



Chapter 4 – Forecast of Aviation Demand

Airport Master Plan | Salinas Municipal Airport

Prepared by:





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4.1 Forecast Overview

Forecasts of aviation demand (commonly referred to as a “forecast”) are an essential element of the airport planning process and require Federal Aviation Administration (FAA) review and approval. Demand forecasts are based on the needs of the community surrounding the airport (service area) and provide a basis for determining the type, size, and timing of aviation facility development over a 20-year period. As the operation and construction of future airport facilities requires FAA and local investment, accurate forecasts are essential for effective airport planning and decision-making and influence all subsequent steps of the planning process. FAA Order 5090.5, *Formulation of the National Plan of Integrated Airport Systems (NPIAS) and Airports Capital Improvement Plan (ACIP)*, dated September 3, 2019, states that forecasts should:

- ◆ Be realistic
- ◆ Be based on the latest available data
- ◆ Reflect current conditions at the airport
- ◆ Provide adequate justification for the airport planning and development

Forecasts of Salinas Municipal Airport’s future aviation demand were developed for the planning period extending through 2042 using various sources described in the next section. The forecast was developed based on the best practice standards as defined in FAA Advisory Circular (AC) 150-5070-6B, *Airport Master Plans*. Information specific to SNS and pertinent to future planning, and consistent with the report *Forecasting Aviation Activity by Airport* prepared for the FAA in July 2001 by GRA, incorporated into this forecasting effort was broken into the following steps:

- ◆ Identification of aviation demand elements
- ◆ Data sources
- ◆ Historical and existing aviation activity
- ◆ Review of aviation forecasts
- ◆ Collection of data
- ◆ Development of the forecast
- ◆ Comparison with FAA terminal area forecast (TAF)
- ◆ Demand forecast summary

Forecasts of aviation demand are developed for several elements or parameters specific to an airport. The key demand elements for SNS include General Aviation (GA) activity and based aircraft. Aviation demand forecasts were developed for the following elements specific to SNS:

- ◆ Number of based aircraft and associated fleet mix
- ◆ Annual general aviation operations (includes total and local versus itinerant)
- ◆ Operational Mix by Type and Airport Reference Code
- ◆ Critical Design Aircraft

4.2 Data Sources

Information factored into the forecast effort included FAA GA fleet trends and anticipated changes in the aircraft fleet mix operating at SNS. The data and assumptions used to define baseline conditions and future activity trends were derived from the following data sources:

- ◆ **Salinas Municipal Airport (SNS):** Historical documentation that was prepared for/by the Airport, which includes existing operations and based aircraft, annual fuel sales, and aviation forecasts including the prior Airport Layout Plan Narrative Report demand forecast (prepared in 2015).
- ◆ **FAA Terminal Area Forecast (TAF):** The TAF is the official FAA forecast of aviation activity for U.S. airports. Activity estimates are derived from national estimates of aviation activity that are then assigned to individual airports based on multiple market and forecast factors. The FAA looks at local and national economic conditions, as well as trends within the aviation industry, to develop each forecast. The TAF is updated annually and was last published in February 2023.
- ◆ **FAA Traffic Flow Management System Counts (TFMSC):** TFMSC contains data derived from the FAA's Air Traffic Airspace Lab's Traffic Flow Management System. The data provides historical records of aircraft operations under Instrument Flight Rules (IFR) that can be reviewed and filtered to provide specific historical information on the aircraft types operating at SNS during a defined period.
- ◆ **Form FAA 5010 (5010):** The 5010 – Airport Master Record – is a publicly available FAA form for each airport with aeronautical data containing general airport information, services, facilities, based aircraft, operations, runway data, navigational aids, and approach data. This form is updated regularly by airports for the FAA, pilot, and public use.
- ◆ **Woods & Poole Economics, Inc., 2022:** Woods & Poole is an independent firm that specializes in developing long-term economic and demographic projections. Their database includes every state, Metropolitan Statistical Area (MSA), and county in the U.S. and contains historical data and projections through 2050 utilizing more than 900 economic and demographic variables.
- ◆ **California Aviation System Plan, 2020:** The California Aviation System Plan study of 2020 (CASP 2020) is California's State Aviation System Plan (SASP) and provides local and regional trends in aviation with forecasts.

4.3 Historical and Existing Aviation Activity

The demand forecast is based on historic aircraft operations and based on aircraft at Salinas Municipal Airport for the last ten years. Historical aviation activity at the Airport was gathered using sources noted in **Section 3.2**. The different types of aviation activity at SNS are described below:

- ◆ **General Aviation (GA):** Its activities include flight training, sightseeing, aerial photography, light cargo, recreational, law enforcement, medical flights, business, and corporate operations. GA aircraft encompass a broad range of types, from single-engine piston aircraft to large jets, as well as rotorcraft, gliders, and amateur-built aircraft. These operations are generally conducted under Federal Aviation Regulations (FAR) Part 91 (General Operating and Flight Rules). GA represents the largest percentage of civil aircraft in the U.S. and accounts for most operations handled by towered and non-towered airports, as well as most certificated pilots. These operations do not include air carrier, air taxi and commuter, scheduled commercial cargo, and military flights.
- ◆ **Military:** Operations conducted by the nation's military forces. Both local and itinerant military operations at SNS have been reported with annual totals as few as 171 and at most 1,054 in the FAA Terminal Area Forecast (TAF) over the past 10 years. Given the low activity of military operations, this report will not present a forecast for military activity for SNS but will consider the FAA TAF forecast of itinerant 1,070 military operations, and 322 local military operations for each phase in the planning period.
- ◆ **Air Taxi:** Carriers that operate aircraft with 60 or fewer seats or have a cargo payload capacity of less than 18,000 pounds and carry passengers on an on-demand basis only (charter service) and/or carry cargo or mail on either a scheduled or charter basis. Air taxi carriers are governed under FAR Part 135 (Commuter and On-Demand Operations).

4.3.1 Based Aircraft

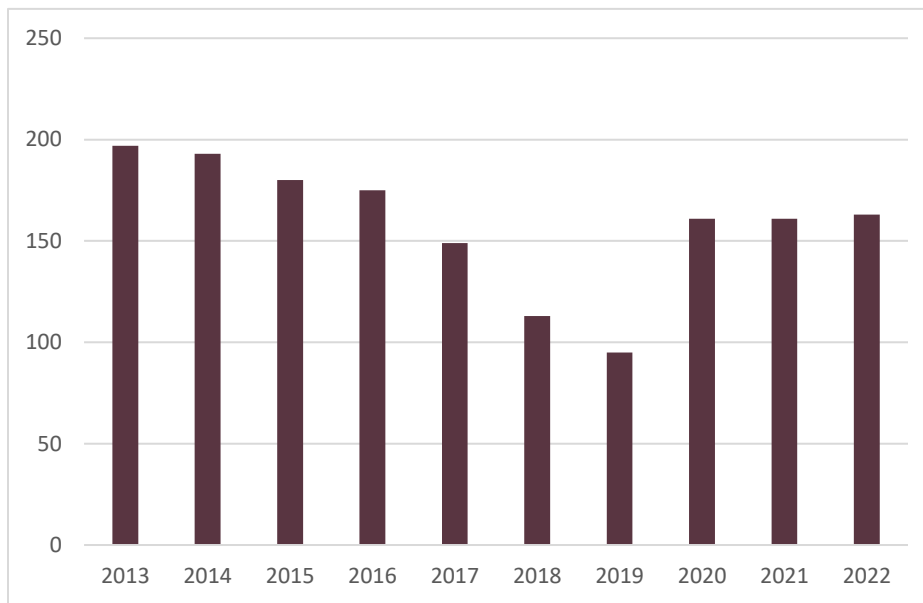
FAA defines a based aircraft as an aircraft that is operational and airworthy and based at a specific airport for most of the year. By reviewing historical based aircraft activity and existing activity, the forecast for future based aircraft will be analyzed. A look at past and prospective industry growth rates for comparison will help determine the best forecast plan for the Airport's planning period. The following sources have been reviewed for historical and/or existing based aircraft data for this report:

- ◆ FAA Terminal Area Forecast
- ◆ National Based Aircraft Inventory

4.3.1.1 FAA Terminal Area Forecast (TAF)

The data published in the FAA TAF in the past 10 years shows based aircraft had an average annual growth rate¹ (AAGR) of 0.47 percent (see **Figure 4.1**). The past five years had an AAGR of 13.70 percent with a significant increase from 2019 to 2020. It should be noted that the drop in based aircraft from 2017 to 2019 was not due to an actual drop in the physical number of based aircraft. This drop is attributed to outdated counts in the National Based Aircraft Inventory Program which was then updated in 2020 to accurately reflect the based aircraft count.

Figure 4.1 - FAA TAF Historical Based Aircraft at SNS



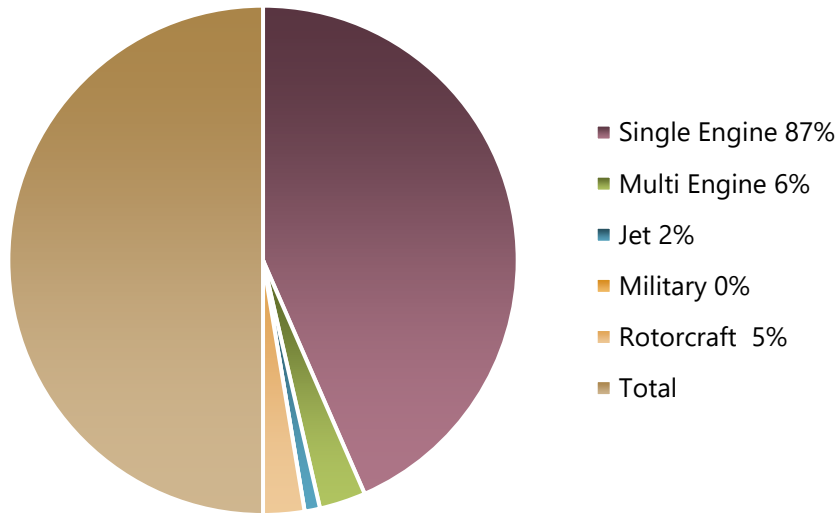
Source: FAA TAF February 2023, C&S Engineers, Inc.

4.3.1.2 Salinas Municipal Airport-Based Aircraft Inventory Counts

Based aircraft counts for existing data from the Airport are presented in **Figure 4.2** by category. These counts are recorded and validated in the National Based Aircraft Inventory Database. The validated total based aircraft for 2022 is 153.

¹ Average annual growth rate (AAGR) is the average annualized return of an investment, portfolio, asset, or cash flow over time [based aircraft and airport operations]. The average annual growth rate helps determine long-term trends. It applies to almost any kind of financial measure including growth rates of profits, revenue, cash flow, expenses, etc. to provide the investors with an idea about the direction wherein the company is headed. <https://www.investopedia.com/terms/a/aagr.asp> (Accessed October 2022)

Figure 4.2 - National Based Aircraft Inventory 2022



Source: SNS (April 2022), National Based Aircraft Inventory

The Airport will utilize the existing 163 based aircraft published in the FAA TAF as the existing based aircraft for the baseline of forecast projections for 2022.

4.3.2 Aircraft Operations

Airport operations are classified as local and itinerant. Local operations are those operations performed by aircraft that operate from the airport, remain within a specified radius, and do not land at another airport. Itinerant operations are aircraft that land at an airport, arrive from outside the airport area, or depart an airport and leave the airport area. Similar to the based aircraft review/analysis, by reviewing historical and existing operations activity, the forecast for future activity at the Airport will be analyzed. A look at past and prospective industry growth rates for comparison will help determine the best forecast plan for the Airport’s planning period. The following sources have been reviewed for historical and/or existing operations data for this report:

- ◆ FAA Terminal Area Forecast
- ◆ Traffic Flow Management System Counts (TFMSC)
- ◆ Salinas Municipal Airport Fuel Sales
- ◆ Air Traffic Activity Syst

4.3.2.1 Terminal Area Forecast (TAF)

The data published in the FAA TAF over the past 10 years shows an AAGR of -1.66 percent (see **Table 4.1**).

Table 4.1 - FAA TAF Historical and Existing Aircraft Operations at SNS

Year	Air Carrier	Air Taxi	Itinerant GA	Itinerant Military	Local GA	Local Military	Total Operations
2013	2	1,551	40,753	242	14,776	86	62,043
2014	0	1,403	35,509	251	19,409	168	55,660
2015	5	1,552	40,557	235	18,329	304	60,332
2016	9	2,013	40,119	543	17,679	500	62,549
2017	0	1,462	39,151	397	19,365	198	60,166
2018	2	1,801	39,476	635	21,482	422	63,818
2019	0	1,787	44,473	484	31,764	82	78,590
2020	0	1,091	37,295	427	23,018	131	61,962
2021	0	1,168	35,338	739	24,840	250	62,335
2022	0	1,465	29,370	1,070	16,635	322	48,862

Source: FAA TAF February 2023, C&S Engineers, Inc.

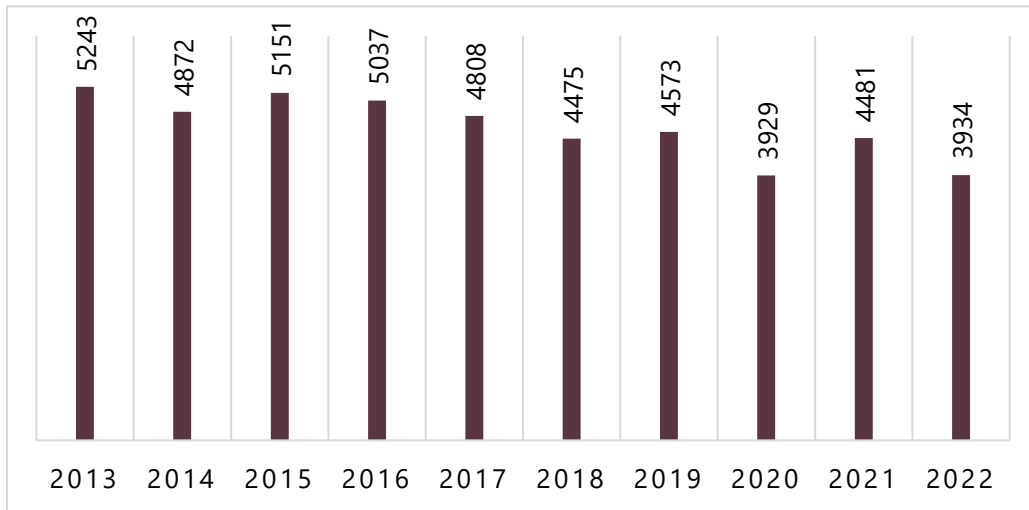
The annual total operations for 2021 (62,335) as recorded in the FAA TAF, will be utilized as the existing baseline for forecast operations. Although 2022 data is available at the time of this report, because of frequent and ongoing Tower closures presumably due to staffing issues, 2022 historical TAF operations underrepresent what is actually happening at the airport. Therefore, the airport elects to use 2021 as its base year for operations forecasting purposes. The AMR-5010 references 2019 data which further reveals the disparity in the 2022 data. Additional considerations for operations activity are detailed below for instrument approach activity as well as fuel sales. These will be considered in the operations forecast analysis.

4.3.2.2 Instrument Approaches: Traffic Flow Management System Counts (TFMSC)

Instrument approaches are approach and landings where the pilot uses aircraft instruments for navigation guidance based on an instrument approach procedure (IAP). Runway 8/26 has a non-precision RNAV (GPS) approach on the Runway 8 end. Runway 13/31 is equipped with a precision approach on the Runway 31 end as well as RNAV (GPS) approaches on both ends and a VOR approach on the 13 end.

The TFMSC data is derived from actual instrument flight rule (IFR) operation counts rather than an estimate of overall activity and therefore allows a more accurate understanding of IFR activity trends by user category and aircraft type. As shown in **Figure 4.3**, the TFMSC recorded an AAGR of -2.12 percent for total IFR airport operations over the 10-year reporting period. When looking at a five-year trend at SNS, the AAGR was -1.20 percent, with a rise in operations from 2020 to 2021.

Figure 4.3 – TFMSC Historical IFR Operations at SNS



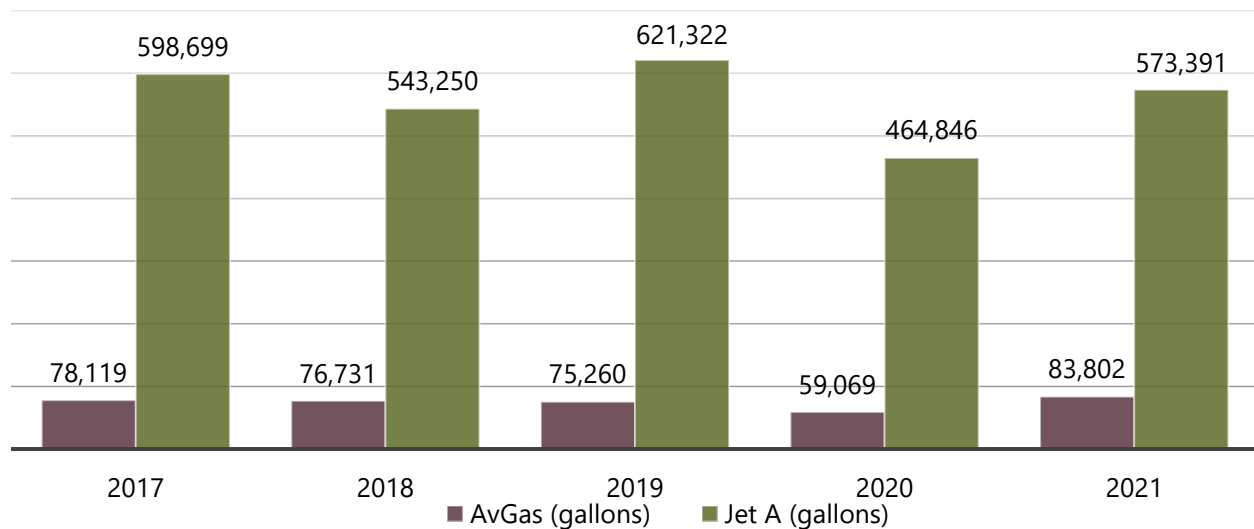
Source: Traffic Flow Management System Counts (January 2024), C&S Engineers, Inc.

4.3.3 Fuel Sales

Trends in fuel sales depict the activity seen at the Airport and are helpful to consider when forecasting future activity. The growth in aircraft operations at SNS over the past five years is reflected in fuel sales (in gallons) at the Airport. **Figure 4.4** shows historical and existing fuel sales provided by the FBO with the results summarized below:

- ◆ Increase in AvGas fuel sales of 4.2 percent AAGR for the past 5-year period
- ◆ Increase in Jet A fuel sales of 0.8 percent for the past 5-year period
- ◆ One-year increase in Jet A fuel sales of over 108,000 gallons (23 percent) from 2020-2021

Figure 4.4 – Fuel Sales History (gallons)



Source: Salinas Municipal Airport, C&S Engineers, Inc. (March 2022)

4.4 Review of Previous Aviation Forecasts

Historical aviation activity forecasts were reviewed to evaluate projected forecasting trends and methodologies used to prepare those analyses.

4.4.1 Forecast Data Specific to SNS

Forecast data was reviewed from the 2015 Salinas Municipal Airport – Airport Layout Plan Narrative Report, the 2020 California Aviation System Plan (CASP), and the FAA TAF for the years 2022 to 2042. The forecast data in this section is shown as reported in those documents and has not been adjusted.

4.4.1.1 Salinas Municipal Airport – Airport Layout Plan Narrative Report (2015)

An Airport Layout Plan for SNS was published in 2015. It included an evaluation of future forecast activity at the Airport. The forecast covered a planning period including the years through 2035. **Table 4.2** provides a breakdown of the forecast summarizing based aircraft and operations. Overall, the compound average growth rates² (CAGR) for the based aircraft and operations reflected in the forecast were 0.74 percent and 0.52 percent, respectively, through 2035.

Table 4.2 – Salinas Municipal Airport – 2015 ALP Aviation Demand Summary

Year	Based Aircraft		Total Operations	
2014	210	CAGR 0.74%	54,550	CAGR 0.52%
2020	215		55,500	
2025	225		57,100	
2035	245		60,800	

Source: SNS ALP Narrative Report, 2015

² Average annual growth rate (AAGR) is the average increase. It is a linear measure and does not take into account compounding. Meanwhile, the **compound annual growth rate (CAGR)** does, and it smooths out an investment's returns, diminishing the effect of return volatility. The compound annual growth rate isn't a true return rate, but rather a representational figure. It is essentially a number that describes the rate at which an investment [based aircraft and airport operations] would have grown if it had grown at the same rate every year.

<https://www.investopedia.com/terms/c/cagr.asp> (Accessed October 2022)

4.4.1.2 California Aviation System Plan (2020)

The California Aviation System Plan (2020) states, “The California Aviation System Plan study of 2020 (CASP 2020) embarks on a new direction for State Aviation System Plans (SASPs). Traditionally, states review their airports collectively to describe their facilities and capabilities as a system that serves aviation needs for a range of system users: travelers, corporate flight operations, cargo, training and as a source for employment and other economic contributions. A “traditional” SASP uses elements described by the Federal Aviation Administration (FAA) in its guidance document, Advisory Circular 150/5070-7 (AC 150/5070-7), Change 1, *The Airport System Plan Process*. An AC conveys technical information for subject areas within FAA jurisdiction. Focused on airports, the AC’s 15 elements are applied only to airports in the National Plan of Integrated Airport Systems (NPIAS).

In contrast, CASP 2020 comprehensively views California public-use airports to evaluate aviation and contribute to the California Transportation Plan of 2050 (CTP 2050). CTP 2050 is the state’s long-range transportation plan that establishes an aspirational vision that articulates strategic goals, policies, and recommendations to improve multimodal mobility and accessibility while reducing greenhouse gas (GHG) emissions.”³

Table 4.3 shows the compounded annual growth rates for California’s General Aviation Airports forecast from 2020 to 2045.

Table 4.3 – California Aviation System Plan 2020: General Aviation Forecast

Year	Based Aircraft	Total Operations
2020-2045	CAGR 0.78%	CAGR 0.21%

Source: CASP 2020, Table 4.3

4.4.1.3 Terminal Area Forecast (TAF)

The FAA TAF provides forecasted data for passenger enplanements, airport operations, Terminal Radar Approach Control Facilities (TRACON) operations, and based aircraft, and as such, serves as the benchmark against which the FAA compares all airport activity forecasts. The TAF shows gradual increases for operations and based aircraft through the forecast period from 2022 to 2042, with forecasted AAGRs for based aircraft of 1.10 percent and 3.23 percent for operations.

Table 4.4 shows a breakdown of the FAA TAF projected growth for forecast years 2023 to 2042.

³ California Aviation System Plan <https://dot.ca.gov/programs/aeronautics/california-aviation-system-plan>, accessed March 2022

Table 4.4 – FAA TAF Aircraft Operations and Based Aircraft Forecast at SNS

Year	Air Taxi	Itinerant GA	Itinerant Military	Local GA	Local Military	Total Operations	Based Aircraft
Existing 2022	1,465	29,370	1,070	16,635	322	48,862	163
2023	1,575	27,673	1,070	17,013	322	47,653	165
2024	1,727	35,120	1,070	23,896	322	62,135	167
2025	1,801	45,275	1,070	33,804	322	82,272	169
2026	1,801	45,411	1,070	33,876	322	82,480	171
2027	1,801	45,547	1,070	33,948	322	82,688	173
2028	1,801	45,684	1,070	34,020	322	82,897	175
2029	1,801	45,821	1,070	34,092	322	83,106	177
2030	1,801	45,959	1,070	34,164	322	83,316	179
2031	1,801	46,097	1,070	34,236	322	83,526	181
2032	1,801	46,235	1,070	34,309	322	83,737	183
2033	1,801	46,374	1,070	34,382	322	83,949	185
2034	1,801	46,513	1,070	34,455	322	84,161	187
2035	1,801	46,653	1,070	34,528	322	84,374	189
2036	1,801	46,793	1,070	34,601	322	84,587	191
2037	1,801	46,934	1,070	34,674	322	84,801	193
2038	1,801	47,075	1,070	34,747	322	85,015	195
2039	1,801	47,216	1,070	34,821	322	85,230	197
2040	1,801	47,358	1,070	34,895	322	85,446	199
2041	1,801	47,500	1,070	34,969	322	85,662	201
2042	1,801	47,643	1,070	35,043	322	85,879	203

Source: FAA TAF February 2023, C&S Engineers, Inc., 2022 reflects existing conditions while years 2023-2042 are forecast conditions.

4.4.2 Aviation Industry Trends

Industry data sources in addition to those described previously, were used to identify aviation trends that are anticipated to influence aircraft activity at SNS over the forecast period (2022 to 2042).

4.4.2.1 FAA Aerospace Forecast, Fiscal Years (FY) 2021-2041

The FAA Aerospace Forecast provides an overview of aviation industry trends and expected growth for commercial passenger carrier, cargo carrier, and GA segments. National growth rates in enplanements, operations, and fleet growth, and fleet mix for commercial and GA fleets are

provided over a 20-year forecast period. With no commercial service at SNS, a closer look at national GA trends was the focus of the review.

Below are several key elements regarding GA activity:

- ◆ The active GA fleet is projected to increase with an average annual growth rate of 0.1 percent throughout the forecast period. Each of the fleet categories are projected to grow or decline at varying rates over the planning period (see **Table 4.5**).
- ◆ The number of hours flown in the active GA fleet is projected to increase by 1.0 percent yearly over the forecast period, as the newer aircraft fly more hours each year. The FAA uses characteristics of aircraft such as flight hours to estimate aircraft activity.⁴

Although the largest section of the national GA fleet, fixed-wing piston aircraft, are forecast to shrink annually over the forecast period, growth in the U.S. economy’s gross domestic product (GDP) and continuous growth of turbine and rotorcraft fleets help to offset the decline (see **Table 4.5**). The total number of aircraft that make up the GA fleet are forecast to increase from 205,870 in 2021 to 208,790 aircraft in 2041, which portrays a 0.1 percent AAGR over the forecast period.

Table 4.5 - FAA Aerospace Forecast Growth Rates - Historic and Future

Active GA Fleet and Air Taxi Aircraft						
	Single-Engine Piston	Multi-Engine Piston	Turboprop	Turbojet	Rotorcraft	Total GA Fleet
AAGR 2010-2020	-0.9%	-2.5%	0.9%	2.9%	0.1%	-0.9%
AAGR 2021-2041	-0.9%	-0.4%	0.6%	2.3%	1.4%	0.1%
Active GA Fleet and Air Taxi Hours Flown						
AAGR 2010-2020	-0.3%	-0.6%	1.2%	-0.7%	-2.3%	-0.7%
AAGR 2021-2041	-0.7%	-0.3%	1.0%	3.5%	2.0%	1.0%

Source: FAA Aerospace Forecast FY 2021-2041, Tables 28 and 29

4 General Aviation and Part 135 Activity Surveys - CY 2020; accessed March 2022 via https://www.faa.gov/data_research/aviation_data_statistics/general_aviation/CY2020/

4.4.3 Collection of Other Data

This step of the process involves the gathering of additional applicable and pertinent information/data that may be used in the forecast development.

4.4.3.1 Socioeconomic Trends Affecting Aviation

Airports are often affected by national and regional trends in population, per capita income, employment, and tourism. While socioeconomic activity more directly correlates with airports supporting commercial passenger service, it is still important to review and have a clear understanding of local demographic and economic forces that can influence and provide context for an aviation activity forecast.

4.4.3.2 Monterey County Socioeconomic Trends

A more detailed look at County demographic data can help determine the general trends in the region. Comparisons in average annual growth rates in historical data and forecast data is depicted below for Monterey County. The forecasted growth rates for population, employment, and per capita income are shown in **Table 4.6**.

Table 4.6 - Historic and Projected Socioeconomic Growth Rates

Year	Population	Employment	Per Capita Income
AAGR 2011-2020	0.39%	1.03%	4.26%
AAGR 2021-2041	0.35%	0.79%	4.58%

Source: Woods & Poole Economics, Inc. 2021; C&S Engineers, Inc. (February 2022)

4.4.3.3 Potential Part 139 Commercial Service at SNS

As a part of this master planning effort, the potential for future commercial service at the Airport will be studied. This analysis will assess the readiness of the infrastructure at the Airport to support commercial passenger service as well as the business case for airlines to operate at Salinas Municipal Airport. The goal of the Part 139 Study is to determine the feasibility of commercial operations and to outline the steps the Airport would need to take to begin service. Due to the numerous factors involved in beginning commercial service such as certification, infrastructure improvements, public review, and airline support, the study will not attempt to forecast the number of future commercial operations. For this reason, commercial operations have not been included in the operations forecast for SNS.

4.4.3.4 Electric Vertical Take Off and Landing (eVTOL) Aircraft

eVTOL refers to a variety of aircraft that use electric power to hover, take off, and land vertically⁵. Many believe that eVTOL aircraft will revolutionize the aviation industry as we know it. They promise fast and affordable transportation in densely populated urban areas to avoid being stuck in vehicle traffic. They will take off and land vertically like a helicopter before transitioning to horizontal flight to maximize efficiency and speed. As of 2022, there are no certified eVTOL aircraft, but there are currently over 200 different companies at various stages of developing these types of aircraft⁶. The earliest estimates of passenger flights are projected to occur in 2024⁷. If the rollout of these aircraft occurs on this timeline, then they have the possibility to drastically change the aviation industry.

There have been studies specific to the San Francisco Bay Area which would presumably include reach to the Salinas Airport. These studies focus on land use and verti-port development.⁸ Studies also discuss the viability of Cargo delivery in eVTOL aircraft.⁹ While there is a diversity of use cases for eVTOL aircraft and diversity in types of eVTOL aircraft, no matter which use case your airport supports they should be separated from current operational segments. However, due to the untested claims of this new technology, the potential advent of the eVTOL has not been factored into this forecast.

There is, at present, one eVTOL company at SNS. This company's operations are currently limited due to several key factors chiefly of which is that the company's primary focus at the airport is that of research and development. Additionally, these aircraft are not yet certified. As of now, eVTOL aircraft do not exist as a specific category of certified aircraft, therefore their operations are likely considered experimental small single engine or multi-engine operations and captured in the existing forecast replacing traditional aircraft. Currently, there are simply too many unknowns and variables to predict the future needs of these types of aircraft with any degree of certainty. The staff at SNS are aware of this industry and will continue to look for ways to support this market as opportunities present themselves. More considerations about eVTOL will be discussed in the Requirements and Alternatives Chapters.

⁵ Wikipedia contributors. (2022, July 27). eVTOL. In Wikipedia, The Free Encyclopedia. Retrieved 15:10, August 26, 2022, from <https://en.wikipedia.org/w/index.php?title=eVTOL&oldid=1100659673>

⁶ eVTOL, "More than 200 Evtol Aircraft Now in Development," [evtol.com](https://evtol.com/news/more-than-200-evtol-aircraft-now-in-development/), September 9, 2019, <https://evtol.com/news/more-than-200-evtol-aircraft-now-in-development/>.

⁷ Ben Alaimo, "Joby Aviation Stock: Uber Flying Taxis by 2024 (NYSE:Joby)," SeekingAlpha (Seeking Alpha, July 19, 2022), <https://seekingalpha.com/article/4524106-joby-aviation-stock-uber-flying-taxis-by-2024>.

⁸ <https://transweb.sjsu.edu/press/Paving-Way-Future-Mobility-Bay-Area-Case-Study-Provides-Key-Insights-Vertiport-Planning>

⁹ <https://arc.aiaa.org/doi/10.2514/6.2018-2006>

4.5 Forecasts

The following presents the forecasts that were considered for projecting activity at SNS, as well as the selected scenarios for the forecast framework.

4.5.1 Based Aircraft

4.5.1.1 Forecast Methodologies

Trend Analysis in Based Aircraft

Trend analysis involves the evaluation of historical data to develop projections of future activity. This method delivers a trend projection for future activity at SNS.

Historical based aircraft information for SNS was retrieved from the FAA TAF. The data provided by the TAF shows a slight decrease in based aircraft from 2011 to 2020, with an overall positive 10-year trend (AAGR) of 0.47 percent. Trend analysis in based aircraft was used for comparison in the preferred based aircraft forecast analysis.

Regression Analysis of Socioeconomic Factors

Regression analysis is a statistical methodology that connects factors of aviation demand (dependent variables) such as based aircraft or operations to socioeconomic measures (independent variables) such as population, employment, or income. This is useful when reliable forecasts are available for the independent variables. Specifically, a regression analysis comparing socioeconomic factors (independent variables) and the total number of based aircraft (dependent variable) within the Airport's service area (Salinas) can be used to project future totals.

In comparing the past ten years of based aircraft data with the past ten years of population, employment, and per capita income data for Salinas, the r-squared value¹⁰ was 0.82, 0.29, and 0.89, respectively. The results from the analysis show a strong meaningful correlation with based aircraft for population and per capita income. Therefore, the socioeconomic average annual growth rates of 0.39 percent (Monterey County population) and 4.26 percent (Monterey County per capita income) were considered for comparison for the preferred based aircraft forecast.

¹⁰ The percentage of the response variable variation that is explained by a linear model. R-squared is always between 0 and 100%: 1) 0% indicates that the model explains none of the variability of the response data around its mean. 2) 100% indicates that the model explains all the variability of the response data around its mean. In general, the higher the R-squared, the better the model fits your data.



Comparison with Regional Forecasts

The California Aviation System Plan (2020) supports the projections of regional activity with a forecasted AAGR of 0.78 percent for based aircraft through 2045. This annual average growth rate was considered for comparison for the preferred based aircraft forecast.

Comparison with FAA TAF

When utilizing the projected annual based aircraft counts from the latest published FAA TAF, the resulting AAGR is 1.10 percent for the forecasted years of 2022 to 2042. This FAA TAF based aircraft forecast for SNS was considered for the preferred based aircraft forecast comparison.

4.5.1.2 Based Aircraft Forecast

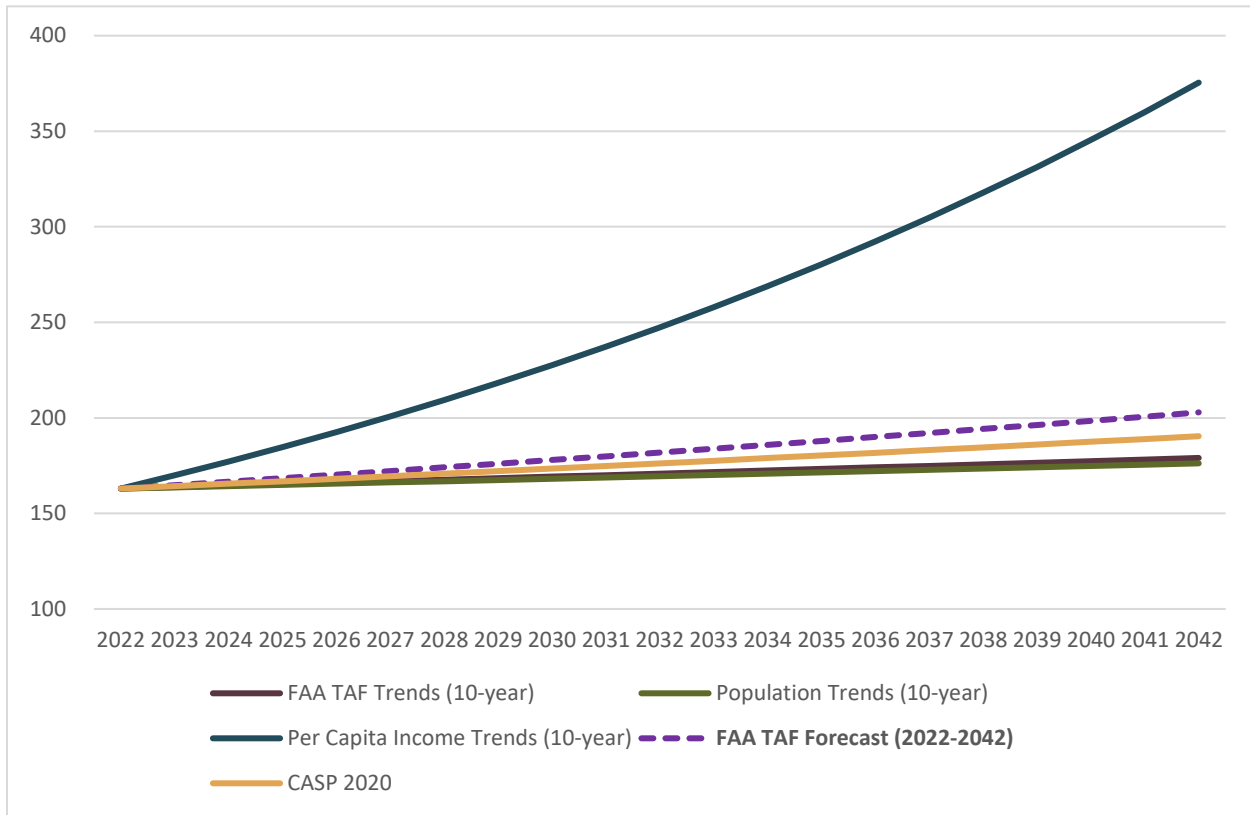
Summaries of the forecast scenarios are detailed below in **Table 4.7** and **Figure 4.5**.

Table 4.7 - Based Aircraft Forecast Scenario Comparison

Methodology	Growth Rate	20-Year Forecast
Trend Analysis: FAA TAF	0.47%	168
Regression Analysis: Salinas Population	0.39%	165
Regression Analysis: Salinas Per Capita Income	4.26%	352
Comparison with Regional Forecast: CASP	0.78%	178
FAA TAF Forecast	-	203

Source: Salinas Municipal Airport, C&S Engineers, Inc. (Feb 2023)

Figure 4.5 - Based Aircraft Forecast Scenarios



Source: C&S Engineers, Inc.

After taking the based aircraft forecast scenarios described above into consideration and comparing the forecasted data with each scenario, **the preferred based aircraft forecast is the FAA TAF Forecast**. This preferred forecast shows the growth of 40 additional based aircraft over the planning period.

4.5.2 Based Aircraft Fleet Mix Forecast

The fleet mix of an airport is made up of aircraft that are based at the facility as well as the transient aircraft that operate to and from it. Existing information for 2021 was collected from the published National Based Aircraft Inventory with projections based on the regional and national trends in aircraft activity from the FAA Aerospace Forecast, the California Aviation System Plan, as well as what can be expected at Salinas Municipal Airport (see **Table 4.8**). As of now, eVTOL aircraft do not exist as a specific category of certified aircraft, therefore their operations are likely considered experimental small single-engine or multi-engine operations and are assumed to be represented in the based aircraft summary as such.

Table 4.8 - Based Aircraft Forecast at SNS by Fleet Mix

Aircraft Type	2022 Existing	5 Year	10 Year	15 Year	20 Year
Single-Engine	143	150	160	168	176
Multi-Engine	9	10	10	10	10
Jet	3	4	4	5	6
Rotorcraft	8	9	9	10	11
Total	163	173	183	193	203

Source: FAA TAF (February 2023), C&S Engineers, Inc.

4.5.3 Aircraft Operations

4.5.3.1 Forecast Methodologies

Comparison with Regional Forecasts

Comparisons with other forecasts from the previous SNS ALP forecast (2015), as well as the California Aviation System Plan (2020) were discussed in detail in Section 2.1.4.1. The ALP Update from 2015 forecast reported a 0.52 percent AAGR for the years covering 2014 to 2035. The CASP reports forecasted operations included a CAGR of 0.21 percent for operations at SNS for the years 2020 to 2045. Both of these forecasts were considered in the analysis for the preferred operations forecast at SNS.

Comparison with National Trends

The general aviation operations forecast in the *FAA Aerospace Forecast FY 2021-2041* utilizes specific growth rates for each type of aircraft as well as an annual average growth rate for the total U.S. GA fleet aircraft as well as hours flown by those aircraft. The growth rate published in the *FAA Aerospace Forecast FY 2021-2041* for the total U.S. GA active fleet hours flown is 1.0 percent. This annual average growth rate was used in consideration for the SNS preferred operations forecast.

Regression Analysis of Socioeconomic Factors

In comparing the past ten years of operations with the past ten years of population, employment, and per capita income data for Salinas, the r-squared value was 0.47, 0.12, and 0.35, respectively. These regression analysis results do not show a strong meaningful correlation between operations and socioeconomic factors in Monterey County. Therefore, the socioeconomic average annual growth rates were not utilized for comparison with the operations forecast.

Comparison with FAA TAF

The latest published FAA TAF projects growth from 2022 to 2042 with an operations count reaching 85,879 by the end of the planning period. In addition to the actual TAF projections, an analysis of the FAA TAF Growth Rate for the years from 2022 to 2042 was considered for the preferred operations forecast (3.23% AAGR).

4.5.3.2 Aircraft Operations Forecast

As noted, several forecasts have been developed specifically for Salinas Municipal Airport, and regional and national aviation activity, that are worth considering.

Table 4.9 - Aircraft Operations Forecast Comparison

Methodology	Growth Rate	20-Year Forecast
Comparison with Regional Forecasts: SNS ALP 2015	0.52%	69,148
Comparison with Regional Forecasts: CASP 2020	0.21%	65,006
Comparison with National Forecasts: GA Hours Flown	1.0%	76,061
FAA TAF Growth Rate Forecast 2022-2042	3.23%	117,720
FAA TAF Forecast 2022-2042	-	85,879

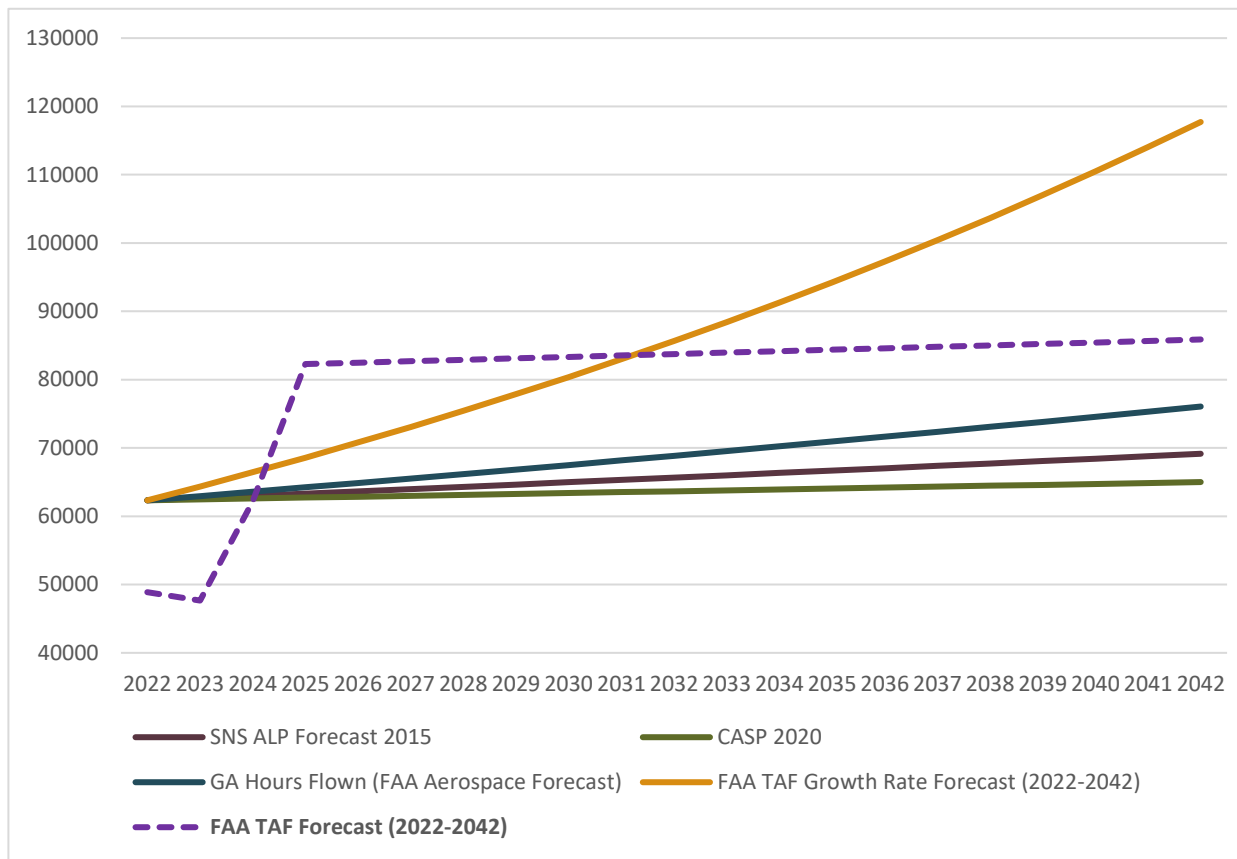
Source: Salinas Municipal Airport, C&S Engineers, Inc. (February 2023)

The Airport has not yet achieved the growth predicted in the prior Salinas Municipal Airport ALP forecast and therefore is not a relevant source for growth rate comparison for current activity. The FAA TAF Growth Rate Forecast using the AAGR of 3.23 percent is more aggressive than the past growth at the Airport and will therefore not be the preferred forecast.

The SNS **Preferred Operations Forecast will use the FAA TAF Forecast** for operations for the period 2022 to 2042 and is represented in **Figure 4.6**. This forecast shows the anticipated growth at the Airport. While the first three years of the FAA TAF are not consistent with the operational counts used for the baseline year, before the 5 year forecast, the annual operations will level out to be more consistent with the activity projected at SNS. Additionally, with an update to the FAA Master Record 5010 following this Master Plan process, published operations should be more accurate.

As of now, eVTOL aircraft do not exist as a specific category of certified aircraft, therefore their operations are likely considered experimental small single-engine or multi-engine operations and are assumed to be represented in the forecast as such and are considered incorporated into the existing categories and assumed to replace some traditional flights.

Figure 4.6 - Preferred Operations Forecast for Salinas Municipal Airport



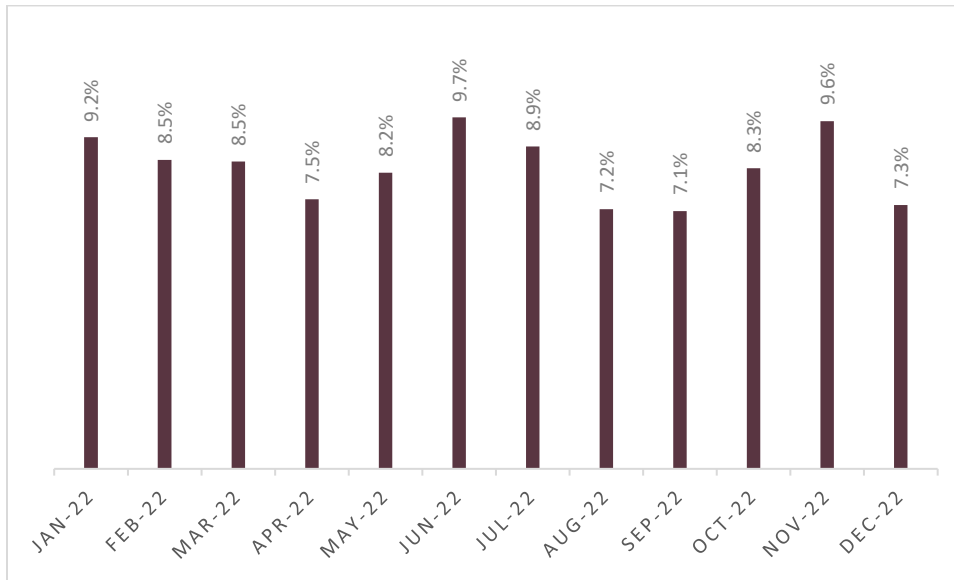
Source: C&S Engineers, Inc., Note: Some forecasted numbers may vary as a result of rounding.

4.5.4 Peak Period Activity

Defining peak periods for aviation demand is an essential step in the planning process. Peak activity refers to specific sets of time (e.g., seasonal, monthly, daily, etc.) in which the number of aircraft operations (arrivals and departures) is at its highest frequency, putting increased demand on airport facilities. At SNS, understanding peak period demands assists in determining where specific airfield improvements may be needed to address increased aircraft departure queue times or to determine if adequate transient parking exists during specific times.

Peak period operations can be evaluated by month, day, or hour. With the existing year for this forecast being 2022, the analysis for peak period activity will consider the months with the higher levels of activity and utilize the percentage of operations for that month. Per ATADS operations count, the peak month was June with 10 percent of the recorded operations for the year (see **Figure 4.6** below).

Figure 4.7 - Operations by Month



Source: ATADS; C&S Engineers, Inc.

Activity peaking is evaluated to show potential capacity constraints that may need to be addressed through facility requirements or operational improvements. Peak periods of aviation demand were calculated using existing aircraft operations activity information and were broken down by monthly operations, daily operations, and hourly departures with the following methodology (see **Table 4.10**):

- ◆ **Peak Month Operations:** This level of activity is defined as the calendar month when peak aircraft operations occur. The peak month for SNS will use 10 percent of the annual operations (per the recorded ATADS operations of 10 percent of annual totals for June 2022).
- ◆ **Design Day Operations:** This level of operations is defined as the average day within the peak month (ADPM), calculated by the number of peak month operations divided by the number of days in the peak month (30).
- ◆ **Design Hour Operations:** This level of activity is defined as the peak hour within the ADPM. Typically, these operations will range between 10 – 15 percent of the ADPM operations. Therefore, 12.5 percent was used for this calculation.

These measures of activity are considered when calculating runway and taxiway capacity and transient aircraft parking needs.



Table 4.10 - Peak Period Forecast

Forecast Year	Total Operations	Peak Month	ADPM	Peak Hour of ADPM
Existing 2022	62,335	6,234	208	26
5 Year	82,688	8,269	276	34
10 Year	83,737	8,374	279	35
15 Year	84,801	8,480	283	35
20 Year	85,879	8,588	286	36

Source: ATADS; FAA TAF (Feb 2023) C&S Engineers, Inc.

4.5.5 Comparison with FAA Terminal Area Forecast

For FAA approval of the forecasts, per AC 150/5070-6B Airport Master Plans, the general requirement is that they are supported by an acceptable forecasting analysis and consistent with the TAF. GA airports with fewer than 100,000 total annual operations or 100 based aircraft, do not require the forecasts to be reviewed at FAA Headquarters but should be provided to the FAA for the annual update of the TAF.

The preferred forecast for SNS utilizes the published FAA TAF Forecast (February 2023) for operations and will therefore not need a comparison.

4.5.6 Recommended Demand Forecast Summary

Table 4.11 presents a summary of the Airport’s aviation activity forecast including peak period operations. The breakdown of operations into itinerant and local operations is based on an assumed 35 percent local and 65 percent itinerant operations split based on the FAA TAF operations for 2021 and 2022.

Table 4.11 - Salinas Municipal Airport Demand Forecast Summary

	Existing 2022	5 Year	10 Year	15 Year	20 Year
Based Aircraft	163	173	183	193	203
Operations	62,335	82,688	83,737	84,801	85,879
Itinerant	40,518	53,747	54,429	55,121	55,821
Local	21,817	28,941	29,308	29,680	30,058
Peak Month	6,234	8,269	8,374	8,480	8,588
Average Day Peak Month	208	276	279	283	286
Design Hour	26	34	35	35	36

Source: Salinas Municipal Airport; C&S Engineers, Inc.

4.6 Critical Aircraft

To maintain and develop an airport that meets FAA defined design standards, as well as the needs of the airport users, it is critical to have a clear understanding of the specific types of aircraft (e.g., manufacturer and model) that operate at the airport. Due to the varying size and speed characteristics of each aircraft type, the airport must be planned and designed to properly accommodate them. An essential step in the ALP development process is the identification of the critical aircraft or design aircraft that will guide the standards used for separation and geometric design of the airfield facilities.

Defined by the FAA in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, "The critical aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, which make regular use of the airport. Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing." This can be recognized as a specific aircraft model or a composite of similar aircraft models.

To determine the existing critical aircraft amongst the Airport's diverse fleet mix, a review of the FAA's Traffic Flow Management System Counts (TFMSC) of aircraft operations (under IFR) performed over 12 months at the Airport was completed. The TFMSC provides a great deal of information about each aircraft operating, such as its aircraft approach category (AAC) A through E, and airplane design group (ADG) I through VI. This data provides detail for aircraft that file an Instrument Flight Rules (IFR) flight plan to or from SNS and thus represents a sample of the Airport's total operations. See **Table 4.12** for category details.

Table 4.12 - Aircraft Approach Category and Airplane Design Group

Aircraft Approach Category (AAC)		
Category A	Speed less than 91 knots.	
Category B	Speed 91 knots or more but less than 121 knots.	
Category C	Speed 121 knots or more but less than 141 knots.	
Category D	Speed 141 knots or more but less than 166 knots.	
Category E	Speed 166 knots or more.	
Airplane Design Groups (ADG)		
Group	Tail Height	Wingspan
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

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

4.6.1 Aircraft Operations

TFMSC operations counts were used to capture current annual operations by specific aircraft. While TFMS data only reflects IFR data and therefore is not indicative of all activity at the Airport, it does capture the majority of the larger aircraft that often operate under IFR and provides data to validate the determination for a critical aircraft. See **Table 4.13** for 2021 and 2022 IFR operations by AAC/ADG.

Table 4.13 - SNS Operations under IFR (2021 + 2022)

2021 IFR Base Year Operations					
	A	B	C	D	Grand Total
ADG I	1,728	533	106	21	2,388
ADG II	123	1,438	248	23	1,832
ADG III			27	17	44
ADG IV			3		3
Total	1,851	1,971	384	61	4,267
2022 IFR Base Year Operations					
	A	B	C	D	Grand Total
ADG I	1,193	408	76		1,677
ADG II	163	1,411	319	8	1,979
ADG III		11	11	15	137
ADG IV			11		11
Total	1,356	1,830	417	23	3,934

Source: Traffic Flow Management System Counts 2021 and 2022 *No aircraft data available for 80 operations. 133 helicopter operations are excluded (Total for 2021 = 4480)

Further review of the TFMSC data for SNS produced findings on the most common types of aircraft frequenting the airport. **Table 4.14** provides a listing of these aircraft and their physical characteristics.

Table 4.14 - Common Aircraft Operating at SNS

Aircraft (AAC/ADG)	Total IFR Ops	MTOW	Length	Wingspan	Approach Speed	AAC - ADG	TDG
Beech 200 Super King	215	12,500	43.75 ft.	54.50 ft.	98	B-II	2A
Cessna Citation V/Ultra/Encore	209	16,300	48.90 ft.	52.17 ft.	107	B-II	2A
Cessna Skyhawk 172/Cutlass	507	2,650	27.17 ft.	36.08 ft.	62	A-I Small	1A
Cessna Citation CJ4	245	17,110	53.33 ft.	50.83 ft.	111	B-II	1B
Cessna Citation II/Bravo	222	14,800	47.21 ft.	52.17 ft.	112	B-II	1A
Learjet 75	117	21,500	58.0 ft.	50.92 ft.	125	C-II	1B
Beech King Air 90	90	9,300	35.50 ft.	45.92 ft.	100	B-I Small	1A
Pilatus PC-12	118	10,450	47.25 ft.	53.33 ft.	87	A-II Small	1A

Source: Traffic Flow Management System Counts 2021 and 2022; FAA Aircraft Characteristics Database

Based on data compiled in **Table 4.14**, the only aircraft that accounts for 500 annual operations is the Cessna Skyhawk 172. However, there are larger aircraft using the airport that comprise a total of 500 or more operations in the B-II category. The largest percentage of operations by aircraft are comprised of the Beech 200 Super King, the Cessna Citation CJ4, and the Cessna Citation II/Bravo.

For 2021, there were over 445, and for 2022 there were over 440 see **Table 4.13** operations documented in the C and D ADG categories. As stated previously, because of widespread tower closures during 2022 we use 2021 as our base year. In the long-term planning period of 15-20 years, a recommendation will be made to designate a future critical aircraft in the C-II design group for SNS. The next chapter of this master plan will provide a detailed discussion of future critical aircraft design standards, including changes to Runway Protection Zones (RPZs).

Facility requirements will be analyzed based on the current category (B-II) for the short-term planning of 0-10 years, and the future category (C-II) for the long-term planning period of 15-20 years.

4.6.2 Critical Design Aircraft by Runway

The FAA requires a critical aircraft designation for each runway at an airport. Runway 13/31 is 4,825 feet long and is considered the primary runway as it is equipped with an instrument landing system including approach lights. Runway 8/26 is 6,004 feet long and classified as the secondary runway due to the lack of precision instrument approach. Due to the primary runway having superior approach minimums and the secondary runway being longer, it is assumed that both runways will see similar numbers of operations. For this reason, both the existing and future critical aircraft for both runways are the same.

As stated in the first paragraph of Section 3.6, critical aircraft can be recognized as a specific aircraft model or a composite of similar aircraft models. Based on the total operations presented in **Table 4.13** and discussed in the paragraph above, annual operations by aircraft in AAC B, ADG II exceed the FAA's regular use threshold of 500 annual operations. Since there is not a single aircraft that exceeds the 500 annual operations threshold, a family of aircraft with the most operations and similar characteristics in the B-II category is considered the existing critical aircraft family: Beech 200 Super King, Cessna Citation CJ4. And Cessna Citation II/Bravo.

As indicated in **Table 4.13** there were 445 recorded IFR operations by aircraft with an approach category of either C or D in 2021 and 440 recorded in 2022. Applying the TAF growth rate over the 20-year planning period and anticipating that the number of jet operations will increase faster than other types of aircraft, it is anticipated that the number of C/D operations will exceed the 500-operation threshold to qualify as the critical design aircraft. The justification for critical aircraft will be achieved by grouping several corporate jets in this category such as the Learjet

75, Challenger 300, and various versions of Gulfstream jets. The Learjet 75, by far, had the highest number of current-day operations – almost 40 percent of activity in the C and D categories - and was selected as the aircraft to represent the future critical design aircraft of C-II. It is expected that in the future, operations from the existing critical aircraft will continue to exceed the 500-operation threshold. To account for this, the Beech 200 Super King Air is also included in the future critical aircraft mix to continue to protect the required taxiway width for TDG 2A aircraft.

Table 4.15 provides a listing of these aircraft and their characteristics for both runway designations.

Table 4.15 - Critical Aircraft Characteristics

	Runway	Critical Aircraft	AAC	ADG	TDG
Existing	8/26	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B	II	2A
	13/31 (Primary)	Beech 200 Super King Air, Cessna Citation CJ4, and Cessna Citation II/Bravo	B	II	2A
Future	8/26	Learjet 75, Beech 200 Super King Air	C	II	2A
	13/31 (Primary)	Learjet 75, Beech 200 Super King Air	C	II	2A

Source: Aircraft Characteristics Data, Appendix 1 of AC 150-5300-13B, effective 03/31/2022; <https://cessna.txtav.com/en/turboprop/caravan>; <https://www.globalair.com/>. Discussion justifying Runway 13/31 as the primary runway is included in the Inventory Chapter.