

Forecasts of Aviation Activity



INTRODUCTION. Forecasting is a key element in the master planning process. The forecasts are essential for analyzing existing airport facilities and identifying future needs and requirements of the facilities. Forecasting, by its very nature, is not exact, but it does establish some general estimates for future aviation activity levels and provides a defined rationale for potential changes at airports as demands increase. The amount and kind of aviation activity occurring at an airport are dependent upon many factors, but are usually reflective of the services available to aircraft operators, the meteorological conditions under which the airport operates (daily and seasonally), the businesses located on the airport or within the community the airport serves, and the general economic conditions prevalent within the surrounding area.

Aviation activity forecasting generally commences by utilizing the present time as an initial point and baseline, supplemented with historical trends obtained from previous years' activity and recorded information. This data has evolved from a comprehensive examination of historical



airport records from airport personnel, FAA Form 5010-1, *Airport Master Record* data, FAA Terminal Area Forecasts (TAF), and the *FAA Aerospace, Forecasts Fiscal Years 2010-2030*. These documents were assembled in different years, making the base year data quite variable, and emphasizing the need for establishing a well-defined and well-documented set of base information from which to project future aviation activity trends.

Prior to an examination of current and future activity levels at the Airport, there are conditions and assumptions that should be noted that form the basis or foundation for the development of the forecasts contained here. These variables represent a variety of physical, operational, and socioeconomic considerations, and, to varying degrees, relate to and affect aviation activity at Nut Tree Airport.

Socioeconomic Conditions

Historically, the socioeconomic conditions of a particular area affect aviation activity within that region. It is usually helpful to incorporate an analysis of local and regional socioeconomic data into the forecast for future aviation demands at an airport. Typically, the most often analyzed indicators are population, employment, and income. Socioeconomic data was obtained from recognized sources, including local, regional, state, and federal planning organizations.

Population. The existing socioeconomic condition of a particular region has historically impacted aviation activity within that area. The two primary socioeconomic indicators, which are often analyzed in the forecast of aviation activity, are population and employment statistics. Solano County is strategically located 45 miles from San Francisco and 45 miles from the state capitol of Sacramento. The County covers 909.4 square miles, including 84.2 square miles of water area and 675.4 square miles of rural land area. According to the *California Department of Finance*, the average population increase for the cities of Vacaville and Fairfield from 2000 to 2009 was 0.95 percent per year and 1.14 percent per year, respectively. The following table shows that, during this same time period, the population of Solano County is estimated to have increased from 394,930 to 426,729, an average of 0.87 percent per year. However, the rate of population growth in the area has slowed in recent years in response to the 2008 economic recession. From 2005 through 2009, the cities of Vacaville and Fairfield increased at the rate of 0.28 percent per year and 0.60 percent per year, respectively, while Solano County's population increased at a rate of 0.50 percent per year.



Table C1
HISTORICAL AND FORECAST POPULATION, 2000-2030

	City of Vacaville	City of Fairfield	Solano County
2000	88,642	96,178	394,930
2005	96,195	104,079	418,876
2009	96,450	106,440	426,729
2010	---	---	441,061
2020	---	---	503,248
2030	---	---	590,166

Sources: State of California, Department of Finance, E-4 Population Estimates for Cities, Counties and the State, 2001-2009, with 2000 Benchmark. Sacramento, California, May 2009. State of California, Department of Finance, Population Projections for California and Its Counties 2000-2050, by Age, Gender and Race/Ethnicity, Sacramento, California, July 2007.

Employment and Income. According to the U.S. Census Bureau, Solano County median household income (in 2008 inflation adjusted dollars) was \$68,603, while median family income was \$77,162. There were approximately 204,561 persons in the County’s labor force in 2008, and the mean travel time to work was estimated at 29.8 minutes. A large portion of the County’s employment force commutes outside of County lines to work. However, due to the declining economy in 2008 and 2009, as of March 2010, the County’s unemployment rate has climbed to 9.7 percent, according to the California Employment Development Department.

Community Support. Nut Tree Airport benefits from the support of the surrounding communities, as well as local industry and residents. The Airport is recognized as a vital county asset, which contributes to the stability and the future of the area’s economy. The overall position of the County is one of continued growth and development, with a recognized focus that Nut Tree Airport assists in maintaining and attracting additional economic and aviation-related development to the area.

Economy. Solano County has suffered job losses, but it has done so at a slightly lower rate than the State as a whole. The area’s diversified economy has helped buffer the region. While some industries, such as construction, have been hit hard, others, such as health services, have grown. California’s two-year recession ended in the fourth quarter of 2009 - lagging several months behind the U.S., according to the Business Forecasting Center at the University of the Pacific.

Historical Airport Activity Summary

With no on-site airport traffic control tower facilities, there are limited historical records that provide accurate information concerning the historical aviation activity present at Nut Tree Airport. Historical FAA Form 5010-1s for the Airport show operations estimates as high as 144,000 per year in the 1980s and 1990s. However, recent operations levels are estimated to have remained fairly steady at just over 100,000 per year as reported in the FAA Terminal Area Forecast (TAF) for the Airport. The TAF system is the official forecast of aviation activity at FAA facilities. The TAF is prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF includes forecasts for:

- **FAA towered airports**
- **Federally contracted towered airports**
- **Non-federal towered airports**
- **Non-towered airports**

For non-towered general aviation airports like Nut Tree Airport, the FAA uses data from the 5010-1 form to develop baseline levels of aircraft operations. The FAA has less confidence in operations data from 5010-1 reports, as opposed to counting of operations by a staffed control tower or an activity counter. Consequently, lacking better baseline data, the TAF often assumes a zero percent growth rate when forecasting future operations at non-towered general aviation airports. A tabulation of the best available historical aviation activity information since 2000 is presented in the following table entitled *HISTORICAL AVIATION ACTIVITY, 2000-2009*.

Table C2
HISTORICAL AVIATION ACTIVITY, 2000-2009

Year	Total Aircraft Operations ¹	Based Aircraft				Total Aircraft
		Single Engine ²	Multi-Engine ²	Jet ²	Helicopter ²	
2000	101,500	237	11	1	1	250 ¹
2001	101,500	234	11	1	1	247 ¹
2002	101,500	233	11	2	1	247 ¹
2003	101,500	231	12	3	1	247 ¹
2004	101,500	231	12	3	1	247 ¹
2005	101,500	187	12	6	1	206 ²
2006	101,500	184	12	7	2	205 ²
2007	101,500	192	14	5	2	213 ²
2008	101,500	175	14	5	3	197 ²
2009	101,500	179	14	5	3	201 ²

Sources: ¹ FAA Terminal Area Forecast Detail Report, December 2009.
² FAA Form 5010-1, Airport Master Record, and Solano County Assessor Records.

Existing Operations by Aircraft Type

According to airport personnel, over 88 percent of all airport operations are conducted by single engine, piston driven aircraft. The following table, entitled *EXISTING OPERATIONS BY AIRCRAFT TYPE, 2009*, indicates the percentage of operations for each aircraft type.

Also, according to the FAA TAF, less than one percent of the total operations at Nut Tree Airport is classified as air taxi operations. An air taxi operation, as defined by FAA, is an operation by an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation on demand (i.e., no schedule). Air taxi operations are regulated by Federal Aviation Regulations (FAR) Part 135. Section 135.385 of this regulation requires that turbine engine-powered large transport category airplanes (aircraft weighing over 12,500 pounds) be able to make a full stop landing within 60 percent of the effective length of each runway. This restriction on air taxi use by large aircraft likely limits most of the estimated 1,500 annual air taxi operations to smaller single and multi-engine piston and turboprop type aircraft at Nut Tree Airport. The critical aircraft identified during the previous planning effort is the Beech Super King Air B-200. The current and projected critical aircraft for Nut Tree Airport are further discussed in the following chapter.



The existing aircraft operations at Nut Tree Airport are conducted for a wide variety of purposes including, but not limited to, business travel, government agency travel, personal flying, recreational flying, flight training, prisoner transport, drug enforcement activity, and medical transport.

Table C3
EXISTING OPERATIONS BY AIRCRAFT TYPE, 2009

Aircraft Type	Operations	Percentage¹
Single Engine	89,600	88.28%
Multi-Engine Piston	4,800	4.73%
Turboprop	2,420	2.38%
Business Jet	3,420	3.37%
Helicopter	1,250	1.23%
Military	10	0.01%
Total Operations	101,500	100%

Source: ¹ Nut Tree Airport personnel.

Notes: Represents the approximate total percentage of operations at Nut Tree Airport.



Aviation Activity Forecasts

Prior to the development of aviation activity forecasts, several factors that have an influence on the aviation industry, either positive or negative, should be considered in the planning process.

Factors and Conditions

Despite recent economic challenges in Solano County and the region, activity at Nut Tree Airport has remained fairly consistent. A large percentage of both itinerant and local operations at the Airport is attributable to the Japan Air Lines (JAL) flight crew training center at the Napa County Airport. JAL uses Nut Tree Airport for flight training, utilizing a variety of single and multi-engine piston aircraft. However, in January 2010, JAL filed for bankruptcy protection under a \$10 billion turnaround plan after four Japanese government bailouts failed to revive the airline. JAL has stated publicly that the airline will continue operations but shed staff, cut unprofitable routes, and retire older aircraft. It is currently unknown how the bankruptcy will change how the airline trains pilots, or if they will continue to operate at Napa County Airport and Nut Tree Airport.

It is also important to note that the overall condition of the general aviation industry in the United States, since 1978, has been in significant decline. The FAA identified several factors that have contributed to this prolonged downturn. These factors include three economic recessions, two fuel crises, the enactment of the *Airline Deregulation Act of 1978*, the expiration of the GI Bill, and the repeal of the Investment Tax Credit.

Other causes of this downturn include the expense of owning and operating aircraft (i.e., the cost of insurance, fuel, and maintenance), competition from commuter airlines in the more open aviation market since airline deregulation, changes in disposable discretionary income, increases in airspace restrictions affecting fair-weather flying, reductions in personal leisure time, and shifts in personal preference as to how leisure time is spent. In particular, these factors have severely restricted the single engine light aircraft segment of the industry. In response to this downturn, the general aviation industry has been focusing more on the business aircraft operator and less on the recreational operator.

Nationally, the business jet component of general aviation is growing at a much faster rate than other aspects of the industry. The growth of this sector, which was statistically significant to begin with, was advanced even more by the events of September 11, 2001. In the post-9/11 environment, the speed and efficiency of business jet travel has created large dividends for the



corporate community in terms of offering greater schedule flexibility over the commercial air carriers and less aggravated security considerations.

The growth in the amateur-built aircraft market and the strength of the used aircraft market indicate that demand for inexpensive personal aircraft is still strong. Also, the FAA's recent sport pilot rule and light sport aircraft (LSA) category have generated renewed interest in recreational flying. The FAA is projecting LSA sales to grow by 825 through 2013.

Increased general aviation instrument operations at FAA towered airports, and general aviation aircraft handled at FAA en route centers point to continued growth of the more sophisticated general aviation users. Additionally, operations at non-towered U.S. airports have increased, supporting the belief held by many that much of general aviation is being forced out of many towered airports because of increased commercial air carrier or business jet activity.

General Aviation Operations Forecast

General information regarding expectations for Nut Tree Airport is included in the FAA *Terminal Area Forecast (TAF) Detail Report*. However, as stated previously, due to the lack of either historical tower recorded operations or operations recorded by an activity counter at the Airport, the TAF assumes zero-growth in aircraft operations. This zero-growth assumption is considered overly conservative considering that the Airport maintains a paid deposit, hangar wait list, and that as this latent hangar demand is satisfied, operations are expected to increase over the planning period.

In developing the general aviation activity forecasts, local, state, and national trends were reviewed. Included in this assessment, and, as presented in the following table, entitled *GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2009-2030*, are the forecasts contained in the FAA *Terminal Area Forecast Detail Report* (December 2009), and four separate forecast scenarios developed for this study.

- **TAF:** FAA's *Terminal Area Forecast Detail Report*, December 2009.
- **Scenario One:** Projects an annual average growth rate (AAGR) of 1.69%, which is equal to the estimated annual population growth rate for Solano County through the year 2030.
- **Scenario Two:** Illustrates an average annual growth rate of approximately 0.50%, which is equal to the historical annual population growth rate for Solano County from 2005 through 2009.
- **Scenario Three:** Calculates an average annual growth rate of approximately 1.1%,



which is the growth rate from the *FAA Aerospace Forecast, Fiscal Years 2010-2030* for general aviation hours flown by piston driven aircraft. This growth rate is also very similar to the FAA TAF growth rate for the entire Western Pacific Region through 2030 of 0.99%. **This is the recommended operations forecast scenario for this study.**

- **Scenario Four:** Calculates an average annual growth rate of approximately 2.50%, which is the growth rate from the *FAA Aerospace Forecast 2010-2030* for total GA hours flown by all aircraft types.

By selecting Scenario Three as the recommended forecast scenario, it is recognized that the conditions in Fairfield, Vacaville, and Solano County, in general, will mirror aviation-related influences in the nation. It also recognizes an assumption that there are no identified significant local influences that are expected to either negatively or positively impact the current level of aviation activity at the Airport.

Table C4
GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2009-2030¹

Year	TAF	Scenario One 1.69%	Scenario Two 0.50%	Scenario Three 1.10% ²	Scenario Four 2.50%
2009	101,500	101,500	101,500	101,500	101,500
2015	101,500	112,078	104,539	108,275	117,470
2020	101,500	121,742	107,140	114,279	132,710
2025	101,500	132,253	109,807	120,619	149,951
2030	101,500	143,681	112,543	127,316	169,460

Source: From consultant.

¹ Includes military operations.

² Recommended Forecast.



Operations Forecast by Aircraft Type

The knowledge of the types of aircraft expected to use Nut Tree Airport will assist in determining the amount and type of facilities needed to meet the aviation demand. The following table, entitled *SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2009-2030*, depicts the approximate level of use by aircraft types that are projected to use the Airport. As expected both regionally and nationally, the use of larger general aviation aircraft (turboprop and jet aircraft) is forecast to increase more rapidly than is the use of smaller general aviation aircraft (single engine piston) at the Airport.

It is assumed that the majority of existing and forecast jet aircraft operations at Nut Tree Airport are conducted by FAA approach category B aircraft (aircraft with approach speeds of 91 knots or more, but less than 121 knots). FAA approach categories, as a component of FAA's airport classification system known as the Airport Reference Code (ARC), are discussed in more detail in the following chapter.

In an effort to confirm this assumption, instrument flight plan data by aircraft type was acquired from the FAA's Aircraft Situational Display to Industry (ASDI) system. This system showed only an average of approximately 15 aircraft operations by aircraft with approach speeds of more than 121 knots over the last four years. An example of business jet operations in aircraft approach category B is the Dassault Aviation, Falcon 50B and Falcon 900, both of which are permanently based at Nut Tree Airport.

Table C5
SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2009-2030

Aircraft Type	2009¹	2015	2020	2025	2030
Single Engine Piston	89,600 (88.28%)	92,985 (85.87%)	95,569 (83.62%)	98,157 (81.37%)	100,743 (79.12%)
Multi-Engine Piston	4,800 (4.73%)	5,122 (4.73%)	5,406 (4.73%)	5,706 (4.73%)	6,023 (4.73%)
Turboprop	2,420 (2.38%)	3,660 (3.38%)	5,006 (4.38%)	6,490 (5.38%)	8,124 (6.38%)
Business Jet	3,420 (3.37%)	4,884 (4.51%)	6,297 (5.51%)	7,853 (6.51%)	9,562 (7.51%)
Helicopter	1,250 (1.23%)	1,624 (1.50%)	2,000 (1.75%)	2,413 (2.00%)	2,865 (2.25%)
Military	10 (0.01%)	11 (0.01%)	11 (0.01%)	12 (0.01%)	13 (0.01%)
Total Operations	101,500 (100%)	108,286 (100%)	114,290 (100%)	120,631 (100%)	127,329 (100%)

Source: ¹Estimates from Nut Tree Airport personnel.



Local and Itinerant Operations Forecast

As can be seen in the following table, entitled *SUMMARY OF LOCAL AND ITINERANT OPERATIONS FORECAST 2009-2030*, itinerant operations at Nut Tree Airport are expected to increase slightly over local operations, as more and more general aviation aircraft are increasingly utilized for business-related purposes. Also, as mentioned previously, the impact of the JAL bankruptcy on the training center in Napa is currently unknown. The continued success and/or closure of this training center will also have an impact on the breakdown of local versus itinerant operations as most of the JAL operations are touch-and-go operations, which are classified as local operations.

Table C6
SUMMARY OF LOCAL AND ITINERANT OPERATIONS FORECAST, 2009-2030

Year	Local	Itinerant	Total
2009	40,000 (39.0%)	61,500 (61.0%)	101,500 (100%)
2015	41,149 (38.0%)	67,137 (62.0%)	108,286 (100%)
2020	42,287 (37.0%)	72,003 (63.0%)	114,290 (100%)
2025	43,427 (36.0%)	77,204 (64.0%)	120,631 (100%)
2030	44,565 (35.0%)	82,764 (65.0%)	127,329 (100%)

Source: From consultant.

Based Aircraft Forecast

The number and type of aircraft anticipated to be based at an airport are vital components in developing a plan for that airport. Generally, there is a relationship between aviation activity and based aircraft, stated in terms of operations per based aircraft (OPBA). Sometimes, a trend can be established from historical information of operations and based aircraft. The national trend has been changing with more aircraft being used for business purposes and less for pleasure flying. This impacts the OPBA in that business aircraft are usually flown more often than pleasure aircraft.

Several based aircraft forecast scenarios are presented in the following table entitled *BASED AIRCRAFT FORECAST SCENARIOS, 2009-2030*. These include the *Terminal Area Forecast Detail Report*, and three forecast scenarios developed for this study.

- **TAF:** FAA's *Terminal Area Forecast Detail Report*, December 2009. As the following table illustrates, the TAF does not project any increase in based aircraft for the Airport. It is also important to note that the current based aircraft count of 201 is approximately 11.6%



higher than the 180 based aircraft listed in the FAA TAF.

- **Scenario One:** Projects an average annual growth rate of 0.90%, which is equal to the nationwide active general aviation fleet forecast for based aircraft contained in the *FAA Aerospace Forecasts, Fiscal Years 2010-2030*.
- **Scenario Two:** The current estimate of 101,500 annual operations divided by the current count of 201 based aircraft at the Airport produces an OPBA of 505. This scenario assumes that the level of 505 OPBA is maintained throughout the planning period and projects based aircraft to increase in accordance with the selected operations forecast from Table C4.
- **Scenario Three:** This scenario assumes the existing hangar wait list is accommodated in 2010 and 2011 and then projects based aircraft to increase at the FAA Aerospace AAGR of 0.90%.

Table C7
BASED AIRCRAFT FORECAST SCENARIOS, 2009-2030

Year	TAF	Scenario One 0.90%	Scenario Two 505 OPBA	Scenario Three Satisfy Hangar Demand, then 0.90% ²
2009	180	201 ¹	201 ¹	201 ¹
2015	180	212	214	233
2020	180	222	226	244
2025	180	232	239	255
2025	180	243	252	267

Source: From consultant.

¹ Actual.

² Selected Forecast.



Based Aircraft Forecast by Aircraft Type

The mix of based aircraft is shown on the following table entitled *BASED AIRCRAFT FORECAST BY TYPE, 2009-2030*. It is expected that single engine aircraft will continue to be the dominant aircraft type based at Nut Tree Airport; although, increases in based single and multi-engine turbine, jet, and helicopters are anticipated.

Table C8
BASED AIRCRAFT FORECAST BY TYPE, 2009-2030

Aircraft Type	2009	2015	2020	2025	2030
Single Engine Piston & Turboprop	179 (89.0%)	205 (88.0%)	212 (87.0%)	219 (86.0%)	227 (85.0%)
Multi-Engine Piston & Turboprop	14 (7.0%)	16 (7.0%)	17 (7.0%)	18 (7.0%)	19 (7.0%)
Jet	5 (2.5%)	7 (3.0%)	9 (3.5%)	10 (4.0%)	12 (4.5%)
Helicopter	3 (1.5%)	5 (2.0%)	6 (2.5%)	8 (3.0%)	9 (3.5%)
TOTAL	201 (100%)	233 (100%)	244 (100%)	255 (100%)	267 (100%)

Source: From consultant.



Summary

A summary of the aviation forecasts prepared for this study is presented in the following table entitled *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2009-2030*. This information will be used in the following chapters to analyze facility requirements, to aid development of alternatives, and to guide the preparation of the plan and program of future airport facilities. In other words, the aviation activity forecasts are the foundation from which future plans will be developed and implementation decisions will be made.

Table C9
SUMMARY OF AVIATION ACTIVITY FORECASTS, 2009-2030

Operations	2009	2015	2020	2025	2030
Single Engine Piston	89,600	92,985	95,569	98,157	100,743
Multi-Engine Piston	4,800	5,122	5,406	5,706	6,023
Turboprop	2,420	3,660	5,006	6,490	8,124
Business Jet	3,420	4,884	6,297	7,853	9,562
Helicopter	1,250	1,624	2,000	2,413	2,865
GA Operations	101,490	108,275	114,279	120,619	127,316
Military Operations	10	11	11	12	13
TOTAL OPERATIONS	101,500	108,286	114,290	120,631	127,329
Local Operations	40,000	41,149	42,287	43,427	44,565
Itinerant Operations	61,500	67,137	72,003	77,204	82,764
Based Aircraft by Type					
Single Engine Piston & Turboprop	179	205	212	219	227
Multi-Engine Piston & Turboprop	14	16	17	18	19
Jet	5	7	9	10	12
Helicopter	3	5	6	8	9
TOTAL BASED AIRCRAFT	201	233	244	255	267

Source: From consultant.

