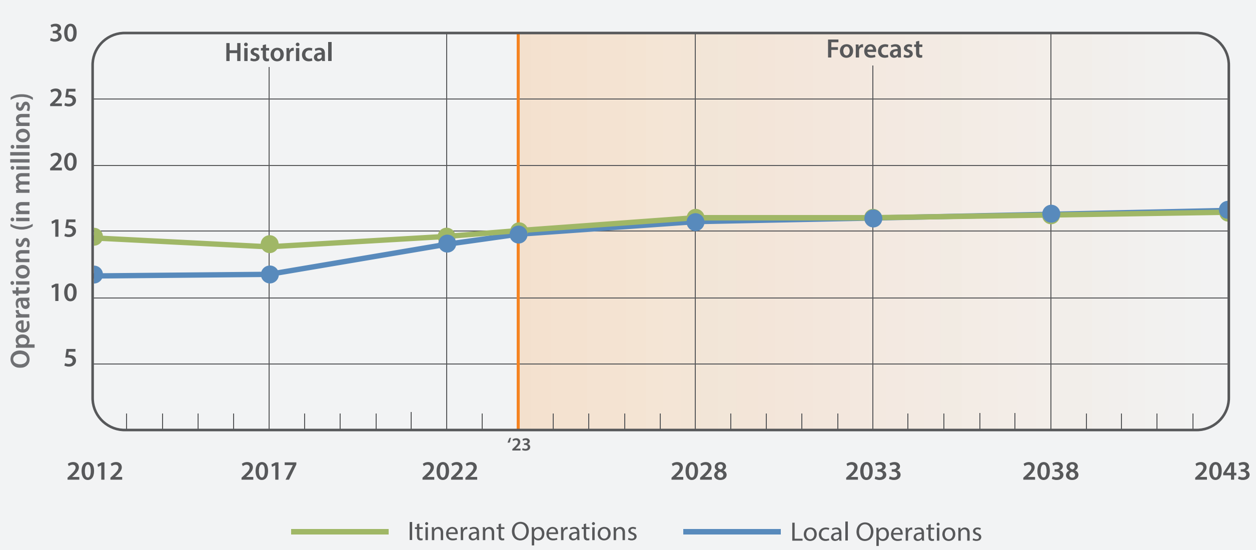
U.S. Active General Aviation Aircraft



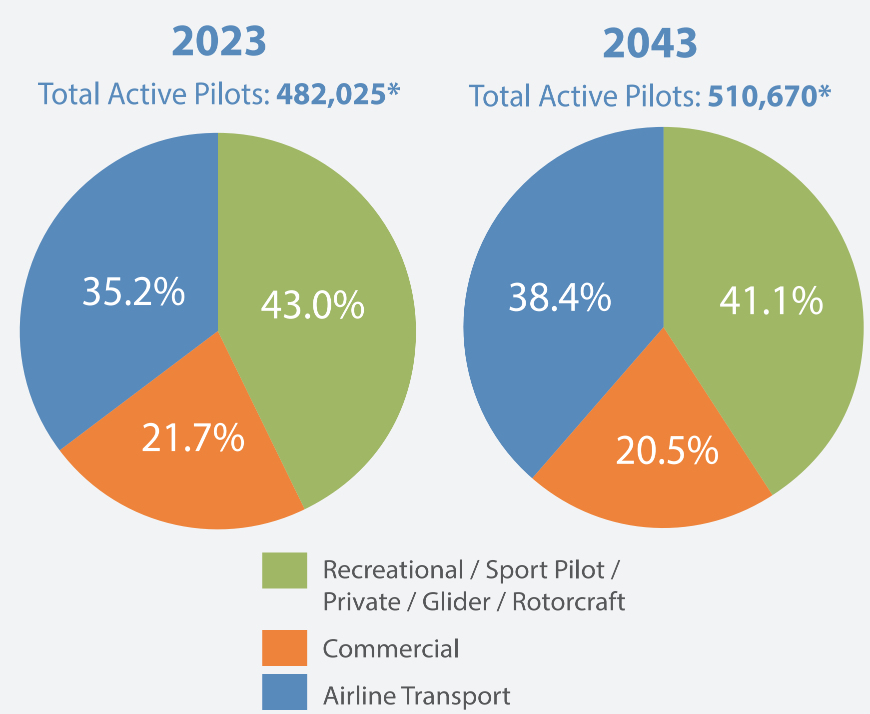
U.S. Air Taxi Operations



U.S. General Aviation Operations



Active Pilots By Certificate



**Excludes Student Pilot Certificates*

Source: FAA Aerospace Forecasts FY2023-2043

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TABLE 2B | Annual General Aviation Airplane Shipments						
Manufactured Worldwide and Factory Net Billings						
Year	Total	SEP	MEP	TP	J	Net Billings ($ million)
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,129
2016	2,268	890	129	582	667	21,092
2017	2,324	936	149	563	676	20,197
2018	2,441	952	185	601	703	20,515
2019	2,658	1,111	213	525	809	23,515
2020	2,408	1,164	157	443	644	20,048
2021	2,646	1,261	148	527	710	21,603
2022	2,818	1,366	158	582	712	22,866

SEP = single-engine piston
MEP = multi-engine piston
TP = turboprop
J = jet

Source: General Aviation Manufacturers Association (GAMA) 2022 Annual Report

U.S. PILOT POPULATION

There were 476,346 active pilots certificated by the FAA at the end of 2022, with 482,025 active pilots projected in 2023. All pilot categories – except private and recreational-only certificates – are expected to continue to increase for the forecast length. Excluding student pilots, the number of active pilots is projected to increase by about 28,645 (up 0.3 percent annually) between 2023 and 2043. The airline transport pilot (ATP) category is forecast to increase by 26,200 (up 0.7 percent annually). Sport pilots are predicted to increase by 2.5 percent, commercial pilots will remain steady over the forecast period, and private pilot certificates are projected to decrease at an average annual rate of 0.2 percent through 2043. The FAA has currently suspended the student pilot forecast.

CIVILIAN UNMANNED AIRCRAFT SYSTEMS (UAS)

UAS, which are commonly referred to as drones, have been experiencing healthy growth in the U.S. and around the world in the past few years. According to the *FAA Aerospace Forecast – Fiscal Years 2023-2043*:

> "A drone consists of a remotely piloted aircraft and its associated elements – including the control station and the associated communication links – that are required for the safe and efficient operation in the national airspace system (NAS). The introduction of drones in the NAS has opened up numerous possibilities, especially from a commercial perspective. This has also brought challenges including drones' safe and secure integration into the NAS. Despite these challenges, the drone sector holds enormous promise; potential uses range from individuals flying solely for recreational purposes to large companies delivering commercial packages and delivering medical supplies. Public service uses, such as conducting search and rescue support missions following natural disasters, are proving promising as well."

On December 21, 2015, the FAA launched an online registration system for recreational/model small drones, requiring all drones weighing more than 0.55 pounds (or 250 grams) and fewer than 55 pounds (or 25 kilograms) to be registered. The registration system captures the number of registered pilots but does not capture individual drone aircraft; nevertheless, the registration information provides a basic understanding of the growth in drone activity from which the FAA has forecast drone growth for the next five years.

Trends in Recreational/Model Aircraft

Through an examination of the drone aircraft registrations and renewals, the FAA estimated as many as 1.69 million small drones in the national fleet. The FAA developed three forecasts, which are presented in **Table 2C**. The FAA is forecasting as many as 1.89 million small drones by 2027.

TABLE 2C | Total Recreational/Model Fleet

Fiscal Year	Low*	Base**	High**
2022	612,200	1,688,500	1,688,500
FORECAST			
2023	620,500	1,750,200	1,762,200
2024	639,300	1,785,400	1,815,800
2025	654,800	1,803,500	1,852,000
2026	663,400	1,814,900	1,875,700
2027	668,500	1,823,400	1,891,800
CAGR	**1.78%**	**1.55%**	**2.30%**

*Effective/active fleet counts combined with multiplicity of aircraft ownership
**New registration counts combined with multiplicity of aircraft ownership
CAGR = compound annual growth rate

Source: FAA Aerospace Forecast FY 2023-2043

Trends in Commercial/Non-Model UAS Aircraft

Online registration for commercial/non-model small drones went into effect on April 1, 2016. These are commercial drones weighing less than 55 pounds. Unlike recreational/model ownership, each aircraft must be registered individually. Registrations of commercial/non-model UAS aircraft have been increasing yearly, according to the FAA. **Table 2D** shows the FAA forecast for this category of UAS. It is estimated that there were up to 727,000 commercial/non-model UAS in 2022, which is forecast to increase to 1,015,000 by 2027.

TABLE 2D | Total Commercial/Non-Model Fleet

Fiscal Year	Low*	Base**	High**
2022	328,000	727,000	727,000
FORECAST			
2023	349,000	805,000	807,000
2024	364,000	862,000	867,000
2025	373,000	904,000	915,000
2026	378,000	933,000	966,000
2027	382,000	955,000	1,015,000
CAGR	**3.10%**	**5.61%**	**6.90%**

*Effective/active fleet counts combined with multiplicity of aircraft ownership
**New registration counts combined with multiplicity of aircraft ownership
CAGR = compound annual growth rate

Source: FAA Aerospace Forecast FY 2023-2043

Trends in Large UAS

Drones weighing 55 pounds or more cannot be operated as recreational remote piloted aircraft. They are registered with the FAA using the existing aircraft registration system. At present, most large drones are flown by government entities, but commercial operators have steadily increased in 2022; most new large drone operators are active in agricultural spraying operations. The FAA estimates there were 1,206 large drones operating in the NAS in 2022. The FAA forecasts 12,651 commercial large drones will be operating by 2027.

Advanced Air Mobility (AAM)

The AAM segment has some crossover with the functions of the drone segment. The FAA defines AAM as "a safe and efficient system for air passenger and cargo transportation, inclusive of small package delivery and other urban drone services, which support a mix of onboard/ground-piloted and increasingly autonomous operations."

AAM technology presents considerable opportunities for economic growth over the coming decades. The FAA forecasts indicate that package delivery is likely to experience economic growth over the next decade. On the other hand, passenger service promises larger markets for AAM services, but safety challenges, infrastructure, public acceptance, and evolving technology may slow full integration in the short term; nevertheless, flight testing continues, with numerous commercial companies conducting test flights. An example is the advancements that Joby Aviation has made with its electric vertical takeoff and landing (eVTOL) aircraft, which received its Part 135 air carrier FAA certification in May 2022. Currently, this aircraft can fly over 150 miles on one battery charge and can carry four passengers.

One of the potential challenges of eVTOL entering the marketplace is infrastructure. A system of vertiports for AAM services appears to be the preferred method of operation. Joby Aviation and Archer have partnered with parking garage operator REEF Technology with the goal of using parking garage rooftops as vertiports. Other options may include establishing vertiports at existing airports.

RISKS TO THE FORECAST

While the FAA is confident that its forecasts for aviation demand and activity can be reached, they are dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic introduced a new risk, and although the industry has rebounded, the threat of future global health emergencies and potential economic fallout remains.

AIRPORT SERVICE AREA

The initial step in determining the aviation demand for an airport is to define its generalized service area for various segments of aviation. The service area is determined primarily by evaluating the locations of competing airports, their capabilities, their services, and their relative attraction and convenience. In determining the aviation demand for an airport, it is necessary to identify the role of the airport, as well as the specific areas of aviation demand the airport is intended to serve. Sierra Vista Municipal Airport is classified as a Local General Aviation (GA) airport within the NPIAS, meaning that its primary role is to provide the community with access to local and regional markets. General aviation, which includes all segments of the aviation industry except commercial air carriers and the military, is the largest component of the national aviation system. It includes activities such as pilot training, recreational flying, and the use of sophisticated turboprop and jet aircraft for business and corporate use.

The service area for an airport is a geographic region from which an airport can be expected to attract the largest share of its activity. The definition of the service area can be used to identify other factors, such as socioeconomic and demographic trends, that influence aviation demand at an airport. Aviation demand is impacted by the proximity of competing airports, the surface transportation network, and the strength of general aviation services provided by an airport and competing airports.

As in any business enterprise, the more attractive the facility is in terms of service and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of its service area. If facilities and services are adequate and/or competitive, some level of aviation activity might be attracted to an airport from more distant locales.

As a Local GA airport, Sierra Vista Municipal Airport's service area is driven by aircraft owners/operators and where they choose to base their aircraft. The primary consideration of aircraft owners/operators when choosing where to base their aircraft is convenience (i.e., easy access and proximity to the airport). As a general rule, an airport's service area can extend up to and beyond 30 miles. The proximity and level of general aviation services are largely a defining factor when describing the general aviation service area. A description of nearby airports was previously completed in Chapter One and presented on **Exhibit 1H**. There are four public-use airports within 30 nautical miles (nm) of Sierra Vista Municipal Airport – Tombstone Municipal (P29), Benson Municipal (E95), Bisbee Municipal (P04), and Nogales International (OLS) Airports – which provide varying levels of services and amenities.

When discussing the general aviation service area, two primary demand segments need to be addressed. The first component is the airport's ability to attract based aircraft, with the most effective method being to examine the number of registered aircraft owners in proximity to the airport. As previously mentioned, aircraft owners typically choose to base at airports near their homes or businesses. Based on the current registered aircraft data, presented on **Exhibit 2B**, there are 162 registered aircraft within 30 nm of Sierra Vista Municipal Airport. This includes aircraft registered in Cochise, Santa Cruz, and Pima Counties. Of these 162 aircraft, 61 (or approximately 38 percent) are based at the airport, according to airport records.[1]

The second demand segment to consider is itinerant aircraft operations. In most instances, a pilot will opt to utilize an airport nearer their intended destination; however, this is also dependent on the airport's capabilities in accommodating the aircraft operator. As a result, airports offering better services and facilities are more likely to attract itinerant operators in the region.

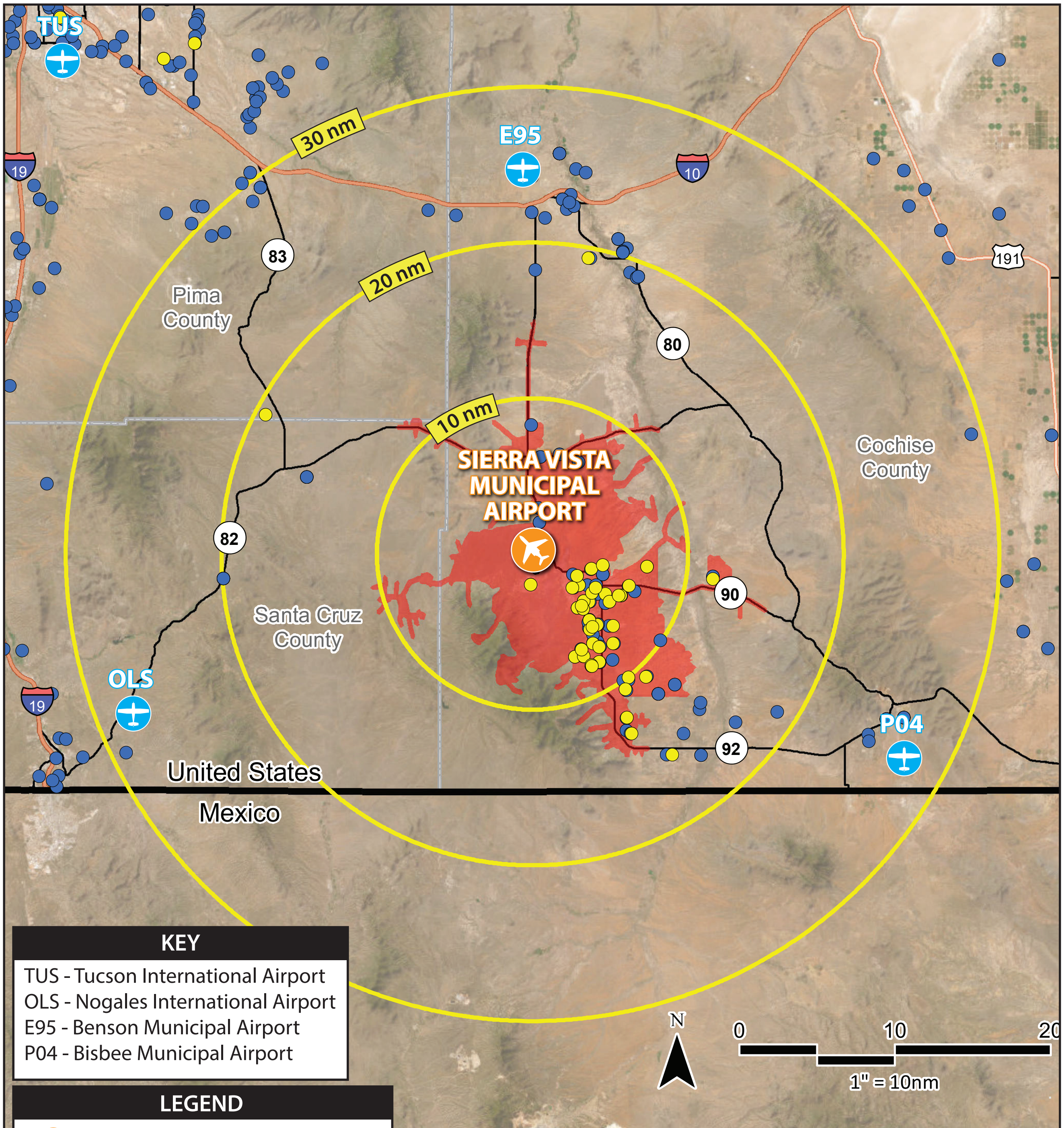
With several competing airports in the region, Sierra Vista Municipal Airport's primary service area is defined by its convenience to its users and its ability to compete for based aircraft. From a convenience perspective, the 30-minute drive time is almost entirely located within Cochise County and does not extend to the competing NPIAS airports in the region. In terms of competition with these airports, none offer a longer runway than the 12,001-foot Runway 8-26 at FHU, with Nogales International providing the second longest in the region with a 7,200-foot runway; however, these facilities provide similar levels of service and amenities, and thus are serious competitors for FHU and could limit demand potential. Additionally, FHU is unique in that it is a joint-use facility, sharing the airport with Libby Army Airfield. There is restricted airspace in the immediate vicinity of the airport, which could be a deterrent to general aviation pilots operating in the area.

As such, convenience is considered the primary driver for demand at FHU, and the primary service area for the airport is established as Cochise County, from which the airport currently draws the majority of its based aircraft owners.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth; however, the judgment of the forecast analyst, based on professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast. The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line/time-series projections, correlation/regression analysis, and market share analysis. The forecast analyst may elect not to use certain techniques, depending on the reasonableness of the forecasts produced using other techniques.

[1] The FAA's database of based aircraft (basedaircraft.com) indicates 51 validated based aircraft at FHU.



FAA Based and Registered Aircraft

Distance from FHU	FAA Registered Aircraft	FAA Based Aircraft
0-10 nm	53	34
10-20 nm	44	9
20-30 nm	65	0
Total	**162**	**43***

*18 based aircraft registered to addresses beyond 30nm from FHU

Source: ESRI Basemap Imagery (2023), FAA Registered Aircraft Database, Sierra Vista Municipal Airport

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

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

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

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

Forecasts will age, and the farther a forecast is from the base year, the less reliable it becomes, particularly due to changing local and national conditions. Nevertheless, the FAA requires that a 20-year forecast be developed for long-range airport planning. Facility and financial planning usually require at least a 10-year view because it often takes more than five years to complete a major facility development program; however, it is important to use forecasts that do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

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

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

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

EXISTING FORECASTS

Consideration is given to any forecasts of aviation demand for the airport that have been completed in the recent past. For Sierra Vista Municipal Airport, the previous forecasts reviewed are those in the FAA *Terminal Area Forecast* (TAF), the 2018 *Arizona State Aviation System Plan* (SASP), and the previous airport master plan, which used a base year of 2011.

FAA TERMINAL AREA FORECAST

The FAA publishes the TAF for each airport included in the NPIAS on an annual basis. The TAF is a generalized forecast of airport activity that is used by the FAA primarily for internal planning purposes. It is available to airports and consultants to use as a baseline projection and is an important point of comparison when developing local forecasts. The current TAF was published in January 2024 and is based on the federal fiscal year (October-September).

As presented in **Table 2E**, the TAF projects general aviation activity at the airport to remain static over the next 20 years. Operations are projected to be dominated by itinerant military operations, which are estimated to account for 81 percent of the total operations over the planning period. General aviation operations are estimated to comprise 15 percent of total annual operations, with air taxi/air carrier making up the remaining 4 percent of annual operations. Based aircraft are also projected to remain flat at 40 aircraft over the next 20 years. As previously noted, even though the TAF projections are static and present no real forecast growth, the FAA will require a comparison of the new forecasts developed for this master plan to the TAF.

TABLE 2E | 2024 FAA Terminal Area Forecast – Sierra Vista Municipal Airport

	2023	2028	2033	2043	CAGR 2023-2043
ITINERANT OPERATIONS					
Air Carrier	5,013	5,013	5,013	5,013	0.0%
Air Taxi	0	0	0	0	0.0%
General Aviation	10,905	10,905	10,905	10,905	0.0%
Military	96,469	96,469	96,469	96,469	0.0%
Total Itinerant	*112,387*	*112,387*	*112,387*	*112,387*	*0.0%*
LOCAL OPERATIONS					
General Aviation	6,887	6,887	6,887	6,887	0.0%
Military	0	0	0	0	0.0%
Total Local	*6,887*	*6,887*	*6,887*	*6,887*	*0.0%*
Total Operations	***119,274***	***119,274***	***119,274***	***119,274***	0.0%
BASED AIRCRAFT	**40**	**40**	**40**	**40**	0.0%

Source: FAA Terminal Area Forecast (TAF), January 2024

ARIZONA STATE SYSTEM PLAN

Another forecast of aviation activity at Sierra Vista Municipal Airport was previously prepared within the 2018 *Arizona State Aviation System Plan* (SASP), as shown in **Table 2F**. The SASP, which used a base year of 2016, forecasted total operations to grow from 135,870 in 2016 to 138,060 by 2036, and based aircraft to increase from 51 to 63 over the 20-year plan period. In terms of based aircraft, the airport is currently approaching this long-range projection, with 61 based aircraft, according to airport-maintained records. Based on recent activity trends at Sierra Vista Municipal Airport and in the region, along with the time that has passed since the preparation of these previous forecasts, it is necessary to develop new forecasts utilizing the most recent information available.

TABLE 2F | SASP Forecasts – Sierra Vista Municipal Airport

	2016	2036	CAGR
Itinerant Operations	67,940	69,030	0.08%
Local Operations	67,930	69,030	0.08%
Total Operations	135,870	138,060	0.08%
Based Aircraft	51	63	1.06%

Source: 2018 Arizona State Aviation System Plan

2014 AIRPORT MASTER PLAN

On a more local level, an estimate of aviation demand was prepared in the previous master plan, which was finalized in 2014. The base year for the forecast analysis was 2011. As can be seen in **Table 2G**, there were an estimated 147,560 total operations in 2011, which included nighttime and weekend operations when the airport traffic control tower (ATCT) was closed. By the end of the planning period in 2032, total annual operations were anticipated to increase to 164,300. In terms of based aircraft, there were 66 reported based aircraft in 2011, and this total was expected to increase to 100 by 2032.

TABLE 2G | 2014 Airport Master Plan

	2011	2017	2022	2032	CAGR 2011-2032
ITINERANT OPERATIONS					
General Aviation	9,570	10,350	11,600	13,800	
Air Taxi	5,920	6,100	6,600	7,600	
Military	65,820	66,400	66,400	66,400	
Total Itinerant	*81,310*	*82,850*	*84,600*	*87,800*	*0.37%*
LOCAL OPERATIONS					
General Aviation	22,330	24,150	27,000	32,200	
Military	43,920	44,300	44,300	44,300	
Total Local	*66,250*	*68,450*	*71,300*	*76,500*	*0.69%*
Total Annual Operations	***147,560***	***151,300***	***155,900***	***164,300***	***0.51%***
BASED AIRCRAFT	**66**	**75**	**84**	**100**	**2.00%**

Source: FAA Terminal Area Forecast (TAF), February 2023

AVIATION FORECASTS

The following forecast analysis examines each of the aviation demand categories expected at Sierra Vista Municipal Airport over the next 20 years. Each segment will be examined individually, and then collectively, to provide an understanding of the overall aviation activity at the airport through 2043. Forecasts for airport activities include the following:

- Service Area Registered Aircraft
- Based Aircraft/Fleet Mix
- General Aviation Operations – Local and Itinerant
- Air Taxi Operations
- Military Operations
- Peaking Conditions
- Critical Aircraft

The remainder of this chapter will examine historical trends with regard to these areas of general aviation and will project future demand for these segments of general aviation activity at the airport. These forecasts, once approved by the FAA, will become the basis for planning future airside and landside facilities.

REGISTERED AIRCRAFT FORECASTS

The most basic indicator of general aviation demand at an airport is the total number of aircraft based at the facility; however, before a projection of based aircraft can be developed, it is important to first ascertain the number (or pool) of aircraft in the market area from which Sierra Vista Municipal Airport's based aircraft will be generated. The methodology for identifying the market pool is to offer an examination and forecast of registered aircraft in the airport's service area. As previously detailed, the primary service area for the airport is Cochise County.

Table 2H presents the historical registered aircraft for Cochise County for 2004 through 2023. These figures are derived from the FAA aircraft registration database, which categorizes aircraft registrations by county based on the zip code of the aircraft owner. Although this information generally provides a correlation to based aircraft, it is not uncommon for some aircraft to be registered in the county but be based at an airport outside the county, or vice versa.

The registered aircraft in the service area show a generally decreasing trend over the last several years, with the historical high of 324 registered aircraft recorded in 2009. As previously stated, the FAA required aircraft owners to re-register their aircraft during this timeframe, which likely accounts for the decrease that followed in subsequent years. Since then, registered aircraft in Cochise County have been declining over the last several years, apart from 2022 through 2023, when there was an increase from 212 to 219 county-registered aircraft.

TABLE 2H | Historical Registered Aircraft – Cochise County

Year	Single-Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	Other[1]	Total
2004	232	10	16	0	6	11	275
2005	261	9	16	1	7	9	303
2006	281	12	1	1	7	11	313
2007	279	13	1	1	9	16	319
2008	278	12	3	1	11	17	322
2009	278	11	3	1	16	15	324
2010	265	11	3	1	17	15	312
2011	253	12	3	1	16	15	300
2012	246	10	2	1	12	17	288
2013	214	8	2	1	9	16	250
2014	220	9	2	1	8	17	257
2015	222	9	1	1	9	33	275
2016	223	10	1	1	10	33	278
2017	219	13	2	1	12	30	277
2018	202	17	1	0	9	18	247
2019	198	15	0	0	10	14	237
2020	204	16	0	0	10	16	246
2021	195	14	0	0	8	15	232
2022	180	16	0	0	8	8	212
2023	181	17	1	0	9	11	219

[1] The "other" aircraft category includes aircraft such as gliders, electric aircraft, experimental aircraft, balloons, and dirigibles.

Source: FAA Aircraft Registration Database

Although there are no recently prepared forecasts for Cochise County regarding registered aircraft, projections have been prepared for this study using market share and ratio projection methods. Several regression forecasts were also considered, including single- and multi-variable regressions examining the correlation of registered aircraft with the service area population, employment, income, and gross regional product, as well as with U.S. active general aviation aircraft. None of the regressions produced a strong correlation (r^2 value over 0.9); therefore, the regression forecasts were not considered further.

Table 2J presents several projections of registered aircraft for the service area, with a goal of presenting a planning envelope that shows a range of projections based on historical trends.

Market Share Projections

The first set of forecasts is based on market share, which considers the relationship between registered aircraft located in Cochise County and active aircraft within the United States. The constant market share forecast maintains the 2023 market share of county residents (0.1047 percent) throughout the planning period. The result is no growth in registrations in the short term, one additional aircraft by the intermediate term, and then an increase to 227 registrations by the long term. This results in a compound annual growth rate (CAGR) of 0.17 percent.

Two increasing market share forecasts were also considered. The first evaluated a high-range market share forecast based on a return to the county's record high market share, which occurred in 2016 with 0.1313 percent. This produced a CAGR of 1.31 percent, or 284 registered aircraft in the county by 2043. A mid-range scenario was also considered, which increased the market share to 0.1173 percent. This resulted in 254 registered aircraft in Cochise County by the end of the planning period at a CAGR of 0.74 percent.

TABLE 2J | Registered Aircraft Projections – Cochise County

Year	Service Area Registrations	U.S. Active Aircraft	Market Share of U.S. Aircraft	Service Area Population	Aircraft per 1,000 Residents
2014	257	204,408	0.1257%	126,666	2.03
2015	275	210,031	0.1309%	125,630	2.19
2016	278	211,794	0.1313%	124,728	2.23
2017	277	211,757	0.1308%	123,698	2.24
2018	247	211,749	0.1166%	125,039	1.98
2019	237	210,981	0.1123%	125,513	1.89
2020	246	204,140	0.1205%	125,522	1.96
2021	232	209,194	0.1109%	125,763	1.84
2022	212	209,140	0.1014%	125,663	1.69
2023	219	209,095	0.1047%	126,046	1.74
Constant Market Share of U.S. Active Aircraft - Low Range					
2028	219	209,510	0.1047%	127,978	1.71
2033	220	210,455	0.1047%	129,939	1.70
2043	227	216,395	0.1047%	133,954	1.69
CAGR	**0.17%**				
Increasing Market Share of U.S. Active Aircraft - Mid Range					
2028	227	209,510	0.1085%	127,978	1.78
2033	236	210,455	0.1120%	129,939	1.81
2043	254	216,395	0.1173%	133,954	1.89
CAGR	**0.74%**				
Increasing Market Share of U.S. Active Aircraft - High Range					
2028	226	209,510	0.1080%	127,978	1.77
2033	241	210,455	0.1146%	129,939	1.86
2043	284	216,395	0.1313%	133,954	2.12
CAGR	**1.31%**				
Constant Ratio Projection per 1,000 County Residents - Low Range					
2028	222	209,510	0.1061%	127,978	1.74
2033	226	210,455	0.1073%	129,939	1.74
2043	233	216,395	0.1076%	133,954	1.74
CAGR	**0.30%**				
Increasing Ratio Projection per 1,000 County Residents - Mid Range – SELECTED FORECAST					
2028	230	209,510	0.1098%	127,978	1.80
2033	241	210,455	0.1147%	129,939	1.86
2043	265	216,395	0.1224%	133,954	1.98
CAGR	**0.96%**				
Increasing Ratio Projection per 1,000 County Residents - High Range					
2028	240	209,510	0.1146%	127,978	1.88
2033	262	210,455	0.1243%	129,939	2.01
2043	300	216,395	0.1386%	133,954	2.24
CAGR	**1.59%**				
10-Year Historic Registered Aircraft Growth Rate					
2028	202	209,510	0.0965%	127,978	1.58
2033	187	210,455	0.0887%	129,939	1.44
2043	159	216,395	0.0735%	133,954	1.19
CAGR	**-1.59%**				

Sources: FAA Aircraft Registration Database; FAA Aerospace Forecast - Fiscal Years 2023-2043; Woods & Poole 2023; Coffman Associates analysis

Ratio Projections

The next set of projections is based on a ratio of the number of aircraft per 1,000 county residents. In 2023, there were 1.74 registered aircraft per 1,000 county residents. Carrying this ratio forward through the plan years as a constant results in a slow growth in the number of registrations in the county over the next 20 years, with 233 aircraft projected by 2043 (0.30 percent CAGR).

Mid- and high-range market share increases were also projected. The mid-range projection, based on the 10-year historic average ratio, results in 265 registered aircraft by 2043, equating to a CAGR of 0.96 percent. The high-range projection, based on a return to the historical high ratio of 2.24, results in 300 aircraft by 2043, for a CAGR of 1.59 percent.

Historic Growth Rate

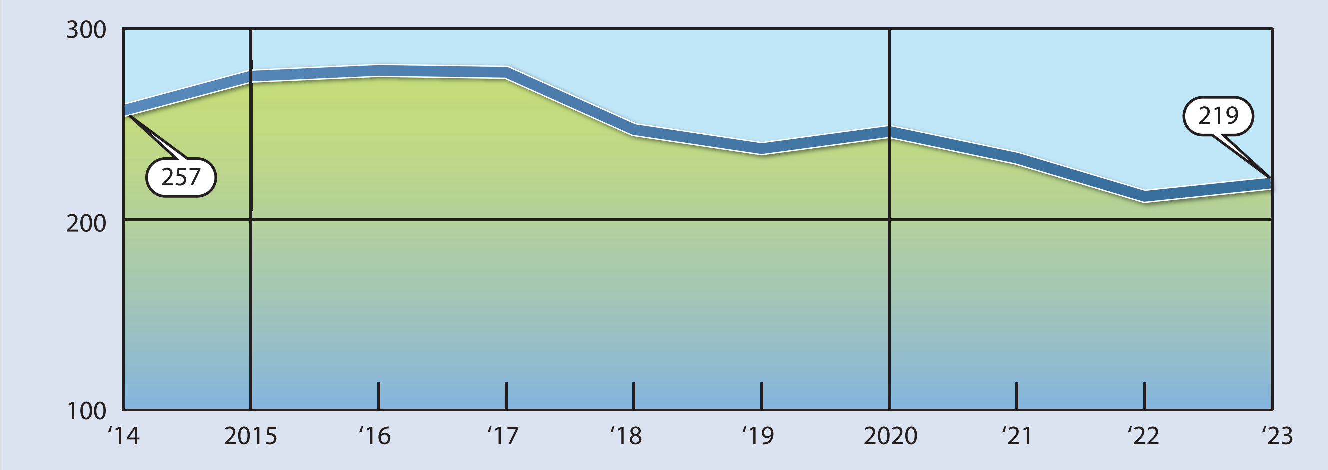
A forecast based on the registered aircraft growth rate in Cochise County over the last 10 years was also evaluated. As detailed previously in **Table 2J**, the county has experienced a declining trend in aircraft registrations, thus resulting in a negative growth rate of -1.59 percent. When this CAGR is applied to the forecast years, a reduction in aircraft registrations results, from the 219 county-registered aircraft in the base year to 159 registered aircraft by 2043.

Selected Forecast

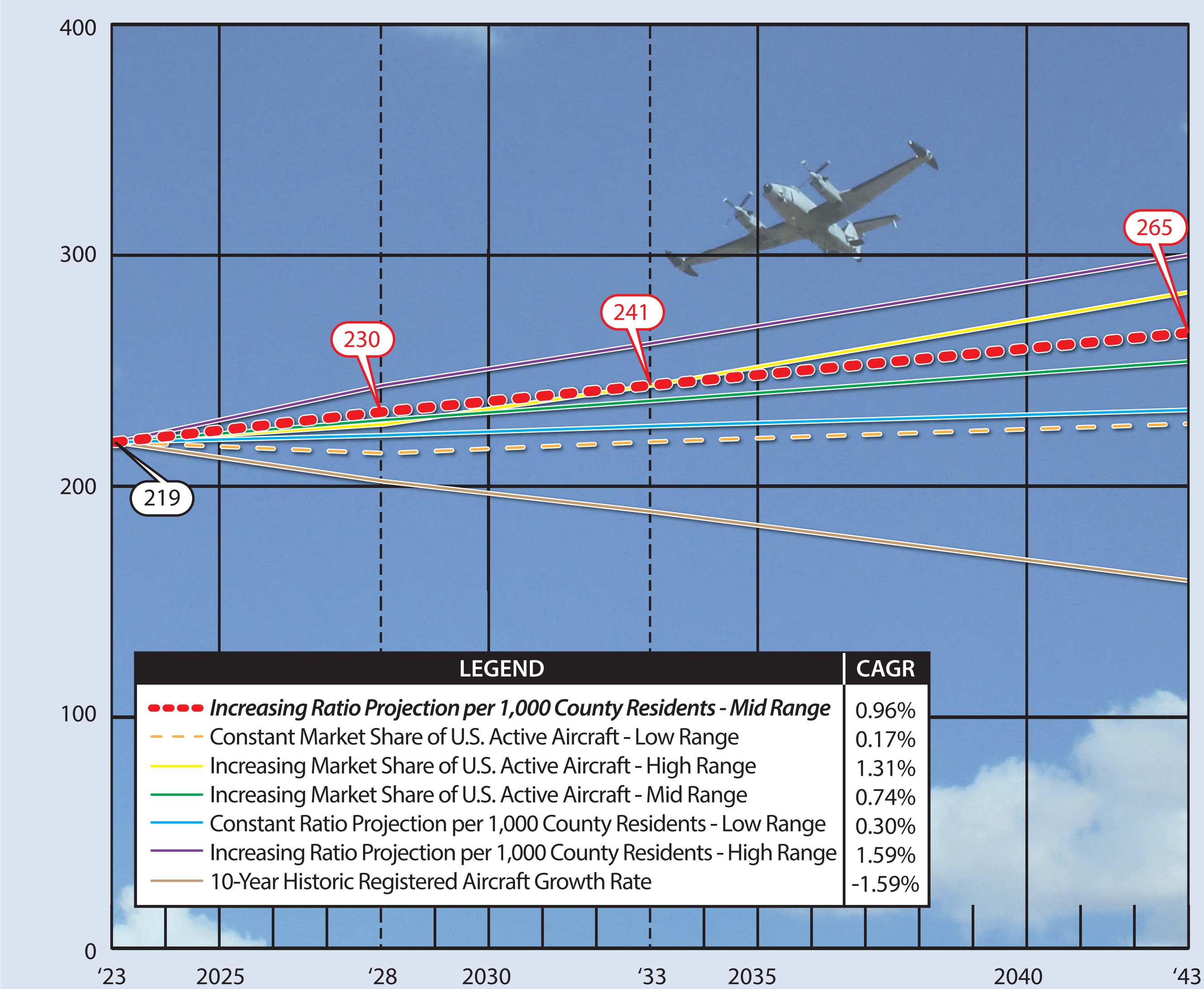
Each of the registered aircraft forecasts offer a projection of what aircraft registrations in the service area could look like over the next 20 years. The 10-year historic growth rate provides the low-end projection and the high-range registration to population ratio forecast makes up the top end of the planning envelope, as shown on **Exhibit 2C**. Even though county registrations have been generally declining, the service area population is expected to grow, as is the number of aircraft in the national fleet; therefore, it is not unreasonable to expect some level of growth in aircraft registrations in Cochise County over the next 20 years. Within the range of forecasts described above, the mid-range ratio projection is considered the most reasonable registered aircraft forecast due to projected increases in population and national aircraft registrations. At a CAGR of 0.96 percent, this forecast yields moderate growth in aircraft registrations in the county, with 265 registered aircraft projected for the service area by 2043.

The registered aircraft projection is one data point to be used in the development of a based aircraft forecast. The following section will present several potential based aircraft forecasts, as well as the selected based aircraft forecast, to be utilized in this study.

Historic Aircraft Registrations



Registered Aircraft Projections



Sources:
FAA Aircraft Registration Database, FAA Aerospace Forecast - Fiscal Years 2023-2043, Woods & Poole 2023

BASED AIRCRAFT FORECAST

Determining the number of based aircraft at an airport can be a challenging task. Aircraft storage can be somewhat transient in nature, meaning aircraft owners can and do move their aircraft. Some aircraft owners may store their aircraft at an airport for only part of the year. For many years, the FAA did not require airports to report their based aircraft counts, nor did they validate based aircraft at airports; however, this has changed in recent years, and now the FAA mandates that airports report their based aircraft levels. These counts are recorded in the National Based Aircraft Inventory program and maintained and validated by the FAA to ensure accuracy. According to the FAA's database, Sierra Vista Municipal Airport has 51 based aircraft, a count which was most recently validated in February 2024. However, current airport records indicate 61 based aircraft at the airport, and this number will be carried forward as the base year count.

Like the registered aircraft forecasts, several projections have been made for based aircraft at Sierra Vista Municipal Airport, including market share and ratio projections, as well as forecasts that consider the growth rates detailed in the FAA's TAF and the 2018 *Arizona State Aviation System Plan* (SASP). The market share is based on the airport's percentage of based aircraft as compared to registered aircraft in the service area, while the ratio projection is based on the number of based aircraft per 1,000 county residents. The growth rate projection considers the FAA's TAF projection for the State of Arizona. The results of these analyses are detailed in **Table 2K** and depicted graphically on **Exhibit 2D**.

Market Share Projections

In 2023, the airport had 61 based aircraft, which equates to 27.9 percent of the market share of registered aircraft in Cochise County. Carrying this percentage throughout the plan years as a constant results in a steady increase in based aircraft, reflective of a 0.96 percent CAGR. This projection yields 74 based aircraft by 2043.

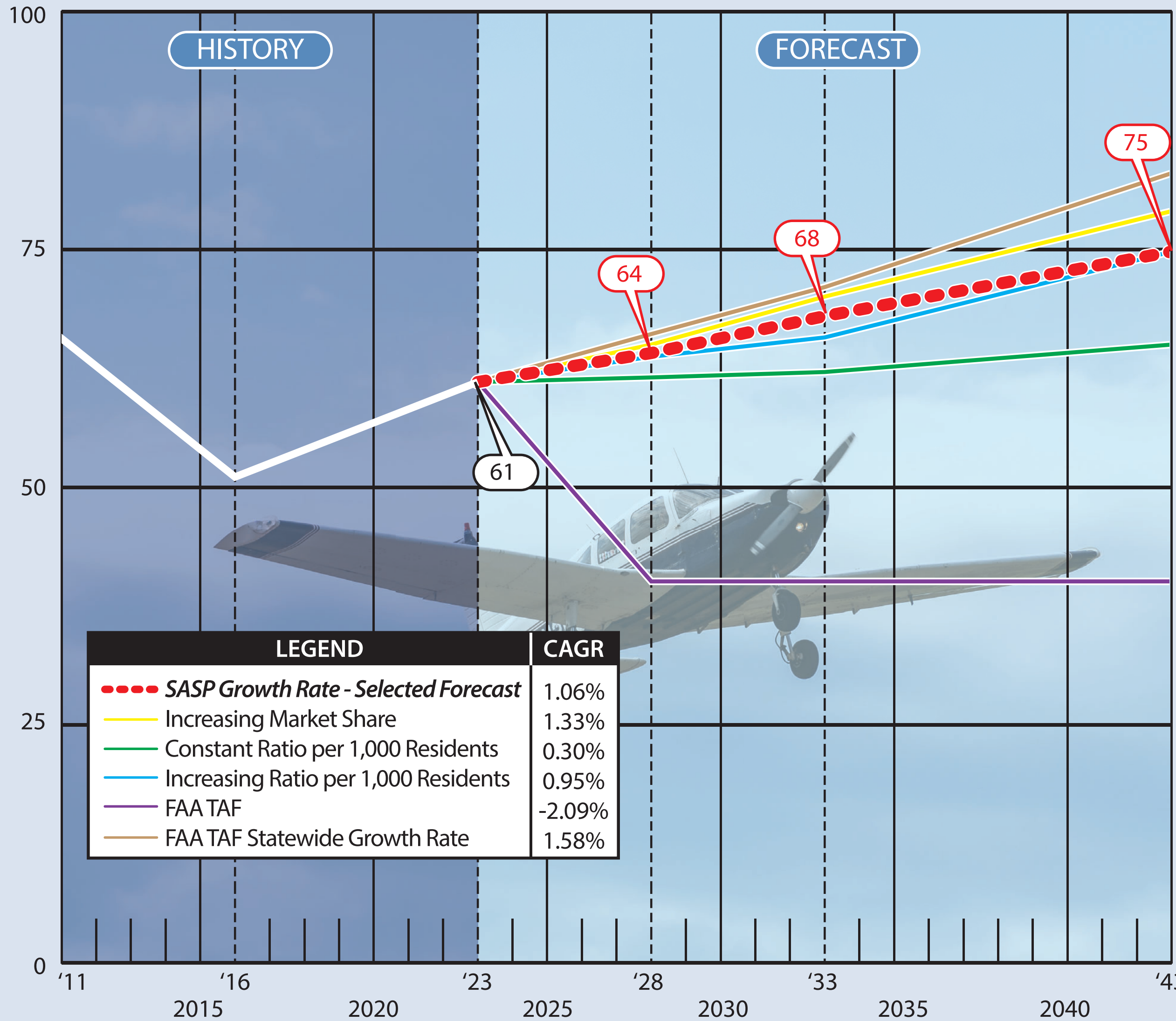
An increasing market share forecast was also evaluated, based on a potential for Sierra Vista Municipal Airport to capture a 30.0 percent market share of county registrations. This produced a CAGR of 1.33 percent, or 79 based aircraft by the end of the planning period.

Ratio Projections

In 2023, the ratio of based aircraft per 1,000 county residents stood at 0.48. Maintaining this at a constant through 2043 resulted in very slow growth in based aircraft, with just four additional based aircraft by the end of the planning period.

An increasing growth scenario was also evaluated. In this analysis, a ratio of 0.55 based aircraft per 1,000 county residents was considered. Applying this ratio to the end of the planning period results in 74 based aircraft at the airport by 2043, at a CAGR of 0.95 percent.

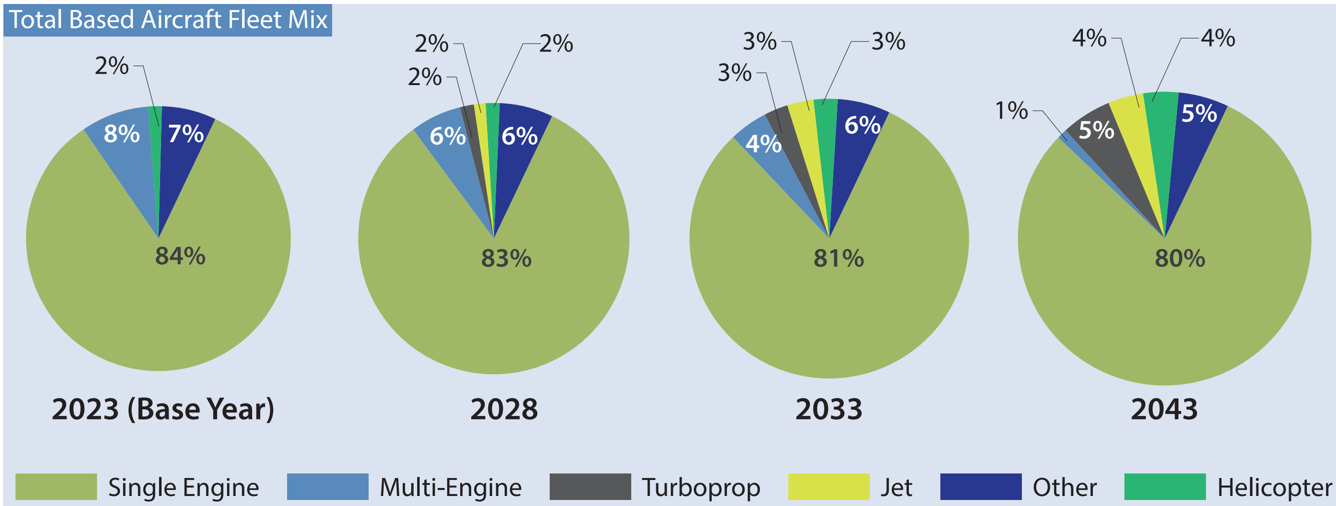
Based Aircraft Projections



LEGEND	CAGR
SASP Growth Rate - Selected Forecast	1.06%
Increasing Market Share	1.33%
Constant Ratio per 1,000 Residents	0.30%
Increasing Ratio per 1,000 Residents	0.95%
FAA TAF	-2.09%
FAA TAF Statewide Growth Rate	1.58%

Sources: Airport records; 2023 FAA TAF; Woods & Poole CEDDS 2023

Total Based Aircraft Fleet Mix



Source: Airport records; Coffman Associates analysis

Exhibit 2D
BASED AIRCRAFT PROJECTIONS

TABLE 2K | Based Aircraft Forecasts for Sierra Vista Municipal Airport

Year	Based Aircraft	Service Area Registrations	Market Share	Service Area Population	Aircraft Per 1,000 Residents
2011	66	300	22.0%	132,931	0.50
2016	51	278	18.3%	124,728	0.41
2023	61	219	27.9%	126,046	0.48
Constant Market Share					
2028	64	230	27.9%	127,978	0.50
2033	67	241	27.9%	129,939	0.52
2043	74	265	27.9%	133,954	0.55
CAGR	**0.96%**				
Increasing Market Share					
2028	65	230	28.4%	127,978	0.51
2033	70	241	28.9%	129,939	0.54
2043	79	265	30.0%	133,954	0.59
CAGR	**1.33%**				
Constant Ratio per 1,000 Residents					
2028	62	230	26.9%	127,978	0.48
2033	63	241	26.1%	129,939	0.48
2043	65	265	24.5%	133,954	0.48
CAGR	**0.30%**				
Increasing Ratio per 1,000 Residents					
2028	64	230	27.7%	127,978	0.50
2033	66	241	27.5%	129,939	0.51
2043	74	265	27.8%	133,954	0.55
CAGR	**0.95%**				
SASP Growth Rate – SELECTED FORECAST					
2028	64	230	28.0%	127,978	0.50
2033	68	241	28.1%	129,939	0.52
2043	75	265	28.4%	133,954	0.56
CAGR	**1.06%**				
FAA TAF					
2028	40	230	17.4%	127,978	0.31
2033	40	241	16.6%	129,939	0.31
2043	40	265	15.1%	133,954	0.30
CAGR	**-2.09%**				
FAA TAF Statewide Growth Rate					
2028	66	230	28.7%	127,978	0.52
2033	71	241	29.6%	129,939	0.55
2043	83	265	31.5%	133,954	0.62
CAGR	**1.98%**				

Sources: Based aircraft records; 2023 FAA TAF; Woods & Poole CEDDS 2023; Coffman Associates analysis

Growth Rate Projections

The 2018 SASP included an estimate of based aircraft at Sierra Vista Municipal Airport using a base year of 2016, and an out year of 2036. The selected forecast in this study projected a growth rate of 1.06 percent. When applying this growth rate to the 2023 total of based aircraft, the result is an increase to 75 based aircraft by the master planning period.

The FAA TAF includes an estimate of future based aircraft in the State of Arizona. According to the TAF, based aircraft in the state are anticipated to grow at a rate of 1.58 percent over the next 20 years. When this CAGR is applied to the based aircraft count at Sierra Vista Municipal Airport, the result is 83 based aircraft by 2043.

Finally, as a point of comparison, the FAA TAF for the airport was also considered. The TAF for Sierra Vista Municipal Airport shows no growth in based aircraft, with the count flatlined at 40 throughout the planning period; this results in a negative CAGR when considering the actual count of based aircraft in 2023.

Selected Forecast

The forecasts produce a planning envelope ranging from 40 (FAA TAF for Sierra Vista Municipal Airport) to 83 based aircraft on the airport by 2043. Historically, there has been clear demand for aircraft storage space at the airport. Currently, all hangars are occupied and there are seven individuals on a waiting list. Combined with favorable trends in aircraft ownership both locally and nationally, it is reasonable to assume an increase in based aircraft at the airport; therefore, the SASP growth rate forecast has been selected as the preferred projection. With a CAGR of 1.06 percent, this forecast results in an increase of 14 based aircraft by the end of the planning period, for a total of 75 aircraft based at Sierra Vista Municipal Airport by 2043.

Based Aircraft Fleet Mix Forecast

It is important to have an understanding of the current and projected based aircraft fleet mix at an airport to ensure the planning of proper facilities in the future. The forecast mix of based aircraft was determined by comparing existing and forecast U.S. general aviation fleet trends to the fleet mix at the airport. The national trend in general aviation is toward a greater percentage of larger, more sophisticated aircraft as part of the national fleet. As a joint-use facility, Sierra Vista Municipal Airport can accommodate all types of aircraft, from smaller general aviation aircraft including pistons and jets, up to larger commercial service airplanes and military aircraft.

As indicated in **Table 2L** and on **Exhibit 2D**, single-engine piston aircraft presently make up the majority of the fleet mix at the airport, comprising 84 percent of the aircraft based at the airport. There are also five multi-engine pistons currently based at the airport, as well as one helicopter and four aircraft categorized as "other," which includes experimental and ultralight aircraft.

TABLE 2L | Total Based Aircraft Fleet Mix

	EXISTING		FORECAST					
Aircraft Type	**2023**	**%**	**2028**	**%**	**2033**	**%**	**2043**	**%**
Single-Engine Piston	51	84%	53	83%	55	81%	60	80%
Multi-Engine Piston	5	8%	4	6%	3	4%	1	1%
Turboprop	0	0%	1	2%	2	3%	4	5%
Jet	0	0%	1	2%	2	3%	3	4%
Helicopter	1	2%	1	2%	2	3%	3	4%
Other	4	7%	4	6%	4	6%	4	5%
Totals	**61**	**100%**	**64**	**100%**	**68**	**100%**	**75**	**100%**

Source: Airport records; Coffman Associates analysis

The FAA predicts piston-powered aircraft will decline in numbers nationwide, with aircraft ownership trends shifting to more sophisticated turboprops and jets; however, it is anticipated that piston aircraft will continue to comprise the majority of the fleet mix at Sierra Vista Municipal Airport, with slower growth in turbine aircraft. The table details the based aircraft fleet mix projections for the airport over the next 20 years. Single-engine pistons are projected to increase from the 51 currently based at the airport to 60 by 2043. The multi-engine piston is expected to begin phasing out, in line with national trends, while turboprops, jets, and helicopters are anticipated to increase in number. The "other" category is expected to remain at its current count of four aircraft.

OPERATIONS FORECASTS

Operations at Sierra Vista Municipal Airport are classified as either general aviation, air taxi, or military. General aviation operations include a wide range of activity, from recreational use and flight training to business and corporate uses. Air taxi operations are those conducted by aircraft operating under Title 14 Code of Federal Regulations (CFR) Part 135, otherwise known as for-hire or on-demand activity. Military operations include those operations conducted by various branches of the U.S. military, and these comprise the majority of operations occurring at FHU. It should be noted that although military operations are being forecast as part of this master plan, the FAA is most interested in civilian (general aviation and air taxi) aircraft activity and operations for purposes of assisting with future improvements on both the airside (runways, taxiways, navigational aids, etc.) and landside (terminal, aircraft parking, support facilities, etc.) at the airport.

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

The first step in forecasting operations at an airport is to establish a baseline of total annual operations occurring for each operational category. FHU is equipped with an airport traffic control tower (ATCT), which operates Monday through Friday from 6:00 a.m. to 11:00 p.m. ATCT personnel record aircraft takeoffs and landings that occur during the hours the tower is staffed, and then categorize these operations as general aviation, air taxi/air carrier, military, or unmanned aircraft system (UAS). These records, detailed in **Table 2M**, were provided for use in this master plan and were used as a baseline for developing operations forecasts.

TABLE 2M | Historic Aircraft Operations

	General Aviation	Air Taxi	Military (Including UAS)	Total
2019	23,021	5,381	106,902	135,304
2020	17,772	4,985	103,511	126,268
2021	17,095	5,836	95,860	118,791
2022	21,962	5,363	88,894	116,219
2023	28,211	5,394	77,563	111,168

UAS: Unmanned Aircraft Systems

Source: FHU ATCT records

The tower does not, however, subcategorize operations as local or itinerant. Libby Army Airfield staff estimates that approximately 95 percent of total operations are local in nature, with itinerant operations comprising the remaining 5 percent. This estimation was applied to both the general aviation and military operations totals to forecast these elements.

GENERAL AVIATION OPERATIONS FORECAST

Market Share Projections

Two market share forecasts for local and itinerant GA operations were developed for FHU, based on the airport's current market share of total U.S. GA operations[2] for each category. In 2023, it is estimated that there were 1,411 itinerant GA operations at FHU, which results in a 0.009 percent market share of national itinerant operations. For local GA operations at the airport, there were an estimated 26,800 operations, for a 0.181 percent market share. The first forecast carries the itinerant and local GA market shares forward as constants through the planning period, resulting in 1,560 itinerant operations and 30,100 local operations by 2043, for CAGRs of 0.50 percent and 0.58 percent, respectively. As growth in both itinerant and local operations is expected to occur nationally, an increasing market share forecast was also developed for each category. This scenario evaluated a market share of 0.015 percent for itinerant operations and 0.220 percent for local operations. This resulted in 2,510 itinerant operations by 2043 at a CAGR of 2.92 percent and 36,570 local operations at a CAGR of 1.57 percent.

Growth Rate Projections

Three growth rate projections for itinerant and local GA operations were also evaluated. The first considered the 5-year historic growth rate of GA operations at FHU using the 2019-2023 operations records provided by the ATCT. According to this data and using airport personnel's estimation of itinerant/local percentages, the growth rate over the last five years was 1.02 percent for both itinerant and local operations. When this is applied to the forecast years, the result is 1,730 total itinerant GA operations and 32,840 local GA operations occurring at FHU by 2043.

A forecast was also developed based on the FAA's TAF for the State of Arizona and the projected growth rate for itinerant and local operations statewide. The FAA anticipates a 0.70 percent growth in itinerant operations over the next 20 years, while local operations are anticipated to grow at a rate of 0.64 percent. When these figures are applied to the base year count of itinerant and local operations occurring at FHU, 1,620 itinerant GA operations and 30,430 local GA operations by 2043 are projected.

Lastly, the FAA's projected growth in national itinerant and local GA operations was evaluated. The FAA's *Aerospace Forecast* for 2023-2043 indicates that itinerant GA operations are projected to grow at a CAGR of 0.51 percent nationally between 2023 and 2043, while local GA operations are estimated to grow at a rate of 0.58 percent. When these growth rates are applied to the base year for these operational categories at FHU, the result is 1,560 itinerant GA operations and 30,090 local GA operations.

[2] As sourced from the FAA's *Aerospace Forecast*, 2023-2043

Table 2N details each of the forecasts described above, and **Exhibit 2E** depicts them in graphic form.

TABLE 2N | Itinerant and Local GA Operations Forecasts

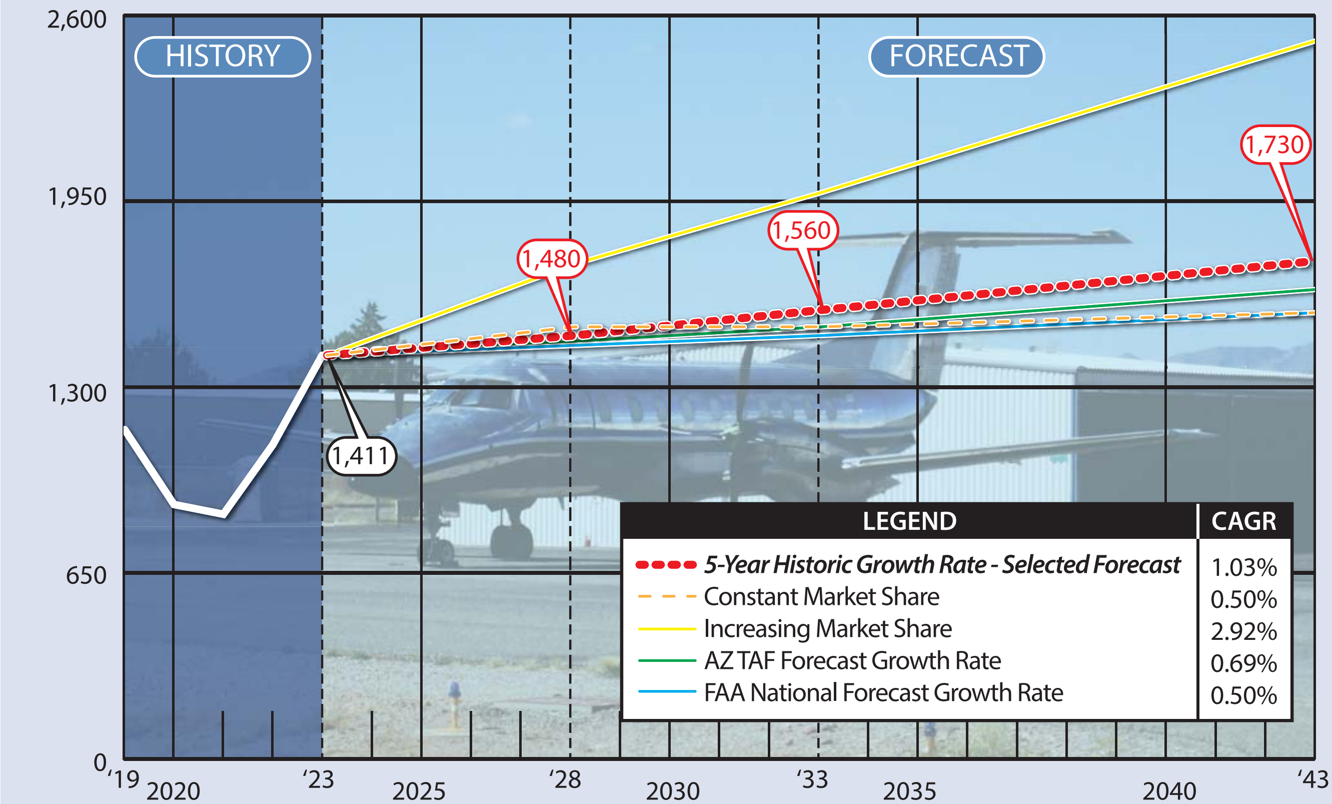
Year	FHU Itinerant GA Operations	U.S. Itinerant GA Operations	FHU Market Share	FHU Local GA Operations	U.S. Local GA Operations	FHU Market Share
2019	1,151	14,244,787	0.008%	21,870	13,109,215	0.167%
2020	889	12,608,003	0.007%	16,883	12,332,877	0.137%
2021	855	13,774,861	0.006%	16,240	13,479,087	0.120%
2022	1,098	14,634,811	0.008%	20,864	14,029,412	0.149%
2023	1,411	15,077,947	0.009%	26,800	14,801,816	0.181%
Constant Market Share						
2028	1,500	16,067,702	0.009%	28,550	15,767,731	0.181%
2033	1,520	16,274,397	0.009%	29,050	16,043,229	0.181%
2043	1,560	16,704,132	0.009%	30,100	16,622,293	0.181%
CAGR	**0.50%**			**0.58%**		
Increasing Market Share						
2028	1,730	16,067,702	0.011%	30,080	15,767,731	0.191%
2033	1,980	16,274,397	0.012%	32,170	16,043,229	0.201%
2043	2,510	16,704,132	0.015%	36,570	16,622,293	0.220%
CAGR	**2.92%**			**1.57%**		
5-Year Historic Growth Rate – SELECTED FORECAST						
2028	1,480	16,067,702	0.009%	28,200	15,767,731	0.179%
2033	1,560	16,274,397	0.010%	29,670	16,043,229	0.185%
2043	1,730	16,704,132	0.010%	32,840	16,622,293	0.198%
CAGR	**1.03%**			**1.02%**		
AZ TAF Forecast Growth Rate						
2028	1,460	16,067,702	0.009%	27,670	15,767,731	0.175%
2033	1,510	16,274,397	0.009%	28,560	16,043,229	0.178%
2043	1,620	16,704,132	0.010%	30,430	16,622,293	0.183%
CAGR	**0.69%**			**0.64%**		
FAA National Forecast Growth Rate						
2028	1,450	16,067,702	0.009%	27,590	15,767,731	0.175%
2033	1,480	16,274,397	0.009%	28,400	16,043,229	0.177%
2043	1,560	16,704,132	0.009%	30,090	16,622,293	0.181%
CAGR	**0.50%**			**0.58%**		

Source: FHU ATCT records; FAA Aerospace Forecasts, 2023-2043; Coffman Associates analysis

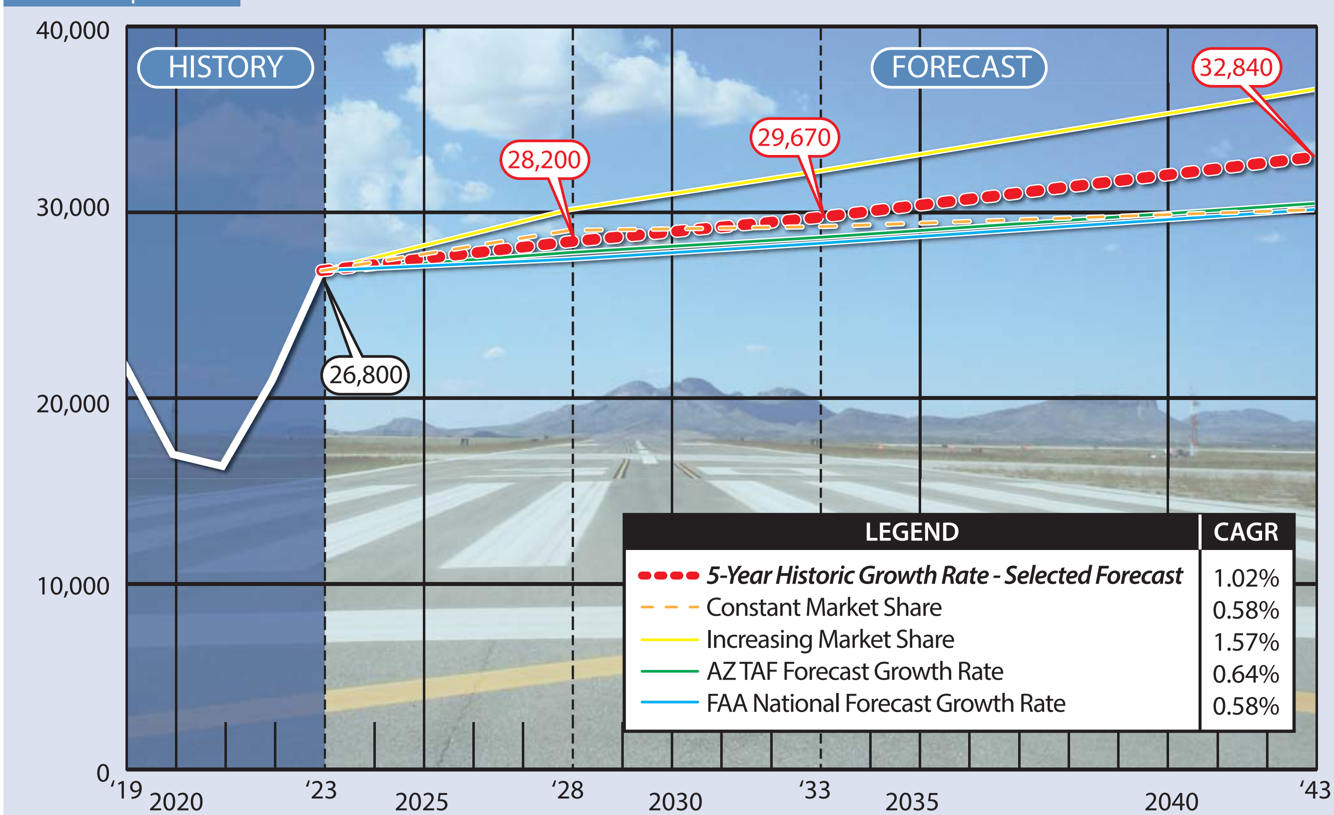
Selected Forecasts

The forecasts for itinerant and local GA operations at FHU for the next 20 years are based on past trends at FHU as well as FAA-projected trends in these operational categories. For itinerant operations, the forecasts present a planning envelope ranging from 1,560 operations to 2,510 operations by 2043. For local GA operations, the projections range from 30,090 operations to 36,570 operations. With historic growth in each of these categories occurring at FHU over the last five years, as well as positive growth trends as anticipated by the FAA, it is reasonable to assume a moderate increase in both itinerant and local GA operations over the next 20 years. As such, the 5-year historic growth rate has been selected as the most reasonable projection for each operational category. For itinerant operations, this is reflective of a 1.03 percent CAGR, or 1,730 operations, while local GA operations are expected to grow at a rate of 1.02 percent, reaching 32,840 annual operations by 2043.

Itinerant GA Operations



Local GA Operations



Source: FHU ATCT records; FAA Aerospace Forecasts, 2023-2043; Coffman Associates analysis.

Exhibit 2E - ITINERANT AND LOCAL GA OPERATIONS FORECASTS

AIR TAXI OPERATIONS FORECAST

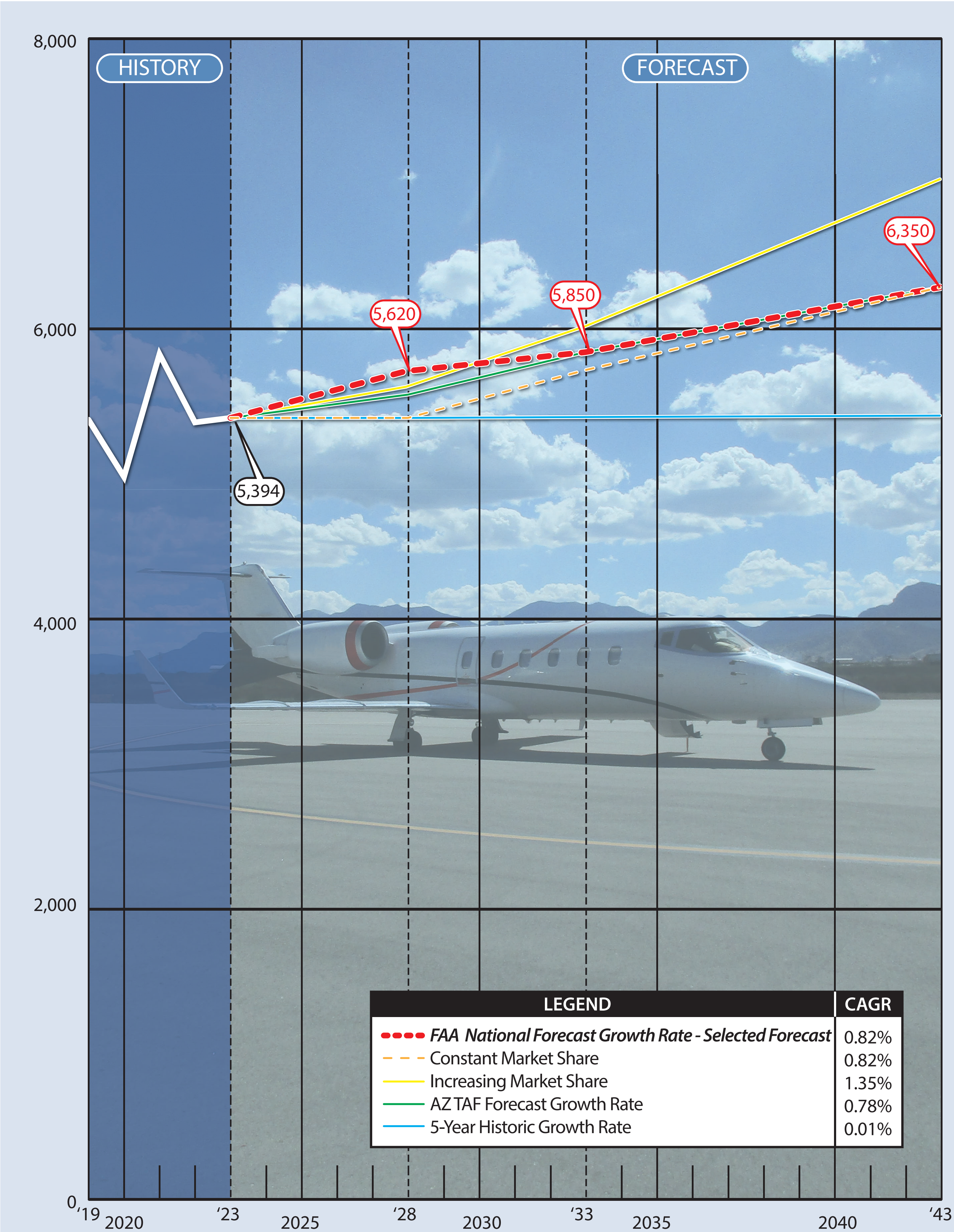
The air taxi category, which is a subset of the itinerant operations category, is comprised of operations that are conducted by aircraft operating under 14 CFR Part 135. Part 135 operations are for-hire or on-demand and include charter and commuter flights, air ambulance, or fractional ownership aircraft operations. The FAA projects a 0.8 percent CAGR increase in air taxi operations nationally between 2023 and 2043. The primary reasons for this increase are the technological advancements of the electric vertical takeoff and landing aircraft (eVTOL) and the continued national growth in the business jet segment of the air taxi category.

Air taxi operations records at Sierra Vista Municipal Airport were provided by ATCT personnel. Like the itinerant and local GA operations, several forecasts were prepared based on market share, historic growth trends, and FAA-projected growth rates both nationally and statewide. In terms of market share, FHU held 0.089 percent of the national market share in 2023, with 5,394 air taxi operations. Held at a constant throughout the forecast years, approximately 6,350 annual air taxi operations are projected by 2043, at a CAGR of 0.82 percent. An increasing market share was also evaluated, based on a return to the historic high market share of 0.099 percent that was reached in 2021. At this percentage, 7,050 air taxi operations are projected for 2043, reflective of a 1.35 percent CAGR.

Growth rate forecasts were also prepared, with the first examining the airport's five-year growth rate. Air taxi operations over the most recent five-year period (2019-2023) have been somewhat stagnant, resulting in a CAGR of 0.01 percent over this period. When applied to the forecast years, the result is virtually no growth, with 5,410 air taxi operations projected by 2043, for an increase of just 16 annual operations compared to 2023. A different scenario emerges, however, when considering FAA's projections for growth in this operational category statewide and nationally. The Arizona TAF indicates a 0.78 percent growth in air taxi operations between 2023 and 2043. When applied to the forecast years, this growth rate results in 6,300 annual air taxi operations by 2043. Nationally, the growth rate is higher, at 0.82 percent. This produces 6,350 air taxi operations by the end of the planning period. **Table 2P** and **Exhibit 2F** details each of these forecasts.

Selected Forecast

The forecasts prepared for annual air taxi operations ranged from 5,410 to 7,050 annual operations by 2043. While air taxi operations, as recorded by the tower, have remained generally flat over the last five years, it is not unreasonable to expect stronger growth in this category in the future, which is in line with the FAA's predictions for air taxi operations. As such, the FAA's national forecast growth rate is the preferred forecast for air taxi operations at FHU. When this growth rate (0.82 percent) is applied to the forecast years, a steady growth pattern occurs, with 6,350 annual air taxi operations by the end of the planning period.



Source: FHU ATCT records; FAA Aerospace Forecasts, 2023-2043; Coffman Associates analysis.

Exhibit 2F
AIR TAXI OPERATIONS FORECAST

TABLE 2P | Air Taxi Operations Forecasts

Year	FHU Air Taxi	US Air Taxi	Market %
2019	5,381	7,234,239	0.074%
2020	4,985	5,471,641	0.091%
2021	5,836	5,884,738	0.099%
2022	5,363	6,522,238	0.082%
2023	5,394	6,039,538	0.089%
Constant Market Share			
2028	5,420	6,073,202	0.089%
2033	5,720	6,401,328	0.089%
2043	6,350	7,105,068	0.089%
CAGR	**0.82%**		
Increasing Market Share			
2028	5,570	6,073,202	0.092%
2033	6,030	6,401,328	0.094%
2043	7,050	7,105,068	0.099%
CAGR	**1.35%**		
5-Year Historic Growth Rate			
2028	5,400	6,073,202	0.089%
2033	5,400	6,401,328	0.084%
2043	5,410	7,105,068	0.076%
CAGR	**0.01%**		
AZ TAF Forecast Growth Rate			
2028	5,610	6,073,202	0.092%
2033	5,830	6,401,328	0.091%
2043	6,300	7,105,068	0.089%
CAGR	**0.78%**		
FAA National Forecast Growth Rate – SELECTED FORECAST			
2028	5,620	6,073,202	0.093%
2033	5,850	6,401,328	0.091%
2043	6,350	7,105,068	0.089%
CAGR	**0.82%**		

Source: FHU ATCT records; FAA Aerospace Forecasts, 2023-2043; Coffman Associates analysis

MILITARY OPERATIONS FORECAST

Most operations occurring at FHU are conducted by the U.S. military. This includes operations by fixed wing aircraft, from smaller fighter jets to wide-body refuelers and transport aircraft, helicopters, and UAS aircraft. **Table 2M**, shown previously, detailed military operations that have occurred at FHU over the last five years, as recorded by ATCT personnel. While this data is certainly helpful in understanding the types and frequency of military operations at the airport, forecasting for this segment of activity is challenging, as these operations are a function of the U.S. Department of Defense, rather than demographics. Additionally, missions can and do change without notice, contributing to the difficulty in forecasting military activity. For these reasons, projections for future military operations were determined as the average of the last five years of total military operations, which is estimated to be approximately 94,500 annual operations. Thus, each of the forecast years (2028, 2032, and 2043) will reflect 94,500 annual military operations.

SELECTED FORECAST SUMMARY

Several projections were prepared for each of the operational categories described above. These evaluated different possible growth scenarios occurring at FHU in terms of general aviation, air taxi, and military operations. **Table 2Q** summarizes each of the forecasts presented, with the selected forecasts shown in bold.

TABLE 2Q | FHU Operations Forecast Summary

Projections	2023	2028	2033	2043	CAGR
Itinerant GA					
Constant Market Share	1,411	1,500	1,520	1,560	0.50%
Increasing Market Share	1,411	1,730	1,980	2,510	2.92%
5-Year Historic Growth Rate	**1,411**	**1,480**	**1,560**	**1,730**	**1.03%**
Arizona TAF Forecast Growth Rate	1,411	1,460	1,510	1,620	0.69%
FAA Aerospace Forecast Growth Rate	1,411	1,450	1,480	1,560	0.50%
Local GA					
Constant Market Share	26,800	28,550	29,050	30,100	0.58%
Increasing Market Share	26,800	30,080	32,170	36,570	1.57%
5-Year Historic Growth Rate	**26,800**	**28,200**	**29,670**	**32,840**	**1.02%**
Arizona TAF Forecast Growth Rate	26,800	27,670	28,560	30,430	0.64%
FAA National Forecast Growth Rate	26,800	27,590	28,400	30,090	0.58%
Air Taxi					
Constant Market Share	5,394	5,420	5,720	6,350	0.82%
Increasing Market Share	5,394	5,570	6,030	7,050	1.35%
5-Year Historic Growth Rate	5,394	5,400	5,400	5,410	0.01%
Arizona TAF Forecast Growth Rate	5,394	5,610	5,830	6,300	0.78%
FAA Aerospace Forecast Growth Rate	**5,394**	**5,620**	**5,850**	**6,350**	**0.82%**
Military					
10-Year Historic Average	**77,563**	**94,500**	**94,500**	**94,500**	**0.99%**

AFTER-HOURS ADJUSTMENT

As mentioned, the ATCT is not staffed during nights and weekends, so estimates for activity occurring during these periods were developed based on information from Libby Army Airfield personnel. According to Libby Army Airfield staff, approximately 10 percent of total operations occur between the hours of 11:00 p.m. and 7:00 a.m. Combined with the operations that occur during the weekend when the ATCT is closed, the following after-hours adjustments have been made:

- General Aviation – 12.5 percent
- Air Taxi – 5.0 percent
- Military – 2.5 percent

These adjustments will be added to the 2023 base year count and selected forecast years for each of the operational categories and are included on **Exhibit 2G**.

	BASE YEAR	2028	2033	2043
BASED AIRCRAFT				
Single Engine Piston	51	53	55	60
Multi-Engine Piston	5	4	3	1
Turboprop	0	1	2	4
Jet	0	1	2	3
Helicopter	1	1	2	3
Other*	4	4	4	4
TOTAL BASED AIRCRAFT	***61***	***64***	***68***	***75***
TOTAL OPERATIONS FORECAST				
General Aviation				
General Aviation, Itinerant	1,411	1,480	1,560	1,730
General Aviation, Local	26,800	28,200	29,670	32,840
After-Hours Adjustment	3,526	3,710	3,904	4,321
GA Subtotal	***31,737***	***33,400***	***35,100***	***38,900***
Air Taxi				
Air Carrier	0	0	0	0
Air Taxi	5,394	5,620	5,850	6,350
After-Hours Adjustment	270	281	293	318
Air Taxi Subtotal	***5,664***	***5,900***	***6,100***	***6,700***
Military				
Military, Itinerant	3,878	4,700	4,700	4,700
Military, Local	73,685	89,775	89,775	89,775
After-Hours Adjustment	1,939	2,362	2,362	2,362
Military Subtotal	***79,502***	***96,800***	***96,800***	***96,800***
TOTAL OPERATIONS	***116,903***	***136,100***	***138,000***	***142,400***

PEAK PERIOD FORECASTS				
Annual	37,401	39,300	41,200	45,600
Peak Month	3,782	3,974	4,166	4,611
Design Day	126	132	139	154
Design Hour	19	20	21	23
Busy Day	158	166	174	192

*Includes gliders, experimental, light sport, etc.

Exhibit 2G
FORECAST SUMMARY

PEAK PERIOD FORECASTS

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

- Peak month – the calendar month in which traffic activity is the highest
- Design day – the average day in the peak month, derived by dividing the peak month by the number of days in the month
- Design hour – the average hour within the design day
- Busy day – the busiest day of a typical week in the peak month

TABLE 2R | Peak Period Forecasts – Sierra Vista Municipal Airport

	2023	2028	2033	2043
Annual Itinerant Operations (General Aviation and Air Taxi)	37,401	39,300	41,200	45,600
Peak Month	3,782	3,974	4,166	4,611
Design Day	126	132	139	154
Design Hour	19	20	21	23
Busy Day	158	166	174	192

Source: Coffman Associates analysis

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

Tower operations data provide an understanding of some of the peak operational periods for the airport. Over the last five years, the peak month has averaged 10.1 percent of annual operations. The design day is the peak month average divided by the number of days in the peak month. The peak months for four of the last five years have been months with 30 days; thus, the peak month is divided by 30 days. Tower data did not provide a breakdown of operations beyond months; therefore, generalized peaking characteristics were used to determine the busy day and design hour. The busy day is calculated at 1.25 times the design day, and the design hour is then calculated at 15 percent of the design day. Peaking characteristics are detailed in **Table 2R** and include civilian operations only associated with general aviation and air taxi activities as detailed previously.

FORECAST SUMMARY

This chapter has outlined the various activity levels that might be reasonably anticipated over the planning period. **Exhibit 2G** presents a summary of the aviation forecasts prepared in this chapter. The base year for these forecasts is 2023, with a 20-year planning horizon to 2043. The primary aviation demand indicators are based aircraft and operations. Based aircraft are forecast to increase from 61 in 2023 to 75 by 2043 (1.06% CAGR). Total operations at FHU are forecast to increase from 116,903 in 2023 to 142,400 by 2043 (0.99% CAGR).

Projections of aviation demand will be influenced by unforeseen factors and events in the future; therefore, it is not reasonable to assume that future demand will follow the exact projection line, but forecasts of aviation demand tend to fall within the planning envelope over time. The forecasts developed for this master planning effort are considered reasonable for planning purposes. The need for additional facilities will be based on these forecasts; however, if demand does not materialize as projected, implementation of facility construction can be slower. Likewise, if demand exceeds these forecasts, the airport may accelerate construction of new facilities.

FORECAST COMPARISON TO THE FAA TAF

Historically, forecasts have been submitted to the FAA for evaluation and to be compared to the TAF. The FAA preferred that forecasts differ by less than 10 percent in the five-year period and 15 percent in the 10-year period. Where the forecasts differ, supporting documentation was necessary to justify the difference.

Table 2S presents a summary of the selected forecasts and a comparison to the FAA TAF. The direct comparison between the master plan forecasts and the TAF is presented at the bottom of the table. The master plan forecast is outside the TAF tolerance for both the five- and 10-year periods for each demand segment being forecast, the exception being the 10-year operations forecast. This is primarily due to the TAF count being flatlined for both total operations and based aircraft. Additionally, in terms of based aircraft, the actual count at FHU exceeds that which is reported in the TAF, creating a discrepancy in the base year, and contributing to a larger difference in the near and mid-term comparison.

TABLE 2S | Comparison of Master Plan Forecasts to the FAA TAF

	BASE YEAR	2028	2033	2043
Total Operations				
Master Plan Forecast	116,903	136,100	138,000	142,400
TAF	119,274	119,274	119,274	119,274
% Difference	2.01%	13.18%	14.56%	17.68%
Based Aircraft				
Master Plan Forecast	61	64	68	75
TAF	40	40	40	40
% Difference	41.58%	46.15%	51.85%	60.87%

AIRCRAFT/AIRPORT/RUNWAY CLASSIFICATION

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

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or a composite aircraft representing a collection of aircraft with similar characteristics. The critical aircraft is classified by three parameters: aircraft approach category (AAC), airplane design group (ADG), and taxiway design group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 2H**.

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

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

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

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

The back side of **Exhibit 2H** summarizes the classification of the most common aircraft in operation today. Generally, recreational and business piston and turboprop aircraft will fall in AAC A and B, and ADG I and II. Business jets typically fall in AAC B and C, while the larger commercial aircraft will fall in AAC C and D. Military aircraft may fall into any of the aforementioned categories, as well as AAC E and ADG IV and V, which would include smaller jets such as the F-16 Fighting Falcon and the F-15 Eagle, (Categories D and E), or the C-130 Hercules, a C-IV aircraft.

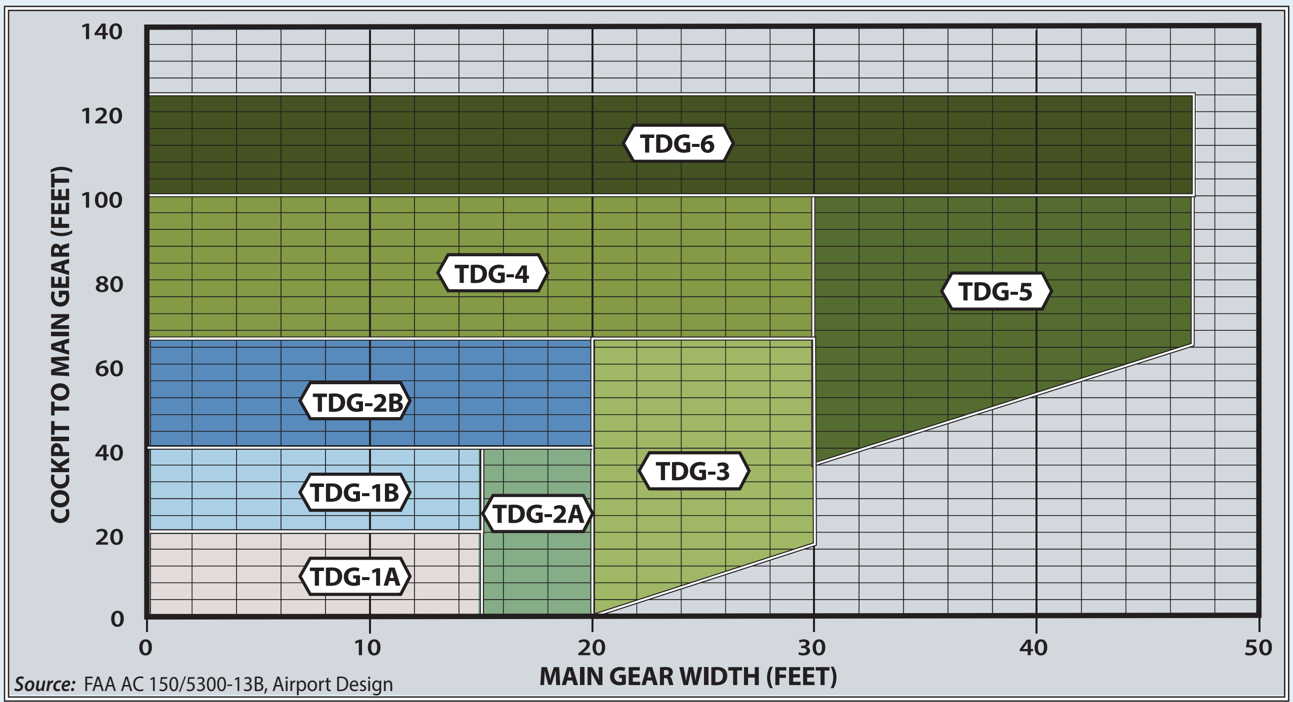
AIRCRAFT APPROACH CATEGORY (AAC)	
Category	**Approach Speed**
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

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

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

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



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

Exhibit 2H
AIRCRAFT CLASSIFICATION PARAMETERS

A-I

Aircraft	TDG
Beech Bonanza	**1A**
Cessna 150, 172	1A
Piper Comanche, Seneca	1A

B-I

Aircraft	TDG
Eclipse 500	1A
Beech Baron 55/58	**1A**
Beech King Air 100	1A
Cessna 421	2A
Cessna Citation M2 (525)	1A
Cessna Citation 1(500)	1A
Embraer Phenom 100	1A

A/B-II 12,500 lbs. or less

Aircraft	TDG
Beech Super King Air 200	**2A**
Beech King Air 90	1A
Cessna 441 Conquest	1A
Cessna Citation CJ2	2A
Pilatus PC-12	2

B-II over 12,500 lbs.

Aircraft	TDG
Beech Super King Air 350	2A
Cessna Citation CJ3(525B)	**2A**
Cessna Citation CJ4 (525C)	1B
Cessna Citation Latitude	1B
Embraer Phenom 300	1B
Falcon 20	1B
Pilatus PC-24	2A

A/B-III

Aircraft	TDG
Bombardier Dash 8	3
Bombardier Global 7500	**2B**
Falcon 7X, 8X	2A

C/D-I

Aircraft	TDG
Lear 35, 40, 45, 55, **60XR**	**1B**
F-16	1A

C/D-II

Aircraft	TDG
Challenger 600/604	1B
Cessna Citation III, VI,VII, X	1B
Embraer Legacy 135/140	2B
Gulfstream IV (D-II)	**2A**
Gulfstream G280	1B
Lear 70, 75	1B
Falcon 50, 900, 2000	2A
Hawker 800XP, 4000	1B

C/D-III less than 150,000 lbs.

Aircraft	TDG
Gulfstream V	2B
Gulfstream 550, 600, **650**	**2B**
Global 5000, 6000	2B

C/D-III over 150,000 lbs.

Aircraft	TDG
Airbus A319, A320, A321	3
Boeing 737-800, 900	**3**
MD-83, 88	4

C/D-IV

Aircraft	TDG
Airbus A300	5
Boeing 757-200	4
Boeing 767-300, **400**	**5**
MD-11	6

C/D-V

Aircraft	TDG
Airbus A330-200, 300	5
Airbus A340-500, 600	6
Boeing 747-100 - 400	5
Boeing 777-300	6
Boeing 787-8, 9	**5**

E-I

Aircraft	TDG
F-15	**1B**

Note: Aircraft pictured is identified in bold type.

Exhibit 2H
AIRCRAFT REFERENCE CODES

AIRPORT AND RUNWAY CLASSIFICATIONS

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

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

The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is more restrictive. The third component relates to the available instrument approach visibility minimums, expressed by RVR values in feet of 1,200 (⅛-mile), 1,600 (¼-mile), 2,400 (½-mile), 4,000 (¾-mile), and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component is labeled “VIS” for runways that are designed for visual approach use only.

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

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

Airport Reference Code (ARC): An airport designation that signifies the airport’s highest runway design code (RDC) minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely at an airport. The 2014 airport layout plan (ALP) which is currently on file for FHU identifies the existing ARC as E-V, based on the significant military activity occurring at the airport.

CRITICAL AIRCRAFT

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily on the characteristics of the aircraft that are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft or a composite aircraft representing a collection of aircraft classified by the three parameters: AAC, ADG, and TDG.

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

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

According to FAA AC 150/5300-13B, *Airport Design*, "airport designs based only aircraft currently using the airport can severely limit the airport's ability to accommodate future operations of more demanding aircraft. Conversely, it is not practical or economical to base airport design on aircraft that will not realistically use the airport." Selection of the current and future critical aircraft must be realistic in nature and supported by current data and realistic projections.

For airports such as FHU that accommodate a significant number of military operations, it is important to account for the impact of these aircraft on facility planning. However, according to FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, planned projects based upon the need of military aircraft are not eligible for FAA funding (Airport Improvement Program [AIP]). In these cases, a critical design aircraft for AIP eligibility can be made separately from a critical design aircraft for airfield facility planning.

AIRPORT CRITICAL AIRCRAFT

There are three elements for classifying the airport critical aircraft: the AAC, the ADG, and the TDG. The AAC and ADG are examined first, followed by the TDG.

The FAA's Traffic Flow Management System Counts (TFMSC) database captures an operation when a pilot files a flight plan and/or when a flight is detected by the National Airspace System, usually via radar. The database includes documentation of commercial traffic (air carrier and air taxi), general aviation, and military aircraft. Due to certain factors, such as incomplete flight plans, limited radar coverage, and VFR operations, TFMSC data does not account for all aircraft activity at an airport by a given aircraft type; however, the TFMSC does provide an accurate reflection of instrument flight rules (IFR) activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate.

Exhibit 2J presents the civilian TFMSC operational mix at the airport for turboprops and jets since 2014, while **Exhibit 2K** presents the military operations as recorded within the TFMSC. It should be noted that TFMSC data do not indicate runway usage; however, based on a historical understanding of airport operations, it is generally understood that Runway 8-26 serves as the primary runway accommodating most military aircraft as well as general aviation aircraft, including business jets and turboprops. Runways 12-30 and 3-21 serve as crosswind and secondary runways primarily for general aviation aircraft.

ARC	Aircraft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-I	Lancair Evolution/Legacy	0	2	0	0	0	0	0	0	0	0
	Kodiak Quest	0	0	0	0	0	0	0	0	0	6
	Piper Malibu/Meridian	0	0	2	0	2	2	2	2	2	2
	Cirrus Vision Jet	0	0	0	0	0	0	2	26	14	2
	Socata TBM 7/850/900	4	0	0	0	4	4	6	12	4	8
	Total	4	2	2	0	6	6	10	40	20	18
A-II	CASA Aviocar	0	0	0	0	2	0	0	0	0	0
	Cessna Caravan	0	0	0	10	0	0	2	0	0	0
	Pilatus PC-12	98	174	26	72	68	32	14	30	30	28
	Total	98	174	26	82	70	32	16	30	30	28
A-III	De Havilland Dash 7	0	0	2	0	0	0	0	0	0	0
	Total	0	0	2	0	0	0	0	0	0	0
B-I	Gulfstream Commander	2	4	2	4	4	12	8	8	2	2
	King Air 100	0	6	2	0	0	0	0	0	0	2
	Beechjet 400	0	4	4	8	4	4	0	10	0	4
	Citation M2	0	0	0	0	0	0	0	0	0	4
	Cessna 425 Corsair	0	0	0	0	0	0	0	0	0	2
	Citation I/SP	0	4	0	0	0	0	0	0	0	0
	Citation Mustang	4	2	0	0	0	2	2	0	2	10
	Citation CJ1	22	28	154	146	266	390	232	94	144	204
	Challenger 300	0	6	2	2	0	0	2	2	2	12
	Phenom 100	6	2	2	4	0	4	2	2	4	0
	Eclipse 500	28	18	20	18	8	14	10	10	12	6
	Honda Jet	0	0	0	0	0	2	0	0	4	2
	Learjet 31	0	0	2	0	0	0	0	2	0	0
	Mitsubishi Marquise/Solitaire	0	2	0	0	0	0	2	0	0	0
	Premier 1	4	2	0	0	0	0	2	2	4	2
	Total	66	78	188	182	282	428	260	130	174	250
B-II	Beech 1900	440	428	506	644	350	22	4	4	20	10
	King Air 200/300/350	40	70	38	44	46	36	50	64	80	56
	King Air 90	16	10	16	10	6	8	2	14	22	10
	Citation CJ2/CJ3/CJ4	4	4	4	2	0	8	12	6	10	8
	Cessna Conquest	2	0	2	0	4	2	0	4	0	4
	Cessna Citation II/Bravo	0	4	14	8	4	2	0	2	16	2
	Cessna Citation V/Ultra/Encore	2	12	14	12	6	8	4	2	2	2
	Citation XLS	2	6	0	8	0	6	4	8	6	4
	Citation V/Sovereign	2	4	2	6	2	4	2	12	0	6
	Citation II/SP/Latitude	0	0	0	0	0	4	0	2	6	2
	Embraer EMB-110/120	6	2	0	4	164	520	512	526	552	530
	Embraer EMB-545 Legacy 450	0	0	0	0	0	0	2	0	2	26
	Phenom 300	2	6	0	4	2	4	8	0	6	24
	Swearingen Merlin	0	4	0	4	2	6	2	2	8	8
	Total	516	550	596	746	586	630	602	646	730	692
B-III	Convair CV Series	0	0	0	2	0	0	0	0	0	0
	De Havilland Dash 8 Series	0	0	0	2	0	0	0	0	0	0
	Total	0	0	0	4	0	0	0	0	0	0
B-IV	Lockheed C130 Hercules	16	12	10	4	16	10	0	0	6	4
	Total	16	12	10	4	16	10	0	0	6	4
C-I	Learjet 35/36	0	10	6	10	2	0	2	6	0	0
	Learjet 40 Series	10	6	4	10	6	4	12	6	6	14
	Learjet 50 Series	0	0	0	0	2	0	2	0	0	0
	Learjet 60 Series	6	10	2	4	4	2	0	2	6	4
	Rockwell Sabre 40/60	0	0	0	0	0	0	0	0	2	0
	Westwind II	0	0	0	2	2	0	0	0	0	2
	Total	16	26	12	26	16	6	16	14	14	20

ARC	Aircraft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
C-II	Citation Longitude	0	0	0	0	0	0	0	0	0	4
	Cessna Citation X	2	2	2	2	2	0	4	8	8	4
	Challenger 300	0	0	0	0	2	2	0	2	12	6
	Challenger 600/601/604	4	0	2	0	0	6	0	12	10	4
	Embraer ERJ 135/140/Legacy	0	0	0	2	0	0	2	0	0	0
	Dassault Falcon 2000	4	0	4	2	0	0	0	0	0	0
	Dassault Falcon 900	0	0	4	0	0	0	0	4	4	0
	Gulfstream G150	0	0	0	0	2	0	0	0	0	0
	Gulfstream G280	0	0	0	0	0	2	4	2	2	0
	Galaxy/Gulfstream G200	2	0	4	4	0	0	0	0	2	2
	Gulfstream III	2	0	0	0	0	0	0	0	0	0
	Hawker 800 (Formerly Bae-125-800)	0	2	0	2	0	4	4	4	10	4
	Hawker 1000	0	0	0	0	0	0	0	4	0	0
	Learjet 70 Series	0	0	8	6	8	10	10	14	8	10
	Total	14	4	26	20	14	24	24	50	56	3
C-III	Airbus A319/320/321	0	0	0	0	0	0	26	2	0	0
	BAe 146	0	0	0	0	0	0	0	0	0	2
	Boeing 737 (200 thru 700 series)	0	0	2	4	0	2	68	34	4	2
	Bombardier CS100	0	0	0	0	0	0	2	0	0	0
	Gulfstream 600/650	6	2	4	2	4	0	8	2	4	0
	Bombardier BD-700 Global Express	0	0	0	0	0	0	0	2	0	0
	Mcdonnell Douglas MD-81/82/87/90	0	0	0	0	0	2	0	2	0	0
	P-3 Orion	0	0	0	2	0	0	0	0	0	0
	Avro RJ-85 Avroliner	0	0	0	2	4	0	0	0	0	0
	Total	6	2	6	10	8	4	104	42	8	4
C-IV	Airbus A400 Transport	0	0	0	0	0	0	0	0	2	0
	Boeing 757-200	2	0	2	0	0	0	2	0	0	0
	Boeing 767-200/300	0	0	0	0	0	0	6	0	0	0
	Total	2	0	2	0	0	0	8	0	2	0
C-V	Airbus A330-200/300 Series	2	0	0	0	0	0	0	0	0	2
	Boeing 777-200	2	2	0	0	0	2	0	4	0	0
	Total	4	2	0	0	0	2	0	4	0	2
D-II	Gulfstream 400	0	4	2	0	2	0	2	0	0	4
	Total	0	4	2	0	2	0	2	0	0	4
D-III	Boeing 737 800/900	4	4	6	0	0	0	32	16	0	2
	Gulfstream 500/600	0	0	2	2	0	6	6	4	4	6
	Total	4	4	8	2	0	6	38	20	4	8
D-IV	Boeing 767 All Series	0	0	0	0	0	0	2	6	0	0
	Total	0	0	0	0	0	0	2	6	0	0
D-V	Boeing 747 All Series	0	0	0	0	0	2	0	0	0	0
	Total	0	0	0	0	0	2	0	0	0	0

Exhibit 2J
HISTORICAL TURBOPROP AND JET OPERATIONS - CIVILIAN

AIRPORT REFERENCE CODE (ARC) SUMMARY

ARC CODE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-I	4	2	2	0	6	6	10	40	20	18
A-II	98	174	26	82	70	32	16	30	30	28
A-III	0	0	2	0	0	0	0	0	0	0
B-I	66	78	188	182	282	428	260	130	174	250
B-II	516	550	596	746	586	630	602	646	730	692
B-III	0	0	0	4	0	0	0	0	0	0
B-IV	16	12	10	4	16	10	0	0	6	4
C-I	16	26	12	26	16	6	16	14	14	20
C-II	14	4	26	20	14	24	24	50	56	34
C-III	6	2	6	10	8	4	104	42	8	4
C-IV	2	0	2	0	0	0	8	0	2	0
C-V	4	2	0	0	0	2	0	4	0	2
D-II	0	4	2	0	2	0	2	0	0	4
D-III	4	4	8	2	0	6	38	20	4	8
D-IV	0	0	0	0	0	0	2	6	0	0
D-V	0	0	0	0	0	2	0	0	0	0
Total	746	858	880	1,076	1,000	1,148	1,082	982	1,044	1,064

Aircraft Approach Category

AAC	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A	102	176	30	82	76	38	26	70	50	46
B	598	640	794	936	884	1,068	862	776	910	946
C	42	34	46	56	38	36	152	110	80	60
D	4	8	10	2	2	8	42	26	4	12
Total	746	858	880	1,076	1,000	1,148	1,082	982	1,044	1,064

Airplane Design Group

ADG	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
I	86	106	202	208	304	440	286	184	208	288
II	628	732	650	848	672	686	644	726	816	758
III	10	6	16	16	8	10	142	62	12	12
IV	18	12	12	4	16	10	10	6	8	4
V	4	2	0	0	0	4	0	4	0	2
Total	746	858	880	1,076	1,000	1,148	1,082	982	1,044	1,064

Source: FHU TFMSC 1/1/2014 - 12/31/2023 - Data normalized annually

Exhibit 2J
HISTORICAL TURBOPROP AND JET OPERATIONS - CIVILIAN

ARC	Aircraft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-II	CASA Aviocar	0	0	0	0	2	0	0	0	0	0
	Pilatus PC-12	14	6	16	16	10	2	4	76	182	294
	Bell V-22 Osprey	0	0	0	0	2	0	0	0	0	0
	Total	14	6	16	16	14	2	4	76	182	294
A-III	De Havilland Dash 7	10	16	18	0	6	2	2	0	0	0
	Total	10	16	18	0	6	2	2	0	0	0
B-I	Beechjet 400	2	0	0	0	0	0	0	2	0	0
	Citation CJ1	0	0	4	0	0	0	0	0	0	0
	Challenger 300	0	0	0	0	0	0	0	2	0	0
	Phenom 100	0	0	2	0	0	0	0	0	0	0
	T-6 Texan	2	2	2	6	0	2	0	4	4	2
	Total	4	2	8	6	0	2	0	8	4	2
B-II	IAI Astra 1125	2	0	0	0	0	0	0	0	0	0
	Beech 1900	0	6	4	0	0	0	0	0	0	0
	King Air 200/300/350	546	856	898	1058	890	646	504	702	862	954
	Beech King Air 90	4	0	4	0	0	0	0	0	0	0
	Citation II/Bravo	0	0	0	0	2	2	0	0	0	0
	Citation V/Ultra/Encore	4	8	8	2	2	6	2	12	20	6
	Citation Latitude	0	0	0	0	0	0	0	0	0	2
	Dornier 328	0	4	6	0	0	0	0	0	0	0
	Embraer Brasilia EMB 120	0	0	0	0	0	0	2	0	2	0
	Swearingen Merlin	2	0	0	0	2	0	0	0	6	6
	Total	558	874	920	1060	896	654	508	714	890	968
B-III	De Havilland Dash 8 Series	0	0	4	12	0	6	14	46	2	0
	Total	0	0	4	12	0	6	14	46	2	0
B-IV	Lockheed C130 Hercules	218	248	166	178	146	166	98	108	116	70
	Boeing C17	4	22	40	14	20	40	28	42	80	10
	Total	222	270	206	192	166	206	126	150	196	80
C-I	Boeing F-18 Hornet	0	0	2	2	0	0	2	0	0	0
	BAe Systems Hawk	0	0	0	0	6	2	0	0	0	0
	Learjet 35/36	4	4	0	2	6	6	0	2	2	0
	Learjet 60	0	2	0	0	0	0	0	0	0	0
	Total	4	6	2	4	12	8	2	2	2	0
C-II	Fairchild A10	16	14	16	6	6	8	0	12	4	8
	Hawker 4000	6	0	0	0	0	0	0	0	0	0
	Total	22	14	16	6	6	8	0	12	4	8
C-III	BAe 146 -200	0	0	4	2	2	4	0	4	4	10
	Boeing 737 (200 thru 700 series)	0	2	2	4	0	0	2	2	4	14
	Douglas KC-10	0	2	0	0	0	0	0	0	0	0
	Boeing (Douglas) MD 87	0	0	0	0	0	2	0	0	2	2
	Avro RJ-85 Avroliner	0	0	0	2	4	0	8	6	2	8
	Total	0	4	6	8	6	6	10	12	12	34
C-IV	Airbus A400M Atlas	0	0	0	0	0	4	0	0	2	0
	Boeing 767-200/300	0	0	0	0	0	0	0	0	0	4
	Boeing E-6 Mercury	0	0	0	0	2	0	0	0	0	0
	Boeing KC-135 Stratotanker	0	2	2	0	4	0	2	0	0	0
	Total	0	2	2	0	6	4	2	0	2	4
C-VI	Lockheed C-5	0	0	0	0	0	6	0	0	0	0
	Total	0	0	0	0	0	6	0	0	0	0
D-I	Lockheed F-16 Fighting Falcon	30	48	42	12	8	2	0	4	24	2
	T-38 Talon	0	0	0	0	4	0	0	0	0	0
	Total	30	48	42	12	12	2	0	4	24	2
D-III	Gulfstream 500/600	2	6	2	0	0	2	0	2	0	12
	Total	2	6	2	0	0	2	0	2	0	12
D-IV	Boeing (Douglas) DC 10-10/30/40	2	2	2	0	0	0	2	0	0	0
	Total	2	2	2	0	0	0	2	0	0	0
D-V	Boeing 747 All Series	0	0	2	0	0	0	0	0	0	0
	Total	0	0	2	0	0	0	0	0	0	0
E-I	Boeing F-15 Eagle	0	0	0	0	0	2	0	0	0	0
	Total	0	0	0	0	0	2	0	0	0	0

AIRPORT REFERENCE CODE (ARC) SUMMARY

ARC CODE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-II	14	6	16	16	14	2	4	76	182	294
A-III	10	16	18	0	6	2	2	0	0	0
B-I	4	2	8	6	0	2	0	8	4	2
B-II	558	874	920	1,060	896	654	508	714	890	968
B-III	0	0	4	12	0	6	14	46	2	0
B-IV	222	270	206	192	166	206	126	150	196	80
C-I	4	6	2	4	12	8	2	2	2	0
C-II	22	14	16	6	6	8	0	12	4	8
C-III	0	4	6	8	6	6	10	12	12	34
C-IV	0	2	2	0	6	4	2	0	2	4
C-VI	0	0	0	0	0	6	0	0	0	0
D-I	30	48	42	12	12	2	0	4	24	2
D-III	2	6	2	0	0	2	0	2	0	12
D-IV	2	2	2	0	0	0	2	0	0	0
D-V	0	0	2	0	0	0	0	0	0	0
E-I	0	0	0	0	0	2	0	0	0	0
Total	868	1,250	1,246	1,316	1,124	910	670	1,026	1,318	1,404

Aircraft Approach Category

AAC	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A	24	22	34	16	20	4	6	76	182	294
B	784	1,146	1,138	1,270	1,062	868	648	918	1,092	1,050
C	26	26	26	18	30	32	14	26	20	46
D	34	56	48	12	12	4	2	6	24	14
E	0	0	0	0	0	2	0	0	0	0
Total	868	1,250	1,246	1,316	1,124	910	670	1,026	1,318	1,404

Airplane Design Group

ADG	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
I	38	56	52	22	24	14	2	14	30	4
II	594	894	952	1,082	916	664	512	802	1,076	1,270
III	12	26	30	20	12	16	26	60	14	46
IV	224	274	210	192	172	210	130	150	198	84
V	0	0	2	0	0	0	0	0	0	0
VI	0	0	0	0	0	6	0	0	0	0
Total	868	1,250	1,246	1,316	1,124	910	670	1,026	1,318	1,404

Source: FHU TFMSC 1/1/2014 - 12/31/2023 - Data normalized annually

Exhibit 2K
HISTORICAL TURBOPROP AND JET OPERATIONS - MILITARY

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Table 2T presents a summary of combined civilian and military operations by ARC captured in the TFMSC database over the last 10 years.

TABLE 2T | Historic Civilian and Military Turbine Operations by ARC

ARC Code	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
A-I	4	2	2	0	6	6	10	40	20	18
A-II	112	180	42	98	84	34	20	106	212	322
A-III	10	16	20	0	6	2	2	0	0	0
B-I	70	80	196	188	282	430	260	138	178	252
B-II	1,074	1,424	1,516	1,806	1,482	1,284	1,110	1,360	1,620	1,660
B-III	0	0	4	16	0	6	14	46	2	0
B-IV	238	282	216	196	182	216	126	150	202	84
C-I	20	32	14	30	28	14	18	16	16	20
C-II	36	18	42	26	20	32	24	62	60	42
C-III	6	6	12	18	14	10	114	54	20	38
C-IV	2	2	4	0	6	4	10	0	4	4
C-V	4	2	0	0	0	2	0	4	0	2
C-VI	0	0	0	0	0	6	0	0	0	0
D-I	30	48	42	12	12	2	0	4	24	2
D-II	0	4	2	0	2	0	2	0	0	4
D-III	6	10	10	2	0	8	38	22	4	20
D-IV	2	2	2	0	0	0	4	6	0	0
D-V	0	0	2	0	0	2	0	0	0	0
E-I	0	0	0	0	0	2	0	0	0	0
Total	**1,614**	**2,108**	**2,126**	**2,392**	**2,124**	**2,060**	**1,752**	**2,008**	**2,362**	**2,468**

Source: FAA TFMSC

According to the TFMSC data, operations at FHU within AAC B and ADG II have exceeded the 500 operations threshold each year since 2014, including 2020 which saw a decline in operations due to the COVID-19 pandemic. AAC C and D operations combined accounted for 132 total operations in 2023, with 60 of those conducted by military variants of aircraft such as the Gulfstream V and the Boeing 737-300. ADG III, IV, and V operations totaled 148 operations by both civilian and military aircraft, with 130 of those recorded as military operations conducted by aircraft including the C-130 Hercules.

As previously mentioned, the TFMSC does not account for all activity occurring at the airport, as evidenced by the significant discrepancy between ATCT-recorded operations and those included in the TFMSC database[3]. According to tower personnel, FHU regularly experiences operations by larger, faster military aircraft, with most of these occurring on Runway 8-26. While it is important to consider military aircraft in facility planning, military aircraft cannot be used to justify AIP funding for projects, as previously stated. The U.S. Department of Defense (DOD) funds the runways and majority of taxiways at FHU and determines the planning standards to be met for military aircraft usage. **Therefore, based on past planning standards and discussions with tower and military personnel, the existing critical aircraft for primary Runway 8-26 is AAC E and ADG V. It is anticipated that this planning-only classification will apply to the future condition as well.**

[3] In 2023, the FHU ATCT recorded 111,168 total operations, while the TFMSC database reports 3,803 total operations, including those conducted by piston aircraft.

As the crosswind runway, Runway 12-30 has historically been planned to meet ARC C-III design standards, which includes aircraft such as the Boeing 737-300. It is important for FHU to maintain the crosswind runway to continue to accommodate military operations as needed. According to tower and military personnel, Runway 12-30 is used primarily by civilian aircraft, but military aircraft such as the C-130, C-17, and RC-12 (a military variant of the Beechcraft King Air) use the runway when wind conditions or other circumstances dictate. Like the primary runway, the crosswind's design standards will be determined by the DOD; however, based on available data, this runway is supported for up to ARC B-II for civilian usage. Nonetheless, **planning standards for Runway 12-30 should continue to reflect ARC C-III based on historic planning and the continued need for this runway to be capable of supporting larger military aircraft.**

Runway 3-21 accommodates civilian operations almost exclusively, with C-130 arrivals occurring infrequently. Therefore, ARC B-II standards are considered appropriate for the current and future design of Runway 3-21.

As previously discussed, military aircraft cannot be considered by the FAA when justifying AIP funding for projects, and as such, these aircraft operation counts should be removed from consideration in order to establish a civilian critical aircraft (existing and ultimate) for FAA planning purposes associated with this master plan. Civilian aircraft operations as logged by the TFMSC on Exhibit 2J clearly calls out B-II as the existing ARC. Future planning for civilian aircraft will also account for B-II as the ultimate ARC.

TAXIWAY DESIGN GROUP (TDG)

The TFMSC also provides a breakdown of aircraft operations by TDG. According to FHU operations data, presented in **Table 2U**, the highest TDG that exceeds the threshold of 500 annual operations in 2023 is TDG 3, represented by the Embraer Brasilia 120. However, as stated previously, the TFMSC does not capture all operations, including larger military aircraft that have higher TDGs. As such, TDG 5 is considered the existing and future TDG critical design aircraft for taxiway planning purposes. This should apply to taxiways serving Runways 8-26 and 12-30, while taxiways serving Runway 3-21 should be planned to meet TDG 3. Similar to the ARC discussion above, the military will ultimately determine the taxiway design standards that should be met at the airport; however, for civilian aircraft planning, TDG 3 has been identified as the AIP-eligible standard.

TABLE 2U | FHU Operations by Taxiway Design Group

TDG	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1A	124	134	258	216	312	436	266	192	240	280
1B	42	58	40	66	40	56	58	84	88	118
2	112	180	42	88	78	34	18	106	212	322
2A	1,060	1,412	1,520	1,786	1,324	760	592	826	1,028	1,076
2B	242	270	184	188	166	184	114	118	130	92
3	22	26	32	32	174	540	662	630	584	564
4	2	2	6	0	6	0	6	6	0	0
5	10	26	44	16	20	44	36	46	80	16

Source: TFMSC 2014-2023

RUNWAY DESIGN CODE

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

As the primary runway, Runway 8-26 should be designed to accommodate the overall airport design aircraft. The primary runway is 12,001 feet long by 150 feet and has a precision instrument approach with visibility minimums as low as ¾-mile to Runway 26. It has been established that the current and future critical aircraft falls within ARC E-V, based on military usage at the airport; therefore, when factoring in the RVR, the existing and ultimate RDC for Runway 8-26 is E-V-4000. For civilian operations, the RDC for Runway 8-26 is B-II-4000.

For crosswind Runway 12-30, it has been determined that the planning standard that should be met for this runway is ARC C-III, based on military usage of this runway. Currently, this is a visual-only runway, meaning it does not have any published instrument approach procedures. As such, its existing RDC would be defined as RDC C-III-VIS. However, future planning should consider the potential for an instrument approach to be implemented on this runway, with visibility minimums down to one mile. The ultimate RDC for planning purposes is therefore defined as C-III-5000. For civilian operations, the existing RDC for Runway 12-30 is B-II-VIS and the ultimate RDC is B-II-5000.

Runway 3-21 is considered an additional runway and is used predominantly by smaller general aviation aircraft. There are no instrument approach procedures to this runway. It should be planned to meet RDC B-II-VIS in the existing and ultimate conditions[4].

APPROACH AND DEPARTURE REFERENCE CODES

The approach and departure reference codes (APRC and DPRC) describe the current operational capabilities of each runway and the adjacent parallel taxiways when no special operating procedures are necessary. Essentially, the APRC and DPRC describe the current conditions at an airport in runway classification terms when considering the parallel taxiway.

Taxiways P and J for Runway 8-26 are located approximately 1,035 feet from the runway (centerline to centerline). Runway 26 is equipped with an ILS approach down to ¾-mile visibility, resulting in an APRC of D/VI/4000 and a DPRC of D/VI.

Runway 12-30 is separated from Taxiway K by approximately 1,040 feet and has no published instrument approaches. Therefore, its APRC is D/VI/Visual and its DPRC is D/VI.

[4] An additional runway is defined as a runway that is not the primary or crosswind runway. The continued maintenance of Runway 3-21 will be discussed in Chapter Three, Facility Requirements.

AIRPORT AND RUNWAY CLASSIFICATION SUMMARY

Table 2V summarizes the current and future runway classifications.

TABLE 2V | Airport and Runway Classifications

	Runway 8-26 (existing/ultimate) Planning Purposes (includes military)	Runway 8-26 (existing/ultimate) AIP Eligible	Runway 12-30 (existing/ultimate) Planning Purposes (includes military)	Runway 12-30 (existing/ultimate) AIP Eligible	Runway 3-21 (existing/ultimate)
ARC	E-V	B-II	C-III	B-II	B-II
Critical Aircraft	F-15 F-16 Boeing 777-200	EMB Brasilia 120	Boeing 737-300	EMB Brasilia 120	EMB Brasilia 120
RDC	E-V-4000	B-II-4000	C-III-VIS (existing) C-III-5000 (ultimate)	B-II-VIS (existing) B-II-5000 (ultimate)	B-II-VIS
TDG	TDG 5	TDG 3	TDG 5	TDG 3	TDG 3
APRC	D/VI/4000	D/VI/4000	D/VI/VIS	D/VI/VIS	N/A
DPRC	D/VI	D/VI	D/VI	D/VI	N/A

- ARC: Airport Reference Code
- APRC: Approach Reference Code
- DPRC: Departure Reference Code
- RDC: Runway Design Code
- TDG: Taxiway Design Group

Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

SUMMARY

This chapter has outlined the various activity levels that might reasonably be anticipated over the planning period, as well as the critical aircraft for the airport. Total based aircraft at Sierra Vista Municipal Airport are forecast to grow from 61 in 2023 to 75 by 2043. Operations are forecast to grow from an estimated 116,903 in 2023 to 142,400 by 2043. The projected growth is driven by continued use of FHU for military operations, including UAS, as well as the FAA's positive outlook for general aviation and air taxi activity nationwide.

The critical aircraft for the airport was determined by examining the FAA's TFMSC database of flight plans and through discussion with ATCT and military personnel. For the primary runway, which is used for the majority of military operations at FHU, the current and future critical aircraft for planning purposes is described as ARC E-V and is best represented by a combination of the F-15 and F-16 fighter jets and the Boeing 777-200, which is used as a transport aircraft. Crosswind Runway 12-30, which accommodates a significant portion of the general aviation activity at FHU as well as military operations, should be planned to support ARC C-III aircraft, an example of which is the Boeing 737-300. The critical aircraft for Runway 3-21 is classified as an ARC B-II, with the Embraer Brasilia 120 serving as the representative aircraft. As previously detailed, civilian operations support ARC B-II as the existing and ultimate critical aircraft category for activity associated with FAA planning standards, with the Embraer Brasilia 120 serving as the representative aircraft.

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