



Chapter Two

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# Aviation Demand Forecasts



# Aviation Demand Forecasts

Facility planning must begin with a definition of the demand that may reasonably be expected to occur at the facility over a specific period of time. For H.A. Clark Memorial Field, this involves forecasts of aviation activity indicators through the year 2025. In this master plan, forecasts of based aircraft, the based aircraft fleet mix, and annual aircraft operations will serve as the basis for facility planning.

It is virtually impossible to predict, with certainty, year-to-year fluctuations of activity when looking twenty years into the future. Because aviation activity can be affected by many influences at the local, regional, and national level, it is important to remember that forecasts are to serve only as guidelines, and planning must

remain flexible enough to respond to unforeseen facility needs.

Recognizing this, it is intended to develop a master plan for H.A. Clark Memorial Field that will be demand-based rather than time-based. As a result, the reasonable levels of activity potential that are derived from this forecasting effort will be related to the planning horizon levels rather than dates in time. These planning horizons will be established as levels of activity that will call for consideration of the implementation of the next step in the master plan program.

The following forecast analysis examines recent developments, historical information, and current aviation trends to provide an updated set of



aviation demand projections for H.A. Clark Memorial Field. The intent is to permit the City of Williams to make the planning adjustments necessary to ensure that the facility meets projected demands in an efficient and cost-effective manner.

## ***NATIONAL AVIATION TRENDS***

Each year, the Federal Aviation Administration (FAA) publishes its national aviation forecast. Included in this publication are forecasts for air carriers, regional air carriers, general aviation, and military activity. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aviation Forecasts - Fiscal Years 2006-2017*. The forecast uses the economic performance of the United States as an indicator of future aviation industry growth.

Declining through the late 1980s and early 1990s, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limits the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance had been a major factor in the decision by many American aircraft

manufacturers to slow or discontinue the production of general aviation aircraft.

The sustained growth in the general aviation industry slowed considerably in 2001, negatively impacted by the events of September 11. Thousands of general aviation aircraft were grounded for weeks due to no-fly zone restrictions imposed on operations of aircraft in security-sensitive areas. This, in addition to the economic recession that began in early 2001, had a negative impact on the general aviation industry.

While the recession ended a seven-year period of growth in the aviation industry, it was early in 2002 before the severity of the recession was realized. The domestic economy declined for three consecutive quarters in 2001. In 2002 the recovery was underway, and although weak, it has picked up in the last three years. The FAA projects the U.S. economy to continue to strongly grow through 2006 into 2007. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming that there will not be any new successful terrorist incidents against either U.S. or world aviation).

According to the General Aviation Manufacturers Association (GAMA), aircraft shipments in 2005 were up 20.8 percent from 2004, to 3,580 shipments. This followed a static level of growth between 2002 and 2003 and healthy growth in 2004. The number of general aviation hours flown is forecast to increase by 3.2 percent annually over the next 12 years.

After a recent slowdown in business jet shipments (down 31.9 percent in 2003), the business/corporate segment of general aviation began to grow again in 2004 and offers the most growth potential. For 2005, business jet shipments were up 26.9 percent. The FAA expects this segment will continue to expand at a faster rate than personal/sport flying. Safety concerns, combined with increased security processing time at commercial terminals, make business/corporate flying an attractive alternative.

In 2005, there were an estimated 214,591 active general aviation aircraft, representing an increase of 3,296 aircraft (1.6 percent) over the previous year. **Exhibit 2A** depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts general aviation aircraft to increase at an average annual rate of 1.4 percent over the 12-year forecast period, to 252,775. Piston-powered aircraft are expected to grow at an average annual rate of 1.0 percent. This slow growth rate is offset by piston-powered rotorcrafts which are expected to grow at 6.7 percent annually, while single-engine and multi-engine aircraft increase at rates of 0.3 and 0.1 percent, respectively.

Turbine-powered aircraft (turboprop and jet) and helicopters are expected to grow at an average annual rate of 4.0 percent over the forecast period. Even more significantly, the jet portion of this fleet is expected to grow at an average annual growth rate of 4.1 percent. This growth rate for jet aircraft can be attributed to growth in the fractional-ownership industry,

new product offerings (which include new entry-level aircraft and long-range global jets), and the shift away from commercial travel by many travelers and corporations.

Microjets are expected to enter the active general aviation aircraft fleet in 2006 and could potentially redefine business jet travel and air-taxi business services. It is expected that 100 of these relatively inexpensive twin-engine jets will be active this year and are forecast to grow by 400 to 500 aircraft per year, growing to 4,950 aircraft by 2017.

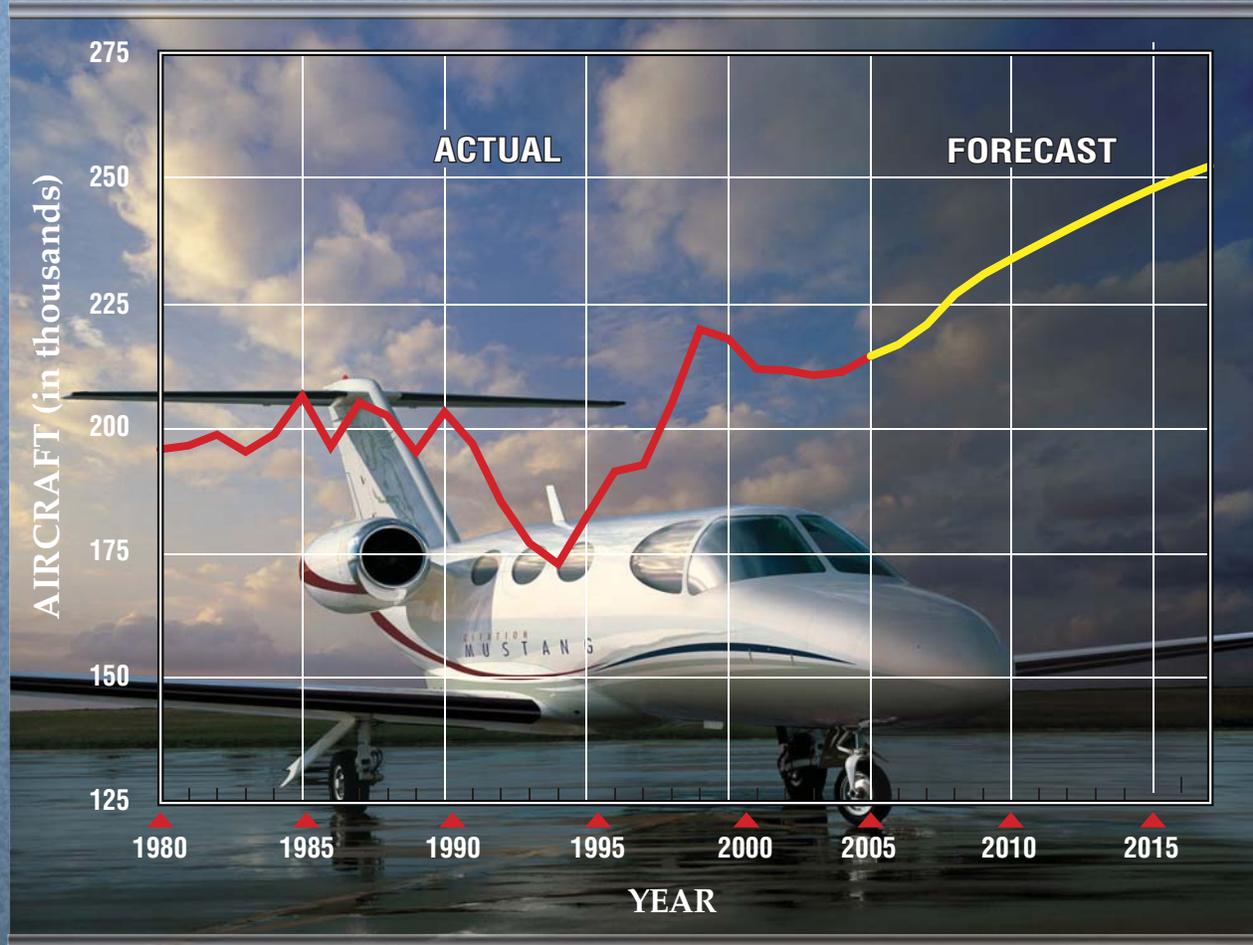
In summary, business aviation, by nature of its ownership and use, will experience cyclical movements in activity relating to economic conditions. Over the long term, however, it is anticipated to continue to be the strongest growth market in general aviation.

## ***FORECASTING APPROACH***

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships are tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and their assessment of the local situation, is important in the final determination of the preferred forecast.

It is important to note that one should not assume a high level of confidence in forecasts that extend beyond five

# U.S. ACTIVE GENERAL AVIATION AIRCRAFT



## U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

Year	FIXED WING				ROTORCRAFT			Sport Aircraft	Other	Total
	PISTON		TURBINE		Piston	Turbine	Experimental			
	Single Engine	Multi-Engine	Turboprop	Turbojet						
2005 (Est.)	144.5	17.5	8.0	8.6	2.8	4.8	22.3	N/A	6.0	214.6
2009	146.7	17.6	8.8	10.8	4.1	5.4	23.5	8.2	5.9	231.0
2013	148.4	17.6	9.6	14.0	5.2	6.0	24.6	11.6	5.8	242.8
2017	149.7	17.7	10.4	17.2	6.0	6.7	25.7	13.6	5.7	252.8

Source: FAA Aerospace Forecasts, Fiscal Years 2006-2017.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.



years. Facility and financial planning usually require at least a ten-year pre-view, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors are known to influence the aviation industry and can have significant impacts on the extent and nature of air service provided in both the local and national market. Technological advances in aviation have historically altered and will continue to change the growth rates in aviation demand over time. The most obvious example is the impact of jet aircraft on the aviation industry, which resulted in a growth rate that far exceeded expectations. Such changes are difficult, if not impossible to predict, and there is simply no mathematical way to estimate their impacts. Using a broad spectrum of local, regional, and national socioeconomic and aviation information and analyzing the most current aviation trends, forecasts are presented in the following sections.

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include:

- Based aircraft
- Based aircraft fleet mix
- Annual operations

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.

## ***BASED AIRCRAFT***

The number of aircraft based at an airport is, to some degree, dependent upon the nature and magnitude of aircraft ownership in the local service area. Therefore, the process of developing forecasts of based aircraft for H.A. Clark Memorial Field begins with a review of historical aircraft registrations in the area.

## **REGISTERED AIRCRAFT FORECASTS**

Historical records of aircraft ownership in Coconino County presented in **Table 2A** were obtained from the U.S. Census of Civil Aircraft for the years 1990 through 1992; Aviation Goldmine for the years 1993 through 2000; Avantext, Inc., Aircraft & Airmen for the years 2001 to 2004; and the Federal Aviation Administration for the year 2005. Since 1990, registered general aviation aircraft in the county have grown from 256 to 296, for an annual average growth rate of 1.0 percent.

**Table 2A** also compares registered aircraft to active general aviation aircraft in the United States. Since 2003, the Coconino County share of the U.S.

market of general aviation aircraft has remained steady near 0.138 percent. This indicates that registered aircraft in the County are growing at a similar rate to aircraft nationally. **Table 2A** presents a projection of registered aircraft in Coconino County based upon

maintaining the 2003-2005 average percentage as a constant share of projected U.S. Active Aircraft in the future. This forecast results in registered aircraft growing to 389 aircraft in 2025, a 1.4 percent annual growth rate.

<b>TABLE 2A</b>					
<b>Registered Aircraft and Independent Variables</b>					
<b>Coconino County</b>					
<b>Year</b>	<b>Registered GA Aircraft</b>	<b>U.S. Active Aircraft</b>	<b>% of U.S. Market</b>	<b>Population</b>	<b>Registered GA Aircraft Per 1,000 Residents</b>
1990	256	N/A	N/A	96,900	2.64
1991	249	N/A	N/A	99,150	2.51
1992	253	185,650	0.136	101,350	2.50
1993	276	177,120	0.156	104,700	2.64
1994	280	172,935	0.162	107,500	2.60
1995	286	182,605	0.157	109,400	2.61
1996	296	187,312	0.158	113,475	2.61
1997	308	189,328	0.163	117,475	2.62
1998	300	205,700	0.146	121,625	2.47
1999	308	219,500	0.140	122,825	2.51
2000	331	217,500	0.152	116,320	2.85
2001	311	211,400	0.147	122,770	2.53
2002	308	211,200	0.146	125,420	2.46
2003	290	210,600	0.138	128,925	2.25
2004	294	211,295	0.139	129,570	2.27
2005	296	214,591	0.138	130,530	2.27
<b>CONSTANT SHARE OF U.S. ACTIVE AIRCRAFT</b>					
2010	323	234,030	0.138	147,352	2.17
2015	342	248,120	0.138	158,753	2.09
2025	389	281,935	0.138	179,555	1.96
<b>CONSTANT RATIO OF REGISTERED AIRCRAFT PER 1,000 RESIDENTS</b>					
2010	334	234,030	0.143	147,352	2.27
2015	360	248,120	0.145	158,753	2.27
2025	408	281,935	0.145	179,555	2.27
<b>SELECTED PLANNING FORECAST</b>					
2010	<b>330</b>	234,030	0.141	147,352	2.24
2015	<b>355</b>	248,120	0.143	158,753	2.24
2025	<b>390</b>	281,935	0.138	179,555	2.17
Sources: Registered Aircraft: (1990-1992) U.S. Census of Civil Aircraft; (1993-2000) Aviation Goldmine; (2001-2004), Avantext Inc., Aircraft & Airmen; (2005) FAA. U.S. Active Aircraft: FAA Aerospace Forecasts; 2025 Forecast Extrapolated by Coffman Associates Population: Arizona Department of Economic Security					

A separate forecast examined the ratio between the Coconino County population and the number of registered general aviation aircraft in Coconino County. As shown in **Table 2A**, there were 2.64 registered aircraft per 1,000 residents in 1990. This ratio has since decreased to 2.27 registered aircraft per 1,000 residents in 2005 as the population has grown at a faster rate than registered aircraft. The population grew at 2.0 percent annually through 2025, whereas registered aircraft grew at 1.0 percent annually.

A projection of registered aircraft was developed assuming that registered aircraft per 1,000 residents will remain static at 2.27. This projection results in registered aircraft growing at the same rate as the population, at an average annual growth rate of 1.6 percent. The forecast of registered aircraft per capita are presented in **Table 2A**.

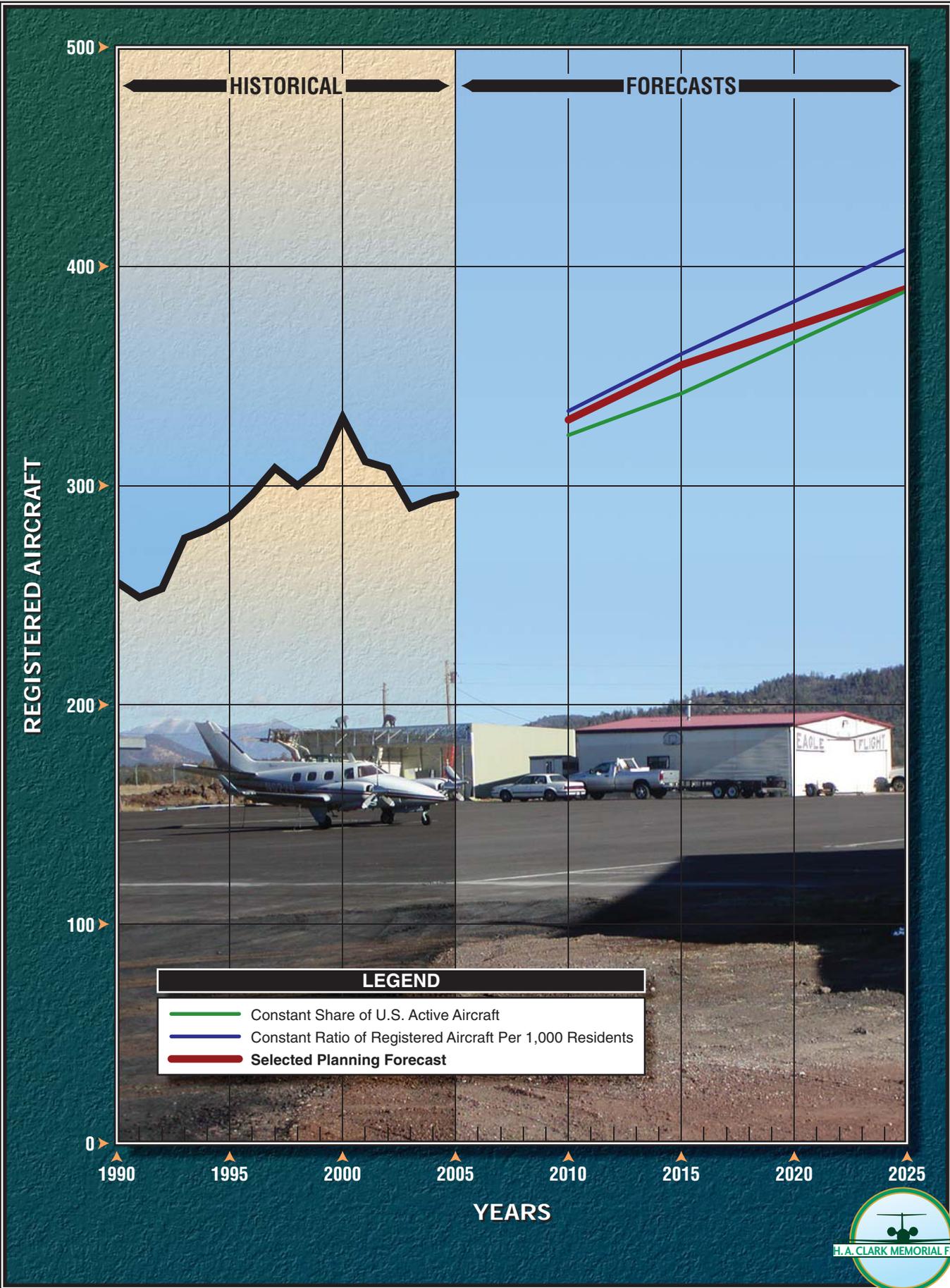
Historically, registered aircraft have grown at a rate slightly lower than the population in the County and has recently grown at a rate consistent to aircraft nationally. The selected planning forecast assumes this trend will continue in the future, with registered aircraft growing at the same annual rate as U.S. Active Aircraft through the planning period. This selected forecast provides a reasonable growth rate over the planning period with registered aircraft in Coconino County growing at 1.4 percent annually through 2025. **Exhibit 2B** graphically depicts the selected forecast in comparison with the other projections.

## **BASED AIRCRAFT FORECAST**

The number of based aircraft is the most basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, the growth of other general aviation activities and demands can be projected. According to the 1995 H.A. Clark Memorial Field Airport Master Plan, there were 12 based aircraft at H.A. Clark Memorial Field in 1995. The number of based aircraft has since increased, with 13 reported by the airport in 2005.

**Table 2B** examines based aircraft as a percentage of aircraft ownership in Coconino County. As shown in the table, the airport's based aircraft were equivalent to 4.2 percent of aircraft registered in the County in 1995. The airport's share increased to 4.4 percent in 2005. This is the result of based aircraft at H.A. Clark Memorial Field growing at a faster rate than the registered aircraft in the county (0.8 percent annually for the airport versus 0.3 percent annually for the County since 1995).

Projections of based aircraft were developed by estimating the H.A. Clark Memorial Field's share of registered aircraft through 2025. The constant share forecast assumes the 2005 share will remain constant at 4.4 percent through the planning period. This would yield 17 based aircraft by 2025, with based aircraft growing at a rate of 1.4 percent annually.



The increasing share forecast assumes the H.A. Clark Memorial share of Coconino County registered aircraft will gradually increase to 5.4 percent

through the planning period. This would yield 21 based aircraft by 2025, with based aircraft growing at an average rate of 2.4 percent annually.

<b>TABLE 2B</b>			
<b>Share of Registered Aircraft</b>			
<b>Year</b>	<b>H.A. Clark Memorial Based Aircraft</b>	<b>Coconino County Registered Aircraft</b>	<b>H.A. Clark Memorial Share of Registered Aircraft</b>
<b>Historical</b>			
1995	12	286	4.2%
2005	13	296	4.4%
<b>Constant Share Projection</b>			
2010	15	330	4.4%
2015	16	355	4.4%
2025	17	390	4.4%
<b>Increasing Share Projection</b>			
2010	16	330	4.8%
2015	18	355	5.0%
2025	21	390	5.4%
Source for historical based aircraft: 1995, 1995 H.A. Clark Memorial Field Master Plan; 2005, Airport Records Source for Historical Coconino County Registered Aircraft: 1995 - Aviation Gold Mine CD; 2005 - Federal Aviation Administration			

Based aircraft were also examined as a ratio of the City of Williams residents. This analysis is summarized in **Table 2C**. The ratio of aircraft to residents has declined slightly from 4.46 aircraft per 1,000 residents in

1995, to 4.13 aircraft per 1,000 residents in 2005. Maintaining the 2005 ratio constant through the planning period yields 29 based aircraft by 2025. This represents an average annual growth rate of 4.1 percent.

<b>TABLE 2C</b>			
<b>Based Aircraft Per 1,000 Residents in Williams</b>			
<b>Year</b>	<b>H.A. Clark Memorial Based Aircraft</b>	<b>Williams Population</b>	<b>Based Aircraft Per 1,000 Residents</b>
<b>Historical</b>			
1995	12	2,690	4.46
2005	13	3,145	4.13
<b>Constant Share Projection</b>			
2010	18	4,305	4.13
2015	24	5,835	4.13
2025	29	6,920	4.13
Source for historical based aircraft: 1995, 1995 H.A. Clark Memorial Field Master Plan; 2005, Airport Records Source for Historical Population: Arizona Department of Economic Security Source for Population Forecast: City of Williams			

For comparative purposes, projections for the 1995 H.A. Clark Memorial Field Airport Master Plan, the Federal Aviation Administration Terminal Area Forecast (TAF) and the 2000 *Arizona State Aviation System Needs Study* (SANS) have also been examined. The 1995 H.A. Clark Memorial Field Airport Master Plan forecast projected based aircraft growing to 20 by 2015. The FAA TAF projects based aircraft remaining stagnant at 12 through 2025. The SANS projects based aircraft at H.A. Clark Memorial Field remaining at 12 through 2015.

**Table 2D** and **Exhibit 2C** provide a summary of these general aviation based aircraft forecasts. The current based aircraft of 13 has already exceeded the SANS forecast. H.A. Clark Memorial Field has experienced slight growth in its share of registered aircraft in the last ten years; therefore, the increasing share of registered aircraft and the constant ratio of aircraft per 1,000 residents were selected as closest to what could be expected. This planning forecast allows for 13 additional based aircraft by 2025, for an average annual growth rate of 3.5 percent.

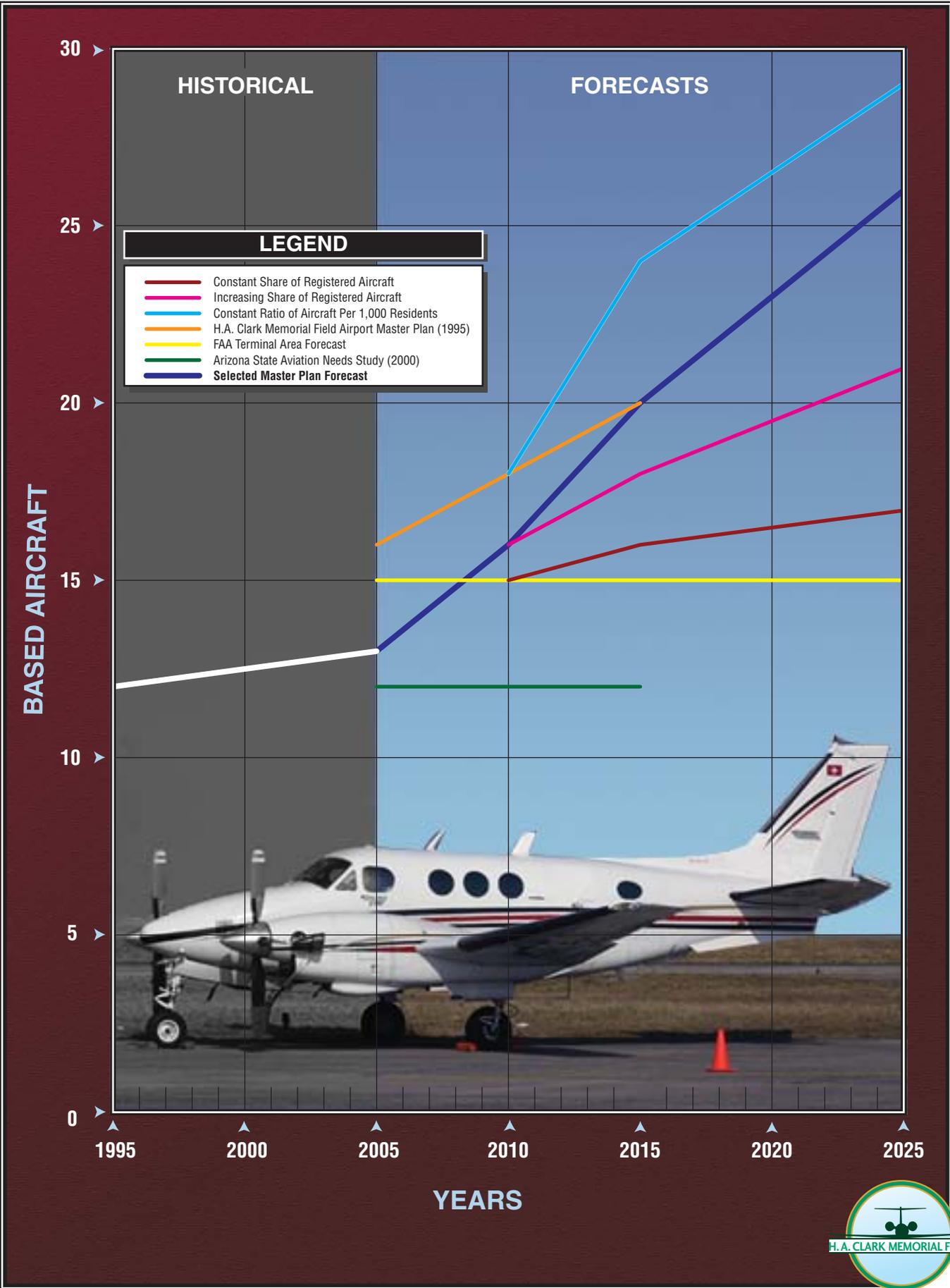
<b>Forecast</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2025</b>
Constant Share of Registered Aircraft	--	15	16	17
Increasing Share of Registered Aircraft	--	16	18	21
Constant Ratio of Aircraft Per 1,000 Residents	--	18	24	29
H.A. Clark Memorial Field Airport Master Plan (1995)	16	18	20	--
FAA Terminal Area Forecast	15	15	15	15
Arizona State Aviation Needs Study (2000)	12	12	12	--
<b>Selected Master Plan Forecast</b>	<b>13</b>	<b>16</b>	<b>20</b>	<b>26</b>

## **BASED AIRCRAFT FLEET MIX**

The aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and type of activities occurring at the airport. The existing based aircraft fleet mix is comprised primarily of single-engine piston aircraft, but also includes three multi-engine piston aircraft. Nationally, the general aviation fleet mix is around 80 percent single-engine aircraft; at H.A.

Clark Memorial Field, single-engine aircraft comprise 77 percent of the fleet.

**Table 2E** outlines the projected fleet mix. The national trend is toward a larger percentage of sophisticated aircraft in the fleet mix. Growth within each category at the airport has been determined by comparison with national projections which reflect current aircraft in production.



<b>TABLE 2E</b>						
<b>Based Aircraft Fleet Mix</b>						
<b>H.A. Clark Memorial Field</b>						
<b>Year</b>	<b>Total</b>	<b>Piston</b>		<b>Turbine</b>		<b>Rotorcraft</b>
		<b>Single-Engine</b>	<b>Multi-Engine</b>	<b>Turboprop</b>	<b>Jet</b>	
<b>ACTUAL</b>						
2005	13	10	3	0	0	0
<b>FORECAST</b>						
2010	16	12	3	0	0	1
2015	20	14	3	1	1	1
2025	26	17	4	2	2	1

## **AIRCRAFT OPERATIONS**

Aircraft operations at airports are classified as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within site of the airport, or which executes simulated approaches or “touch-and-go” operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and industrial use, since business aircraft are used primarily to carry people from one location to another.

H.A. Clark Memorial Field operations are comprised solely of general aviation operations. The FAA 5010 Airport Master Record for H.A. Clark Memorial Field estimates a total of 4,200 general aviation operations in 2005.

The projection of future annual general aviation operations is examined as a ratio of operations per based aircraft. Using the 2005 estimated annual operations for H.A. Clark Memorial Field, the ratio of operations per based aircraft currently average 323. A projection of annual operations which has the operations per based aircraft remaining static at 323 operations per based aircraft through 2025 yields 8,400 annual operations by the end of the planning period. As shown in **Table 2F**, an increasing ratio of operations per based aircraft yields 9,750 operations by the year 2025. The Arizona SANS forecasts operations at H.A. Clark Memorial Field to remain at 3,600 operations through 2015. The FAA TAF projects operations at H.A. Clark Memorial Field remaining static at 3,528 annual operations through 2015. The 1995 Master Plan projected annual operations growing to 6,000 by 2015. Each of the projections is presented in **Table 2F**.

<b>TABLE 2F</b>					
<b>General Aviation Operations Forecast</b>					
<b>H.A. Clark Memorial Field</b>					
<b>Year</b>	<b>Based Aircraft</b>	<b>Itinerant Operations</b>	<b>Local Operations</b>	<b>Total Operations</b>	<b>Operations Per Based Aircraft</b>
2005	13	3,840	360	4,200	323
<b><i>Constant Ratio Projection</i></b>					
2010	16	4,653	517	5,170	323
2015	20	5,740	710	6,450	323
2025	26	7,140	1,260	8,400	323
<b><i>Arizona SANS Forecast</i></b>					
2010	12	--	--	3,600	300
2015	12	--	--	3,600	300
2025	--	--	--	--	--
<b><i>FAA TAF</i></b>					
2010	15	3,175	353	3,528	235
2015	15	3,175	353	3,528	235
2025	15	3,175	353	3,528	235
<b><i>1995 Master Plan</i></b>					
2005	16	3,840	960	4,800	300
2010	18	4,050	1,350	5,400	300
2015	20	4,200	1,800	6,000	300
<b><i>Increasing Ratio Projection (Preferred Planning Forecast)</i></b>					
2010	16	4,700	800	5,500	344
2015	20	5,200	1,800	7,100	355
2025	26	6,900	2,900	9,800	377

The increasing ratio of operations per based aircraft has been selected as the preferred planning forecast. This projection has the operations per based aircraft increasing to 377 by 2025. This ratio will grow to a number similar to other Arizona airports, such as Avi Suquilla Airport, which currently experiences approximately 341 operations per based aircraft; Cottonwood Airport which experiences approximately 365 operations per based aircraft; and Sedona Airport which experiences approximately 411 operations per based aircraft. The preferred planning forecast yields 5,500 annual operations by 2010; 7,100 annual operations by 2015; and 9,800 annual operations by 2025. Local operations

were estimated to currently account for just 8.6 percent of total operations. The percentage of local operations is projected to increase through the planning period as more training activity can be anticipated. A planned theme park in the City of Williams would potentially draw increased itinerant traffic at the airport from tourists.

## ***ANNUAL INSTRUMENT APPROACHES***

An instrument approach as defined by the FAA is “an approach to an airport with the intent to land an aircraft in accordance with an Instrument Flight

(IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.” Due to the lack of an instrument approach at H.A. Clark Memorial Field, instrument approaches are not performed. With the addition of an instrument approach into H.A. Clark Memorial Field, it can be expected that annual instrument approaches (AIAs) would represent one percent of total itinerant operations. Applying this percentage to forecast itinerant operations yields 50 instrument approaches in 2010, 63 in 2015, and 83 in 2025.

***AERIAL TOUR OPERATOR POTENTIAL***

The proximity of H.A. Clark Memorial Field to the Grand Canyon, along with its proximity to Interstate I-40 and the attraction of the City of Williams, creates the potential for an aerial tour operator to base its operations at H.A. Clark Memorial Field. H.A. Clark Memorial Field currently has the necessary terminal facilities to accommodate an aerial tour operator. Airport Rescue and Fire Fighting facilities and equipment will be in place by 2007. An aerial tour operator would result in

increased based aircraft, itinerant operations, and enplanements at the airport. Off-airport facilities such as hotels and restaurants would also benefit from an operation of this type due to the increased amount of tourist travel through the City of Williams.

An aerial tour operator could potentially base anywhere from one to eight aircraft depending on the level of demand at H.A. Clark Memorial Field. These aircraft could be rotorcraft or fixed-wing aircraft.

**Table 2G** depicts the aerial tour operator potential with regard to based aircraft, operations, and annual enplanements. This information was put together using information from aerial tour operators in the Grand Canyon region. It was estimated that each operation would average four enplanements. The mix of air tour aircraft is split evenly between fixed-wing and rotorcraft. In the early portions of the planning period, the fixed wing aircraft are assumed to be single engine piston aircraft. In later portions of the planning period, the introduction of turboprop air tour aircraft is assumed. The mix of air tour aircraft is shown in the table at the end of the chapter.

<b>TABLE 2G</b>			
<b>Aerial Tour Operator Potential</b>			
<b>H.A. Clark Memorial Field</b>			
<b>Year</b>	<b>Based Aircraft</b>	<b>Operations</b>	<b>Enplanements</b>
2010	3	4,500	18,000
2015	5	7,500	30,000
2025	8	12,000	48,000

## **COMMERCIAL AIR SERVICE POTENTIAL**

H.A. Clark Memorial Field has never been served by scheduled airline service. This is most likely due to the proximity of the City of Williams to Flagstaff Pulliam Airport, which provides regularly schedule airline activity. Flagstaff Pulliam Airport is approximately 35 miles east of the City of Williams. Air travel from Williams is also influenced by the Phoenix Sky Harbor International Airport. Many air travelers may also choose to fly directly from Phoenix Sky Harbor due to cost and schedules that are only available from that airport. In this case, these air travelers would also bypass Flagstaff Pulliam Airport.

Considering the proximity of the City of Williams to Phoenix, any potential airline service would likely be commuter/regional type airline service

serving Phoenix Sky Harbor International Airport. Air service at Flagstaff Pulliam Airport is offered by regional airlines with service to Phoenix Sky Harbor International Airport.

An airline's decision to enter a market is purely a business decision based on the potential passenger market. Without a history of air service at H.A. Clark Memorial Field, it is difficult to estimate the air passenger market in Williams. However, examining similar airports and communities with existing scheduled airline service could provide an indication of the potential passenger market in Williams.

Communities near Williams with regional airline service include Show Low, Kingman, Lake Havasu, and Prescott. **Table 2G** compares 2004 population to enplanements in these communities. (An enplanement is a person boarding a scheduled airline.)

	<b>2004 Population</b>	<b>2004 Enplanements</b>	<b>Ratio of Enplanements to 100 Residents</b>
Kingman	24,600	2,473	10
Lake Havasu	52,205	9,432	18
Show Low	9,885	4,895	49
Prescott	40,770	7,014	17

Source for Population: Arizona Department of Economic Security  
Source for Enplanements: FAA ACAIS Database, 2004

Kingman, Lake Havasu, Show Low, and Prescott are all in the federal Essential Air Service (EAS) program. Under this program, a subsidy is paid to the airline serving these communities to guarantee regular service and

reduce ticket prices. This likely increases the number of annual airline enplanements for these communities as tickets prices can be more competitively priced by the airline.

Two projections of potential enplanements in the City of Williams have been developed assuming a similar ratio of enplanements in the City of Williams as has occurred in the past for Show Low and Lake Havasu. **Table 2J** compares the forecast Williams' population and an enplanements factor to derive the potential air passen-

ger market for Williams. As shown in the table, the potential air service market in 2010 could range from approximately 800 annual airline enplanements to over 2,200 enplanements. Assuming these ratios remain constants, the potential range in air passengers can be between 1,300 and 3,500 passengers in 2025.

**TABLE 2J**  
**Potential Air Passengers**  
**H.A. Clark Memorial Field**

Year	City of Williams Population	Ratio of Enplanements to 100 Residents Scenario I	Potential Air Passengers Scenario I	Ratio of Enplanements to 100 Residents Scenario II	Potential Air Passengers Scenario II
2010	4,305	50	2,200	18	800
2015	5,835	50	2,900	18	1,100
2020	6,410	50	3,200	18	1,200
2025	6,920	50	3,500	18	1,300

Source for Population: Arizona Department of Economic Security

An airline needs between 55 and 65 percent of the available seats on each flight filled for a flight to be profitable. One 19-seat aircraft serving the market daily provides a total of 6,935 seats annually into the market. This means that the market would need to provide at least 3,800 passengers annually to support one daily flight (55 percent loading). Typically, three daily flights are needed to ensure reliable and convenient service that will be used by air travelers. As many as 11,500 annual enplanements are needed to support three daily flights. As shown in **Table 2J**, the potential air travel market in Williams is considerably less than this level and may not ever be able to support regularly scheduled airline service.

Attracting scheduled air service to Williams would require a considerable

commitment on the part of the City of Williams. The City of Williams would likely need to provide marketing and/or subsidies to attract scheduled air service as the City is currently not part of the EAS program.

The most important factors in creating and sustaining scheduled air service are the frequency of service and air fares. Competitive air fares would attract travelers who might otherwise choose to drive to Flagstaff Pulliam Airport or Phoenix Sky Harbor International Airport which can offer lower fares and frequency of service. Should the community be able to attract scheduled air service, it is likely that a number of potential local air passengers would still choose to drive to Flagstaff or Phoenix rather than flying directly from Williams.

## SUMMARY

This chapter has outlined the various aviation demand levels anticipated over the planning period. In summary, general aviation activity at H.A. Clark Memorial Field has shown slow growth. However, the airport still has good growth potential for both based aircraft and general aviation operations due to a growing local economy and population and the potential for the theme park to be developed in the City. The proximity of H.A. Clark Memorial Field to the Grand Canyon could allow for an air tour operation to be based at the airport. The airport already has the terminal facilities in place to accommodate this type of operation. The potential for scheduled airline service is remote considering the proximity of the City of Williams to Flagstaff and Phoenix, which already provide scheduled airline service. Requirements for scheduled air-

line service will not be given further consideration in this Master Plan due to the low potential for this type of activity at the airport.

**Table 2K** and **Exhibit 2D** provide a summary of the aviation activity planning horizons for H.A. Clark Memorial Field. Activity for 2005 is included in the table as a baseline reference. In subsequent chapters, these forecasts will be converted to planning horizon milestones to emphasize that the Master Plan will be developed according to a demand-based schedule rather than a time-based schedule.

The next step in the Master Plan will be to assess the capacity of existing facilities to accommodate forecast demand and determine which facilities will need to be improved to meet these demands. This will be examined in the next chapter, Chapter Three, Facility Requirements.

<b>TABLE 2K</b>				
<b>Forecasts Summary</b>				
<b>H.A. Clark Memorial Field</b>				
	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2025</b>
<b>ANNUAL OPERATIONS</b>				
Itinerant Operations	3,840	4,700	5,300	6,900
Local Operations	<u>360</u>	<u>800</u>	<u>1,800</u>	<u>2,900</u>
Total Operations	4,200	5,500	7,100	9,800
<b>ANNUAL OPERATIONS WITH AIR TOUR OPERATOR</b>				
GA Itinerant Operations	3,840	4,700	5,300	6,900
Air Tour Itinerant Operations	--	4,500	7,500	12,000
GA Local Operations	<u>360</u>	<u>800</u>	<u>1,800</u>	<u>2,900</u>
Total Operations	4,200	10,000	14,600	21,800
<b>BASED AIRCRAFT</b>				
Single-Engine Piston	10	12	14	17
Multi-Engine Piston	3	3	3	4
Turboprop	0	0	1	2
Jet	0	0	1	2
Rotorcraft	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>
Total Based Aircraft	13	16	20	26
<b>BASED AIRCRAFT WITH AIR TOUR OPERATOR</b>				
Single-Engine Piston	10	14	17	19
Multi-Engine Piston	3	3	3	4
Turboprop	0	0	1	5
Jet	0	0	1	2
Rotorcraft	<u>0</u>	<u>2</u>	<u>3</u>	<u>4</u>
Total Based Aircraft	13	19	25	34

# Summary of Aviation Activity Forecast

	2005	2010	2015	2025
<b>Annual Operations</b>				
Itinerant Operations	3,840	4,700	5,300	6,900
Local Operations	360	800	1,800	2,900
<b>Total Operations</b>	<b>4,200</b>	<b>5,500</b>	<b>7,100</b>	<b>9,800</b>

<b>Annual Operations with Air Tour Operator</b>				
General Aviation Itinerant Operations	3,840	4,700	5,300	6,900
Air Tour Itinerant Operations	--	4,500	7,500	12,000
General Aviation Local Operations	360	800	1,800	2,900
<b>Total Operations</b>	<b>4,200</b>	<b>10,000</b>	<b>14,600</b>	<b>21,800</b>

<b>Based Aircraft</b>				
Single-Engine Piston	10	12	14	17
Multi-Engine Piston	3	3	3	4
Turboprop	0	0	1	2
Jet	0	0	1	2
Rotocraft	0	1	1	1
<b>Total Based Aircraft</b>	<b>13</b>	<b>16</b>	<b>20</b>	<b>26</b>

<b>Based Aircraft with Air Tour Operator</b>				
Single-Engine Piston	10	14	17	19
Multi-Engine Piston	3	3	3	4
Turboprop	0	0	1	5
Jet	0	0	1	2
Rotocraft	0	2	3	4
<b>Total Based Aircraft</b>	<b>13</b>	<b>19</b>	<b>25</b>	<b>34</b>

