2.0 Aviation Demand Forecasts

This chapter presents the forecasts of aviation demand at Prescott Municipal Airport - Ernest A. Love Field (PRC). Aviation forecasts predict future aviation demands, and thus, the potential need for future facilities. The forecasts were derived based on a review of historical trends, market analysis, and other techniques including the application of professional judgment.

General Aviation is defined as that portion of aviation activity which encompasses all facets of aviation except commercial airline and military operations. This activity constitutes the majority of the aircraft activity at PRC. Consistent with airport planning practice, forecasts are presented for 5-10 year intervals (i.e., short-, intermediate-, and long-term), beginning with year 2007.

Forecasts are shown for:

- General Aviation (GA) Based Aircraft;
- GA Based Aircraft Fleet Mix;
- GA Aircraft Operations (i.e., take-offs and landings);
- Commercial Passenger Enplanements;
- Commercial Service Operations;
- Annual Instrument Approaches; and
- Peaking Characteristics

2.1 Socio-Economic Setting

2.1.1 Regional Economic Considerations

The Prescott Municipal Airport is an active airport that serves two primary operating roles. First, it accommodates the general aviation travel demands generated by aircraft owners located within its Airport Service Area (ASA). These users typically operate piston and turboprop aircraft. Second, it serves as a commercial service airport, which currently provides non-stop service to Phoenix and Las Vegas.

In 2006, an Economic Impact Study (EIS)[1] was conducted for the airport. It concluded that PRC is a vital and needed contributor to the economy of the area. It cited the need to develop a modern air terminal, more hangar space for private aircraft, and improved air carrier service. Furthermore, it revealed that operation of PRC appears to be in line with similar airports around the state when compared to the cost of fuel, hangar space, and other services.

The EIS strongly indicates that the PRC and its users, together with businesses that depend on the airport for their viability, account for a Total Economic Impact of $68,759,134. That total is derived by adding together the Direct Impact of approximately $25,373,538; an Indirect Impact of $10,815,480; and an Induced Impact of $ 32,570,116.

[1] Prescott Airport Economic Impact Study, William V. Cheeks and Associates – May 2006

2.1.2 Airport Service Area

The Airport Service Area (ASA) of an airport is defined by its proximity to other airports providing similar service to the flying public, rather than by any jurisdictional boundaries. PRC is located in central Arizona and primarily serves the population centers of the communities of the City of Prescott, Town of Prescott Valley and the Town of Chino Valley.

At the beginning months of 2008, PRC served as a base for 340 GA aircraft and enplaned over 4,000 passengers in 2007. Enplanement is defined as the total number of passengers boarding an aircraft. The location of the aircraft owners and population helps to define the ASA for the facility. Aircraft basing and the amount of enplaned passengers reflects consideration of such factors as convenience in terms of access, facilities and services available, and aircraft operating costs versus those associated with other airports.

The ASA for the purposes of this forecasting effort may be best identified as the Central Yavapai Metropolitan Region. The state-designated metropolitan planning organization responsible for coordinating transportation planning of local governments within this region is the Central Yavapai Metropolitan Planning Organization (CYMPO). The CYMPO encompasses the communities of Prescott, Prescott Valley, Chino Valley, Dewey-Humboldt, portions of Yavapai County and the Yavapai-Prescott Nation. Socioeconomic data gathered from the CYMPO were used to represent the characteristics of this ASA, and compared to Arizona and national statistics. Principal indicators of the socioeconomic setting of the ASA, State of Arizona and the United States are presented in Table 2.1.

Table 2.1
PRC Airport Service Area Socioeconomic Characteristics

	Central Yavapai Metropolitan Region	Arizona	United States
Population			
2000	65,490	5,130,632	281,421,906
2004	117,671	5,868,004	295,895,897
2007	124,477	6,163,869	301,621,157*
2010	146,600*	6,637,381	308,935,581
2015	192,500*	7,495,238	322,365,787
2020	252,800*	8,456,448	335,804,546
2025	332,000*	9,531,537	349,439,199
2030	438,000	10,712,397	363,584,435
Average Annual Growth Rate	5.9%	2.2%	.77%
Employment (% Distribution)			
Agriculture	n/a	n/a	2.8
Mining, Construction	9.0	9.6	5.5
Manufacturing	4.0	7.0	9.4
Transportation/Utilities/Trade	13.0	19.6	17.5
Finance, Insurance, and Real Estate	3.0	6.9	5.6
Services	58.0	41.6	44.6
Government	13.0	15.6	14.6
Total	100.0	100.0	100.0
Income (Effective Buying Income - 2006)			
Median Household	$34,901	$38,537	$48,201
Households by Percent Dist.			
<$25,000	29.78	22.3	22.3
$25,000 to $50,000	33.73	45.6	42.7
> $50,000	36.49	32.1	35.0
Total	100.0	100.0	100.0

Sources: US Department of Labor, US Census Bureau, Prescott Airport Economic Impact Study-May 2006
* Interpolated

Key features of Table 2.1 are:

1. Population growth rate in the ASA will be greater than that which will occur in Arizona and the United States.
2. The economic base of the ASA is generally comparable to that in Arizona and the United States with a higher proportion of jobs in Services sector at 58%.

3. The median household effective buying income, a measure of disposable income, in the ASA is less than that of Arizona and the United States. However, the percentage of households with effective buying income levels in excess of $50,000, a level that should

provide sufficient funds for discretionary purposes such as air transportation, illustrates a slightly higher percentage than Arizona and the United States

2.2 General Aviation Demand Forecast

Factors that influence the demand for aviation activity at an airport include the socioeconomic characteristics of the ASA, the level of service and facilities provided at the airport versus other airports in the region, and its location with respect to demand generators for originating or transient users and passengers.

First-class hangar facilities, combined with three runways (Runway 3R/21L measuring the longest at 7,616 with ILS capabilities) and major maintenance services attract corporate aircraft and aviation business to use PRC as an operations base. PRC also attracts local aircraft owners to use the facility as a base. These factors, combined with previous capital improvements at PRC and the socioeconomic characteristics of the ASA, suggest that the demand for aviation services at the PRC is being sustained and has the potential for growth.

The population growth of the ASA and the continued diversification of the economy and disposable income levels, support the continued reliance on PRC to provide air transportation services. This is especially relevant when the economic centers are distant from one another or involve excessive travel times to enable same-day ground transportation trips. General aviation air travel supports this user demand. Longer passenger processing times associated with scheduled airline travel and connections have contributed to the increased awareness and utility of general aviation aircraft and the airports they utilize. As discussed in the general aviation national trends, the advent of VLJs and the attractiveness of fractional ownership of business aircraft, both in jet and turboprop families, further support this trend. Availability of land for the construction of hangar facilities at PRC is a primary factor contributing to the continued attraction of aircraft to the facility. Barring an economic scenario that suggests poor performance in the dominant area businesses, both in the ASA and the Prescott municipal area, use of PRC is likely to continue and experience increasing frequency.

From a facilities perspective, PRC is well maintained and offers certain advantages over other area airports as highlighted in Table 2.2. PRC draws pilots and aircraft owners primarily from areas to its north, west and south based on the addresses of aircraft owners. Potential users in areas east of the Airport tend to operate from airports in the north area for reasons of accessibility and available facilities. As determined in the Passenger Leakage Analysis (Appendix A), PRC draws its commercial passengers primarily from Prescott, Prescott Valley, Chino Valley, and Dewey-Humboldt.

Table 2.2
Comparison with Other Area Airports

Airport	Number of Runways & Longest Length	Instrument Approach Capability	Fixed Based Operator	Operations	Based Aircraft	Commercial Passenger Service
Phoenix	3 – 11,489	Yes – P	Major	539,211[i]	93	Yes
Flagstaff	1 – 8,800	Yes – P	Major	36,837[i]	130	Yes
Goodyear	1 – 8,500	No	Major	136,274[i]	197	No
Deer Valley	2 – 8,208	Yes – NPI	Major	378,763[i]	1,125	No
Prescott	3 – 7,550	Yes – P	Major	231,285[i]	340	Yes[*]
Show Low	2 – 7,200	Yes – NPI	Minor	34,014	63	Yes[*]
Glendale	1 – 7,150	Yes – NPI	Major	132,735[i]	357	No
Kingman	2 – 6,827	Yes – NPI	Major	61,100	268	Yes[*]
Page	2 – 5,950	No	Major	23,007	68	Yes[*]
Payson	1 – 5,500	No	Minor	41,850	38	No
Sedona	1 – 5,129	No	Minor	50,000	100	No
Mesa	2 – 5,101	Yes – NPI	Major	270,084[i]	932	No
Chandler	2 – 4,870	Yes – NPI	Major	223,800[i]	425	No

***** Essential Air Service, [i] ATCT Provided, P = Precision Instrument, NPI = Non Precision Instrument
Note: All airports have 100LL, Jet A, Hangars, and Tiedown capabilities
Source: FAA 5010 Records & Prescott Airport Economic Impact Study-May 2006

Of the other airports, only Phoenix Sky Harbor and Flagstaff have precision instrument approach capabilities. Additionally, PRC has the seventh longest runway. Overall, the prospect for future aviation activity at PRC is considered positive and should advance at rates comparable to those expected nationally. Phoenix Sky Harbor, Show Low, Kingman, Flagstaff, and Page airports also provide scheduled airline or commuter service.

2.2.1 Summary of Forecast Methodology

The forecasts were derived from a comparison to the FAA's Terminal Area Forecast (TAF) in addition to an assessment of the Leakage Analysis (Appendix A), survey activities of based aircraft and aircraft operations (Appendix B), on-going and planned airport improvements, and anticipated trends in the general aviation market and commercial passenger travel. These findings are coupled with consideration of causal relationships as reflected in supply (competition) and demand (population, employment and income) factors. This forecast approach allows for differing projections of demand that could be anticipated at PRC. Initially, the forecasts address two key projections – based aircraft and aircraft operations – from which a series of derivative forecasts can be generated.

With the exception of enplaned passengers, the forecasts presented in this chapter will be unconstrained. Meaning, any existing physical or policy constraints at PRC will not be taken into consideration during the development of these forecast numbers. Chapter Four, Development Alternatives, will address any physical and policy constraints and will identify a "constrained" forecast, if warranted. However, the enplanement forecast will consider "what if" scenarios due

to ‘on-going’ plans to build a new larger terminal facility at PRC. The specific methodology for each is documented in the sections below.

2.2.2 General Aviation Trends

The Federal Aviation Administration (FAA) publishes a national aviation forecast. The current document that will be used as a source is *FAA Aerospace Forecast Fiscal Years 2008–2025*. Included in this publication are forecasts for general aviation. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth.

The FAA forecasts the fleet and hours flown for single-engine piston aircraft, multi-engine piston, turboprops, turbojets, rotorcraft (piston, turbine), sport, experiment and other (glider, balloon). The FAA forecasts active aircraft (i.e. flies at least one hour during the year) not total aircraft. As the demand for business jets has grown over the past several years, the current forecast assumes that business use of general aviation aircraft will expand at a more rapid pace than that for personal/sport use. The business/corporate side of general aviation should also continue to benefit from a growing market for new Very Light Jets (VLJ). In addition, corporate safety/security concerns for corporate staff, combined with increasing flight delays at some U.S. airports have made fractional, corporate, and on-demand charter flights practical alternatives to travel on commercial flights. Below, a list is provided summarizing key FAA forecast components for general aviation through 2025.

- The active general aviation fleet is projected to increase at an average annual rate of 1.3 percent through the forecast period of 2025, growing from an estimated 225,007 in 2007 to 286,500 aircraft by 2025.

- The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow at an average of 3.7 percent a year over the forecast period with the turbine jet fleet increasing at 5.6 percent a year.

- The actual number of VLJ deliveries in 2007 fell short of FAA’s assumption in last years forecast (143 vs. 350). However, the current forecast assumes that they will continue to enter the active fleet at a rate of 400 to 500 aircraft a year, reaching 8,145 aircraft by 2025.

- The number of active piston-powered aircraft (including rotorcraft) is projected to decrease from the 2006 total of 167,008 through 2008 and then increase gradually to 181,345 by 2025. Over the forecast period, the average annual increase in piston-powered aircraft is 0.5 percent.

- Starting in 2005, a new category of aircraft (previously not included in the FAA's aircraft registry counts) was created: "light sport" aircraft. At the end of 2006 a total of 1,273 aircraft were estimated to be in this category. The forecast assumes registration of 5,600 aircraft over a 5-year period beginning in 2005 including both newly built aircraft and conversions from ultralight trainers. By 2025 a total of 14,700 light sport aircraft are projected to be in the fleet.

- The number of general aviation hours flown is projected to increase by 3.0 percent yearly over the forecast period.

- The number of active general aviation pilots (excluding air transport pilots) is projected to be 507,930 in 2025, an increase of almost 61,000 (up 0.7 percent yearly) over the forecast period.

- The number of private pilots is projected to increase an average of 0.2 percent a year over the forecast period to total 220,550 in 2025.

2.2.3 General Aviation Based Aircraft Forecast

Post September 11, 2001 combined with a weakening economy has led to reductions in aviation travel. However, the "hassle factor" associated with scheduled airline travel, especially for frequent flyers, has stimulated additional interest in the general aviation industry. Corporate travelers have realized the convenience and improved affordability of using chartered general aviation aircraft or have joined fractional aircraft ownership programs. Fractional aircraft ownership involves the purchase of a predetermined share of an aircraft, which is then maintained and operated by a management company. These programs, initially involving business jet aircraft, now offer participation in turboprop aircraft such as the Beechcraft King Air. The ability of these aircraft to operate at airports located closer to the passengers' homes and suburban office locations have contributed to the success of these programs. As the economy improves, these positive forces are expected to return and stimulate the demand for this type of general aviation activity. This expectation is mirrored in the national FAA forecasts of general aviation activity presented in by the FAA in its "Aerospace Forecasts Fiscal Years 2008 – 2025".

Contributing to this prospect for growth will be the introduction of lightweight, low noise, new technology personal and corporate jet aircraft. An example is the Eclipse 500 twin-engine jet. This aircraft has a maximum gross takeoff weight of 4,700 pounds and can transport 4 passengers and a crew of 2 some 1,600 nautical miles nonstop. The aircraft sells for a little over $1 million. The twinjet aircraft is specifically designed to operate from general aviation airports with runway lengths of at least 2,600 feet, thus making it attractive for use at most general aviation airports.

Existing published forecasts specifically for PRC are included in the FAA Terminal Area Forecast (TAF), the 1998 Airport Master Plan, and limited forecast in the Arizona Department of Transportation (ADOT) State Aviation Needs Study 2000 (SANS 2000). Valid regional forecasts are limited given that the Arizona State Aviation System Plan (SASP) is currently in progress. All three existing forecasts were reviewed as a preliminary step in generating forecasts for this Master Plan Update. Regional and local conditions (i.e., market share) were then reviewed to evaluate the reliability of the forecasts. Table 2.3 provides existing based aircraft forecasts for PRC. The based aircraft and operations forecast methodology and actual forecasts for PRC are described thereafter.

As shown in Table 2.3, the FAA TAF and the SANS 2000 forecast have identical average annual growth rates, while the 1998 Master Plan is slightly lower at 1.5%. To further compare, validate,

and make an informed decision on the appropriate average annual growth rate to use in forecasting based aircraft through the planning period, historical data for based aircraft were collected from several sources, which included the FAA, and provided in Table 2.4. From this data, a trendline analysis[2] for the period of time shown (1989 to 2006) was performed. The correlation coefficient (R^2) determined was 0.92, which is a good correlation coefficient. This trendline analysis resulted in 595 aircraft in 2027, indicating a 2.6% average annual growth rate, which is comparable to both the FAA TAF and the SANS 2000.

Table 2.3
Comparison of Based Aircraft Forecast

Year	Airport-Specific		Regional
	FAA TAF	1998 Master Plan	SANS (2000)
1995	n/a	258	n/a
	x	Forecast	x
2000	312	280	n/a
	x	X	Forecast
2005	365	300	323
	Forecast	X	x
2010	391	325	360
2015	440	350	401
2020	494	374	446
2025	555	n/a	n/a
Average Annual Growth	**2.3%**	**1.5%**	**2.3%**

Table 2.4
PRC Historical Based Aircraft

Year	Based Aircraft	Year	Based Aircraft
1989	197	1998	290
1990	223	1999	312
1991	194	2000	312
1992	197	2001	312
1993	199	2002	335
1994	220	2003	347
1995	218	2004	335
1996	258	2005	349
1997	290	2006	357

After reviewing the resulting average annual growth rates for both the comparable forecasts and the trendline analysis, an average annual growth rate of 2.3% was selected for based aircraft through the planning period. Although the FAA's national projections of the active general aviation fleet indicate a modest 1.3 percent growth rate through 2025, it is anticipated that PRC

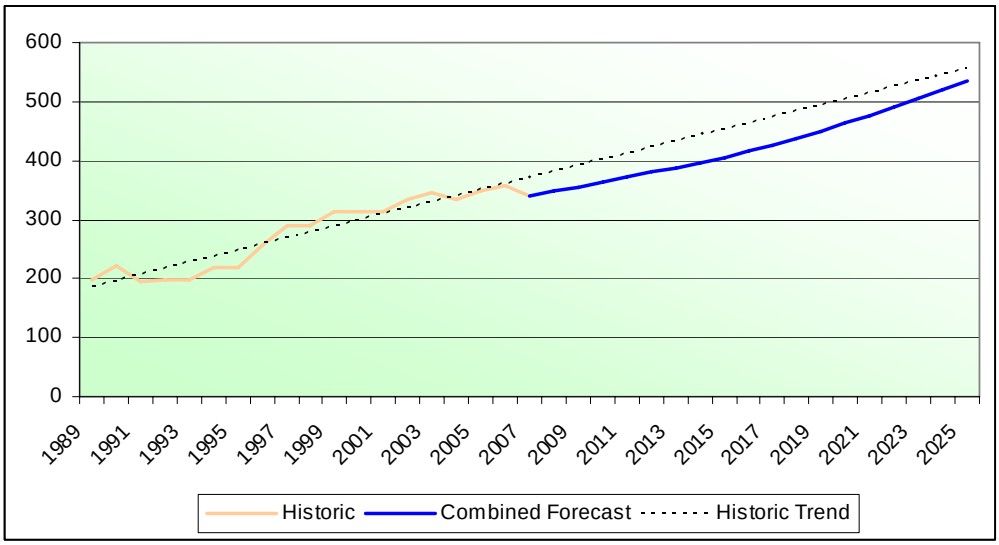
[2] Trendline analysis is a technique in taking historical data in effort to make predictions. Such analysis is also called regression analysis. The analysis produces a R^2 coefficient between 0 and 1. A trendline is more reliable when its R^2 value is at or near 1.

would experience more robust growth in terms of based aircraft due to the higher population growth rate within the ASA, compared to the growth rate nationally (as illustrated in Table 2.1). The resultant projection of based aircraft reflecting the selected growth rate of 2.3 percent is presented in Table 2.5 and illustrated in Exhibit 2.1.

Table 2.5
PRC Forecast Based Aircraft

Year	Based Aircraft
2007	340
2012	380
2017	425
2027	535

Exhibit 2.1
PRC Based Aircraft



2.2.4 Market Share Analysis of Based Aircraft

A market share analysis was also evaluated for PRC to reinforce the based aircraft projections provided in Section 2.2.3. The method used to determine market share was to develop a ratio of based aircraft per 1,000/population in the ASA region (see Table 2.1). Based aircraft per 1,000/ population is expected to decrease throughout the planning period as the population within the ASA increases at a greater growth rate than the number of based aircraft in the ASA. It is anticipated that by the end of the planning period (2027) the ratio will be 1.5. As a result, the projected based aircraft for the year 2027 is estimated to be 555, which is approximately 4 percent higher than the 2027 projection of 535 given in Table 2.7 (2.5% average annual growth rate vs. 2.3% average annual growth rate).

Because the average annual growth rates are within two-tenths of each other, the projected based aircraft of 535 is considered reliable, and will be used during the based aircraft fleet mix and aircraft operations forecast.

2.2.5 Based Aircraft Fleet Mix

The projections of based aircraft fleet mix were developed by using the fleet mix percentages located in Chapter 1, Table 1.6. However, the percentages were adjusted slightly to reflect the national trend forecast favoring an increased growth toward larger aircraft in the active general aviation fleet, notably those powered by turboprop and turbojet engines. In absolute numbers of aircraft nationally, however, the smaller piston-powered active aircraft greatly exceed these larger aircraft by a ratio of more than 10:1 today. Over time, this ratio may decrease to nearly 7:1. This growth rate projection through 2025 for each class of aircraft is presented in Table 2.6.

Table 2.6
National General Aviation Aircraft Fleet Projections

Period	Single-Engine Piston	Multi-Engine Piston/Turboprop	Turbojet	Rotorcraft
2008 – 2025	0.5	4.6	5.6	4.70
Source: "Aerospace Forecasts Fiscal Years 2008 – 2025"				

These same trends and characteristics can be expected at PRC. The resultant projection of based aircraft fleet mix, reflecting a slight adjustment to the current fleet mix percentages using the national growth rates, is presented in Table 2.7.

Table 2.7
PRC GA Aircraft Fleet Projections

Year	Single-Engine	Multi-Engine Piston/Turboprop	Business Jets	Rotorcraft	Total
2007[1]	301	26	3	10	340
Future	**86.5%**	**8%**	**2%**	**3.5%**	**100%**
2012	329	30	7	13	380
2017	368	34	8	15	425
2027	463	43	11	18	535
Source: Berger Calculations					[1]/ Base Year

2.2.6 General Aviation Aircraft Operations Forecast

An aircraft operation is defined as any takeoff or landing performed by an aircraft. There are two types of operations, local and itinerant. A local operation is a takeoff or landing performed by an aircraft that will operate within the local traffic, generally within a 20 nautical mile radius. Itinerant operations are all arrival and departures other than local. Usually, local operations are comprised of training operations and itinerant operations are those aircraft with a specific destination away from or to the airport. Typically, itinerant operations increase with business and

industry use of the airport since business aircraft are used primarily to move individual from one location to another.

Aircraft operations were developed based on traffic counts provided by the FAA Air Traffic Control, which operates between the hours of 6:00 a.m. and 11:00 p.m. daily. The tower presents this information by type of operation (local or itinerant). Year 1997 was the first year of historical data used for this forecast effort total was 353,286 operations (takeoffs and landings). Of these recorded operations, 237,916 were local and 115,370 were itinerant. This level of activity, although accurate for the recording period, does not include or make allowance for aircraft operations that occur when the tower is closed. Consequently, it was appropriate to make an upward adjustment to the recorded tower activity data by 1% to account for this condition. Table 2.8 presents the historical itinerant and local operations at PRC.

Table 2.8
Historical Operations

Year	Itinerant	% of Total	Local	% of Total	Total +1%
1997	118,903	33%	237,916	67%	356,819
1998	125,419	35%	228,056	65%	353,475
1999	119,608	35%	220,432	65%	340,040
2000	116,291	37%	203,746	63%	323,237
2001	119,491	36%	211,833	64%	328,746
2002	111,183	32%	231,196	68%	342,379
2003	116,513	35%	217,017	65%	333,530
2004	97,778	35%	177,805	65%	275,583
2005	88,929	37%	150,236	63%	239,165
2006	87,410	37%	149,292	63%	236,702
2007	87,062	38%	142,563	62%	229,625
	Avg.	**35%**	**Avg.**	**65%**	
Source: FAA ATC Source Data 1997-2007					

Aircraft operations forecasts were developed by applying national growth rates and applying the Operations Per Based Aircraft (OPBA) methodology. The operations at PRC did not correlate well with any of the socioeconomic indicators; thus, regression analysis was not a useful technique. Each of the forecasts is presented in the following sub-sections.

2.2.6.a FAA National Growth Rates

The TAF provided growth rates for itinerant and local operations. The growth rates are based upon national growth expected to occur and are shown in Table 2.9.

Table 2.9
TAF GA Growth Rates

Period	Itinerant Growth Rate	Local Growth Rate
2007-2012	1.3	1.3
2013-2017	0.9	1.7
2018-2022	0.7	1.0
2023-2027	0.6	0.9
Source: PRC TAF FY 2007-2025		

These growth rates were applied to the 2007 local and itinerant operations and the results are summarized in Table 2.10.

2.2.6.b Operations Per Based Aircraft

The OPBA method is a ratio of operations per based aircraft. The OPBA ratio can be calculated and then applied to the forecasted based aircraft to generate an operation forecast. The OPBA ratio calculated for 2007 operations was 675. The OPBA ratio was applied to the forecast of based aircraft in Table 2.5. The forecast of operations is summarized in Table 2.10.

2.2.6.c Combined Forecast

The combined forecast was developed using parts of each forecast presented in the last two sections. For itinerant operations, the national growth rate was used. For the based aircraft, a new OPBA ratio was developed. The new OPBA was derived by taking the 2007 local operations and the 2007 based aircraft. The resulting OPBA was 419. This OPBA was then applied to the forecast of based aircraft to derive local operations. The forecast is summarized in Table 2.10.

2.2.6.d GA Operations Forecast Analysis

As shown in Table 2.10, the different forecast methodologies generate a range of operations scenarios. Analyzing the different forecasts, it was determined that the National Growth Rate method provides a very conservative estimate of operations, at best. The OPBA method generates a very high operations level. However, the OPBA is based on total local and itinerant operations. Although the OPBA represents a ratio based upon actual operations at the airport, it appears very optimistic. Given the knowledge of the region in previous discussions, it seems this forecast would not be appropriate.

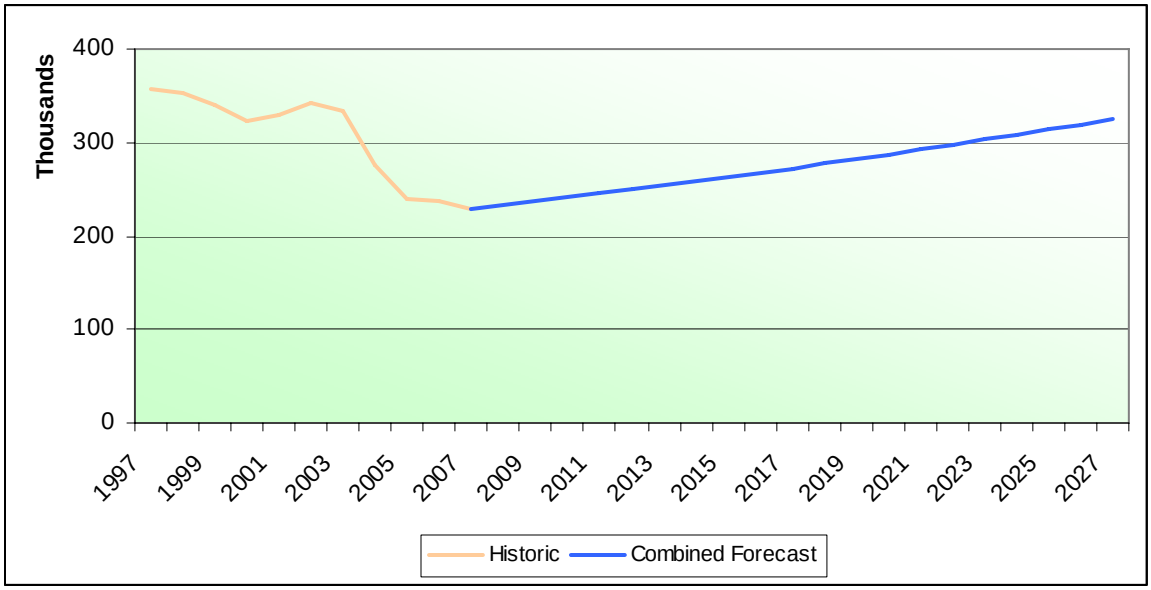
The preferred forecast is the combined forecast. This forecast combines the itinerant growth rates from the National Growth Rates forecast with the OPBA generated specifically for the local operations. This forecast provides a good estimate as it addresses a level of growth from itinerant operations associated with the growth expected in the nation while addressing growth in the based aircraft specific to PRC. Furthermore, the Combined Forecast comes within 10% of the FAA TAF, which is within acceptable limits. Exhibit 2.2 illustrates both historical and forecasted total aircraft operations.

Table 2.10
GA Operations Forecast

Year	National Forecast	OPBA Forecast	Combined Forecast
2007[1]	229,625	229,625	**229,625**
2012	242,518	256,500	**249,664**
2017	260,035	286,875	**272,663**
2027	282,772	361,125	**325,084**

Source: Berger Calculations 1/Base Year

Exhibit 2.2
PRC Total Aircraft Operations



2.2.7 GA Operations Forecast by Fleet Mix

Future aircraft operations by fleet mix were projected on the basis of using the Combined GA Operations Forecast (shown in Table 2.10) and applying the current fleet mix percentages obtained from reviewing the 5010 Data Sheet and past INM Noise Model data inputs. The current fleet mix operations, by percentages, are as follows:

- Single Engine (SE): 66%
- Multi-Engine (ME): 16%
- Business Jet (BJ): 10%
- Rotorcraft (RC): 8%

Subsequently, Table 2.11 depicts the GA operations forecast by fleet mix based upon the combined forecast in Table 2.10 and the fleet mix percentages listed above.

Table 2.11
GA Operations Forecast by Fleet Mix

Year	SE	ME	BJ	RC	Total
2007[1]	151,553	36,740	22,962	18,370	**229,625**
2012	164,778	39,947	24,966	19,973	**249,664**
2017	179,958	43,626	27,266	21,813	**272,663**
2027	214,556	52,013	32,508	26,007	**325,084**
Source: Berger Calculations 1/Base Year, Ref: Table 2.10					

2.2.8 Local and Itinerant Operations

As discussed earlier, Local operations are performed by aircraft that:

- Operate in the local traffic pattern or within sight of an airport,
- Are departing for or arriving from flight in a local practice area located within a 20-mile radius of the airport, or
- Are conducting simulated instrument approaches or low pass at an airport.

Itinerant operations are all other operations. The average split at PRC between 1997 and 2007 is 65 percent local and 35 percent itinerant as shown in Table 2.8. Table 2.12 depicts the local/itinerant split expected to occur at PRC through the planning period. The itinerant percentages are anticipated to increase slightly over time as more business activity occurs.

Table 2.12
Local and Itinerant GA Operations Forecast

Year	Local Forecast	Itinerant Forecast	Total Forecast	Percent
2007[1]	149,256	80,369	229,625	65/35
2012	157,288	92,376	249,664	63/37
2017	169,051	103,612	272,663	62/38
2027	195,050	130,034	325,084	60/40
Source: Berger Calculations [1]/Base Year				

2.3 Commuter Enplanements and Operations

This section provides the forecasts of commuter activity at PRC. The analysis was performed using a three step process to develop the forecasts. First, the airline industry in general and historical commuter activity at PRC was reviewed to identify previous levels of service and trends. Second, an air service assessment was conducted, which addressed current use at the airport, trends affecting air service at PRC, and their affects on future levels and activity. The Passenger Leakage Analysis was utilized as well. Last, a series of alternate forecasts were developed, based on historical data and future "what if" scenarios due to 'on-going' plans to build a new larger terminal facility at PRC. The preferred forecast was then selected. The following sections describe each step in detail, beginning with a short historical perspective of the airline industry

2.3.1 Airline Industry Trends

The Federal Aviation Administration (FAA) publishes a national aviation forecast. The current document that will be used as a source is *FAA Aerospace Forecast Fiscal Years 2008–2025*. Included in this publication are forecasts for commercial aviation. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth.

Commercial aviation was a study in contrasts in 2007. High jet fuel prices continued to plague carriers throughout the world but demand remained robust. The global industry, including the U.S., was able to record its first net profit since 2000. Airlines in the U.S. maintained capacity discipline in domestic markets, increased their international flying, and raised fares modestly. World airlines were not as affected by the high fuel prices because a relatively strong world economy and a weakening dollar allowed international carriers to pass on increased fuel costs to the traveling public through higher fares without dampening demand. In the U.S., higher load factors and modestly higher fares resulted in the first profit for the industry since 2000.

The U.S. commercial aviation industry consists of 36 mainline air carriers that use large passenger jets (over 90 seats) and 84 regional carriers that use smaller piston, turboprop, and regional jet aircraft (up to 90 seats) to provide connecting passengers to the larger carriers. Mainline and regional carriers provide both domestic and international passenger service between the U.S. and foreign destinations, although regional carrier international service is confined to border markets in Canada, Mexico, and the Caribbean.

Three distinct trends have occurred over the past several years that have helped shape today's U.S. commercial air carrier industry:

1. Major restructuring and shrinking by the mainline network carriers;

2. Rapid growth by low-cost carriers, particularly in nontraditional long-distance transcontinental markets; and

3. Exceptional growth among regional carriers.

Below, a list is provided summarizing key FAA forecast components for commercial aviation through 2025.

- Domestic capacity growth in FY 2008 is projected to be 0.6 percent. Mainline carrier capacity is forecast to rise just 0.3 percent following the 1.8 percent increase in 2007 as network carriers continue to shrink and low-cost carriers temper their growth because of continuing record high fuel prices.

- Regional carrier capacity is forecast to grow 2.5 percent in FY 2008 as increasing numbers of 70 and 90-seat regional jets enter service, while the number of smaller regional jets (50 seats or less) shrinks.

- Domestic commercial carrier capacity growth quickens in 2009 to 3.3 percent as mainline carriers grow 2.7 percent while regional carriers grow 7.8 percent.

- For the entire forecast period (2008–2025), domestic capacity is projected to increase at an average annual rate of 3.6 percent, slightly faster than economic growth, with mainline carrier growth lower (3.2 percent) than the regional carriers (5.9 percent).
- Following a 0.2 percent decline in 2006, passenger enplanement growth rebounded in 2007, up 3.1 percent. Passenger volume is expected to grow slowly in 2008 (up 1.0 percent) and speed up in 2009 (up 3.5 percent). During the entire forecast period, domestic enplanements are projected to grow at an average annual rate of 2.8 percent with mainline carriers growing slower than regional carriers (2.5 and 3.8 percent a year, respectively).

2.3.2 Historical and Current Commercial Air Service at PRC

The air service at PRC has always been subsidized by the U.S. Department of Transportation (USDOT) through the Essential Air Service (EAS) program. The EAS is a program operated by the U.S. Department of Transportation that provides subsidies to airlines who agree to provide service on historically non-profitable routes to rural areas, which were served by certified air carriers before the 1979 Airline Deregulation Act. Under EAS contract, Public Law 100-223 states that the airline must provide:

(a) Service to a hub airport, defined as an FAA-designated medium- or large-hub airport;

(b) Service with no more than one intermediate stop to the hub;

(c) Service with aircraft having at least 15 passenger seats at communities that averaged more than 11 passenger enplanements a day in any calendar year from 1976-1986;

(d) Under certain circumstances, service with pressurized aircraft; and

(e) Flights at reasonable times taking into account the needs of passengers with connecting flights.

Mesa Airlines has provided continuous service since January 1989, with the exception of the period between May 2005 and October 2007, during which the EAS contract was awarded to Great Lakes Airlines. The number of passenger enplanement at PRC, as shown in Table 2.13, overall has been declining since 1994, from a high of 14,000 enplanements[3] per year to a low of 4,233 in 2007. The primary factors which account for the decline in enplanements were due to the September 11th terrorist attacks and the two year period when Great Lakes Airline operated in and out of Terminal 2 at Phoenix Sky Harbor (PHX). Passengers arriving in Terminal 2, and connecting to flights departing out of Terminal 3 and 4, had to exit Terminal 2 and repeat the check-in and screening process. Additionally, in some instances, passengers had to collect and recheck their luggage. This had effectively limited the ability of the passenger to select convenient connections, ultimately favoring ground transportation options to travel to PHX.

[3] An enplanement is when a passenger boards an aircraft at the airport. Industry standards typically identify enplanements as the measure of activity at an airport, as it is assumed that the individual that boards will also return to the airport.

Table 2.13
PRC Historical Enplanements

Year	Arizona Pacific	Mesa Airlines	Great Lakes	Total
1989		9,144		**9,144**
1990		11,510		**11,510**
1991		6,565		**6,565**
1992	3,337	8,381		**11,718**
1993		13,428		**13,428**
1994		14,493		**14,493**
1995		11,504		**11,504**
1996		12,055		**12,055**
1997		10,043		**10,043**
1998		8,366		**8,366**
1999		6,395		**6,395**
2000		9,393		**9,393**
2001		4,683		**4,683**
2002		4,818		**4,818**
2003		5,692		**5,692**
2004		7,889		**7,889**
2005		3,735	1,680	**5,415**
2006			4,469	**4,469**
2007		2,200	2,033	**4,233**
Source: PRC Airport Administration				

In May of 2008, Mesa Airlines indefinitely suspended commercial airline service at PRC. The cessation in operations was due to an increase in operating costs that can be attributed to the current high fuel costs. Mesa Airline operated a fleet of Beechcraft 1900 aircraft (19 seat configurations) out of PRC. Mesa Airline had offered flights to Phoenix arriving and departing from PHX at Terminal 4.

Currently, in effort to continue the EAS program, Prescott provides commercial air service through the operation of Great Lakes Aviation, Ltd. (Great Lakes). Service continues to be provided with a 19-seat Beech 1900 aircraft. Great Lakes Airlines provides daily flights to and from Phoenix Sky Harbor Airport (PHX) and Ontario, CA (ONT), through a code share agreement with United Airlines.

Additionally, in partnership with Alaska Airlines, Horizon Air provides daily flights to and from Los Angeles International Airport (LAX). This service is offered on a Bombardier Q-400 turboprop aircraft, which has a capacity to seat up to 79 passengers. The flight from Prescott will originate in Flagstaff. The early morning flight from Flagstaff will make a brief stop in Prescott and then continue nonstop to Los Angeles. The return flight will take the opposite route in the evening, stopping in Prescott before terminating in Flagstaff.

2.3.3 Enplanement Forecast

In this section, several alternative enplanement forecasts are derived, based on TAF historical and forecast data, population, trends, and the Passenger Leakage Analysis (Appendix A). From these alternatives, a recommended forecast was obtained and used to develop commercial operations forecasts.

Three enplanement growth scenarios were defined. These scenarios will be used in development and evaluation of the alternative forecast. These scenarios are:

- **Low Growth**: In this scenario, passenger activity at PRC will grow very slowly. Contributing factors to the low growth may include 1) no additional services provided through the EAS program; and, 2) no improvements to the existing terminal building and services offered. PRC will continue to be served by a single commuter airline, with limited service to one or two destinations.
- **Moderate Growth**: In this scenario, passenger activity at PRC will be more robust due to regional population growth and increased air service demand. Airline service would remain in the current terminal, but may include more than one commuter airline providing air service to potentially more destinations.
- **High Growth**: An aggressive campaign to increase passenger use is assumed in this scenario. Increased efforts will be made to capture those passengers identified as "leakage". Two carriers would likely provide substantial service from PRC, possibly with regional jet service from a new terminal facility.

The choice of scenario is discussed later in this section.

2.3.3.a FAA Terminal Area Forecasts

The FAA's TAF are airport-specific forecast based upon FAA Annual Forecasts. Thus, they are "top-down" forecasts; that is, forecasts for an airport derived from national forecasts. A review of the most current TAF for PRC (March 2007) show that the FAA slightly over estimates current airport enplanements. Accordingly, the TAF growth rates were applied to actual PRC enplanements (Table 2.13) to yield alternative forecasts. The TAF growth rate for PRC is about 0.8% annually over the planning period, virtually showing very little growth. Table 2.14 summarizes the adjusted TAF Enplanement Forecast.

Table 2.14
PRC Terminal Area Enplanement Forecast

Year	TAF Enplanements	Adjusted Enplanements
2007[1]	7,265	4,233
2012	7,546	4,405
2017	7,839	4,584
2027[2]	8,340	4,964

Source: TAF, FY 2007-2025 [1/]Base Year [2]/Interpolated

2.3.3.b Population Growth Rate vs. Enplanement Model

The population growth rate model is predicated on a 5.9 percent average annual growth rate from the 2007 total of 4,233 enplanements to 13,322 enplanements in the year 2027. This annual growth rate is due to the anticipated population growth of the ASA for the same period (see Table 2.1). Table 2.15 depicts the population growth rate model.

Table 2.15
Population Growth Rate vs. Enplanements

Year	Enplanements
2007	4,233
2012	5,638
2017	7,509
2027	13,322
Source: Berger Calculations, ref: Table 2.1	

2.3.3.c Trendline

A trendline forecast based upon historical enplanement data between 1989 and 2007 (Table 2.13) resulted in a poor correlation (R^2 = 0.29) and a downward trend in enplanements. This was expected considering a relatively inconsistent and volatile enplanement pattern during the 1989 to 2007 period. Table 2.16 depicts the results from the trendline analysis the population growth rate model.

Table 2.16
Trendline Forecast

Year	Enplanements
2007	6,400
2012	6,000
2017	5,800
2027	5,000
Source: Berger Calculations, ref: Table 2.13	

2.3.3.d Market Share Analysis

Another technique for assessing and forecasting enplanement growth is a market share analysis. In this method, the historical enplanements at PRC are compared with the potential enplanements within the ASA. The trend in market share is examined, and future market share is estimated. Forecasts can then be developed based on future market share, and the ability for PRC to capture their market share based upon the various scenarios (low, medium, and high) presented.

As identified in the Passenger Leakage Analysis (Appendix A) and in the 1999 Arizona Rural Air Service Study, ADOT estimated that statewide enplanements per capita ratio was 3.10, lead by Phoenix with a 3.76 ratio and Tucson with 2.18. It was then realized that the unconstrained

overall enplanement per capita rate for PRC was 0.87, concluding that Prescott could capture approximately 40% of its total unconstrained demand. A 40 percent capture rate is believed to be reasonable considering that all non regional and secondary airports are affected by passenger leakage. Therefore, a 40 percent capture rate is feasible through the long term planning period.

Table 2.17 summarizes the unconstrained demand at 40 percent capture rate through the planning period. It is important to note, that the enplanements shown in Table 2.15 are not the projected forecast for PRC as they relate to this Master Plan; rather, it quantifies the potential market. Actual capture rates of the PRC's potential market will be applied later as they relate to the various growth scenarios (low, medium, and high).

Table 2.17
Unconstrained PRC Market Share

Year	ASA Population	Unconstrained Demand	PRC ASA Market Share (40%)
2007	124,477	108,544	43,418
2012	163,614	142,671	57,068
2017	215,056	187,528	75,011
2027	371,546	323,988	129,595

Table 2.16 shows how PRC's potential market share will steadily increase over the planning period as the ASA population increases. In forecasting actual future enplanements for PRC, the key question becomes whether or not the airport's ability to capture the potential market share will come to be realized.

For this analysis, the three scenarios defined earlier were applied and corresponding market share capture rate estimates, as follows:

- **Low Growth**: For this scenario, it is assumed that the market share will remain at its current low levels (10 percent market share) and continue to lose passengers at it's current rate as described in the Passenger Leakage Analysis (Appendix A).
- **Moderate Growth**: In this scenario, an increase in market share is assumed (to 18 percent) based on the average of the last 10 years, and factoring in an additional airline providing more service options and destinations.
- **High Growth**: This scenario uses an increased market share to account for improved facilities and terminal gate capacity at PRC. A market share is assumed based on the average of the last 17 years. A market share of 28 percent was used.

Forecasts for PRC were developed using these market share assumptions. Table 2.18 summarizes the calculations.

Table 2.18
PRC Market Share Enplanement Forecast

Year	Low Growth	Medium Growth	High Growth
2007[1]	4,233	4,233	4,233
2012	5,564	10,272	15,979
2017	7,314	13,502	21,003
2027	12,636	23,327	36,287

Source: Berger Calculations [1]/Base Year

2.3.3.e Selected Enplanement Forecast

The Low Growth scenario does not appear to be reasonable and may be too pessimistic. With the projected ASA population to increase at an Annual Growth Rate of 5.6% through the planning period, it is expected that the enplanements would favor a more moderate growth. However, consideration must be given to the potential of increasing PRC's profile and market share by way of the development of a new terminal facility and increased service options to multiple destinations.

For the purposes of estimating the commuter operations forecast, a combined scenario will be recommended and used. The combined scenario takes into account the three growth scenarios and progresses the various captures rates through the planning period. The progression of the capture rates, for the combined scenario, is intended to model the current service environment at little or no growth with the expectation that PRC's enplanements will progressively improve through the planning period. Table 2.19, summarizes the combined scenario.

Table 2.19
Combined Growth Scenario

Year	Combined Growth
2007	4,233
2012	7,262
2017	12,459
2027	36,673

Exhibit 2.3, PRC Passenger Enplanements (1989-2027), illustrates the historical and forecasted passenger's enplanements at PRC based on the Combined Growth scenario.

Exhibit 2.3
PRC Passenger Enplanements (1989-2027)

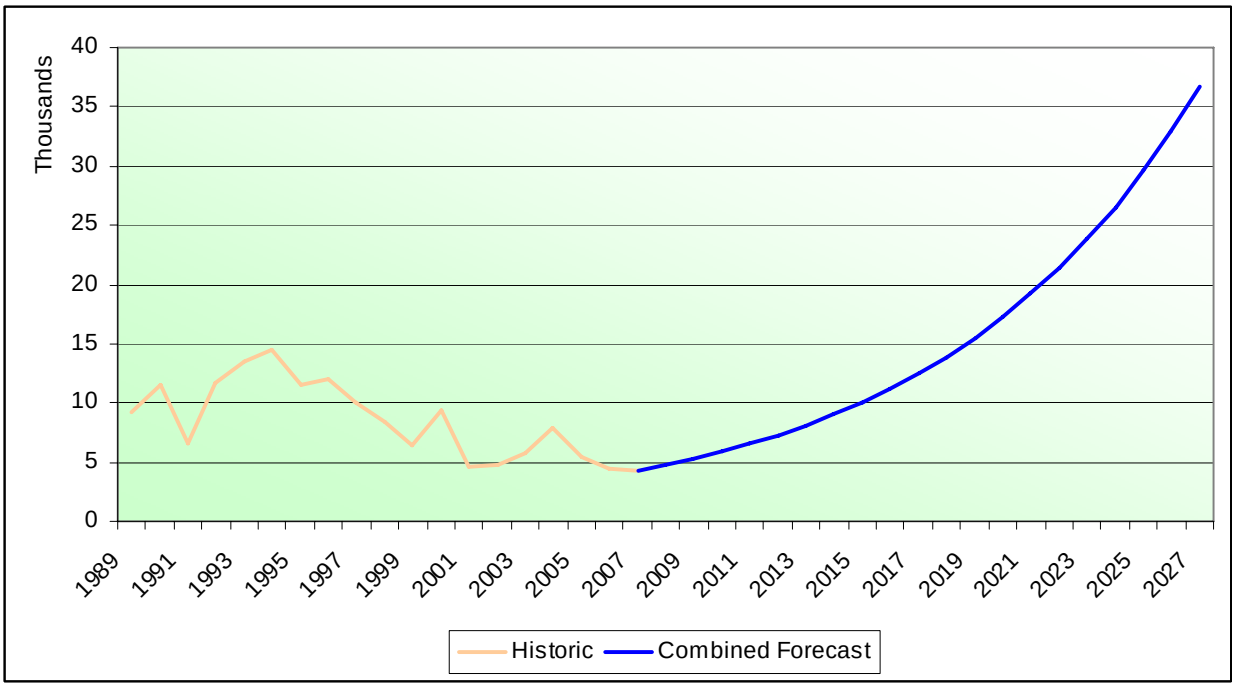
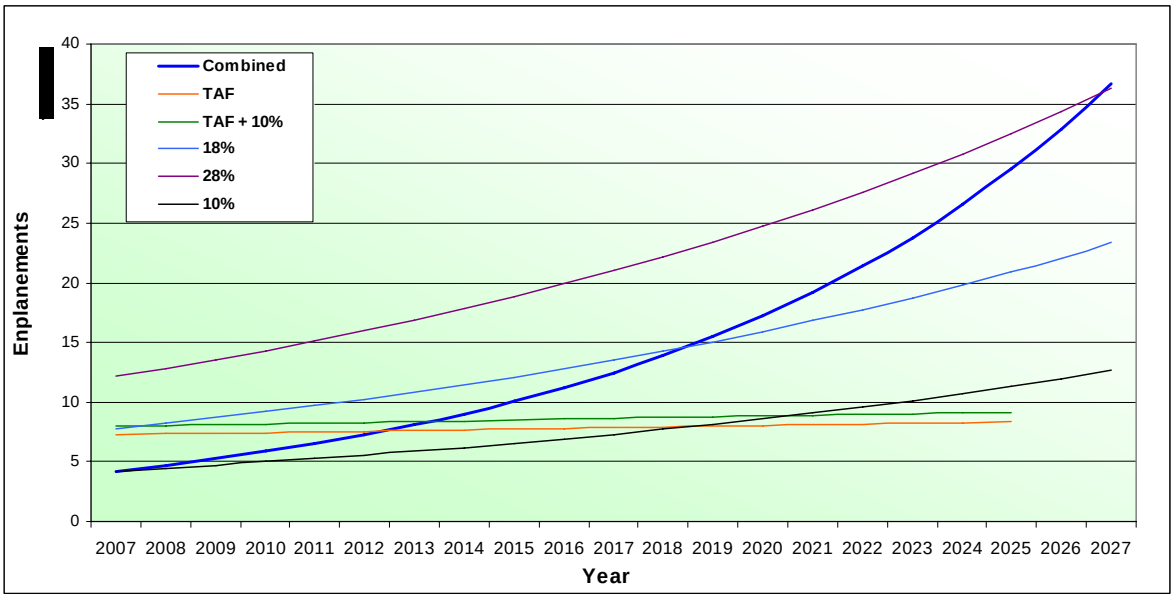


Exhibit 2.4, Enplanement Comparison, illustrates the Combined Growth scenario compared to the low (10 percent), medium (18 percent), and high (28 percent) growth scenarios, as well as the FAA TAF forecast and FAA TAF forecast plus 10 percent. As shown the Combined Growth scenario begins to bypass the FAA TAF forecast in 2012 and the FAA TAF plus 10 percent in 2013. Both the national economy and airline industry will be major factors that influence the combined enplanement forecast. Although the national, state, and local economies are slowing down and the airline industry is struggling with increased fuel prices, it's important to note that the most stable portion of the airline industry has occurred in the regional/commuter air carrier segment. As the economy begins to experience and upturn and the airlines begin to stabilize, enplanement growth at PRC is expected to increase at a more aggressive rate in the mid to latter parts of the planning period (i.e., 2014 through 2027).

Exhibit 2.4
Enplanement Comparison



2.3.3.f Summary of Enplaned Forecast Analysis

Table 2.19 was developed in effort to summarize the enplanement forecast, as well as compare the results to previous other studies providing PRC forecast information.

Table 2.19
Enplanement Forecast Summary

	2007	2012	2017	2027
FAA Terminal Area Forecast (TAF)				
FAA TAF	7,265	7,546	7,839	8,340[3]
FAA TAF Adjusted to Current Levels	4,233	4,405	4,584	4,964
Trendline				
1989-2007 (R^2 = 0.29)	6,400	6,000	5,800	5,000
Average Annual Growth Rate (Population Only)				
ASA Population Growth (5.9%)	4,233	5,638	7,509	13,322
Market Share[1]				
• Low: 10% (current)	4,233	5,564	7,314	12,636
• Moderate: 18% (10 yr. avg.)	4,233	10,272	13,502	23,327
• High: 28% (27 yr. avg.)	4,233	15,979	21,003	36,287
• **Combined**	**4,233**	**7,262**	**12,459**	**36,673**
Other Studies				
SANS 2000	15,160[3]	19,764[3]	26,495[3]	N/A
PRC Airport Master Plan 1998	24,533[3]	30,109[3]	36,799[3]	N/A

N/A – Not Available, [1] See Table 2.18 and 2.19, [3] Extrapolated

2.3.4 Commuter Operations Forecast

In addition to passenger enplanements, there are other factors which affect forecasts of airline facilities. The number of commuter airline operations can be determined from the average ratio of passenger enplanements forecasted per departure. This ratio is dependent upon the size of the aircraft and the average percentage of seats that are filled for each departure. The percentage of enplanements to available seats is called Load Factor (LF).

According to the *FAA Aerospace Forecast Fiscal Years 2008–2025*, the regional carrier passenger fleet is forecast to increase by 6 aircraft in 2008. After 2008, the regional carrier fleet is expected to increase by an average of 37 aircraft (1.2 percent) over the remaining years of the forecast period, reaching 3,469 aircraft in 2025. The number of regional jets (90 seats or fewer) at regional carriers is projected to grow from 1,803 in 2007 to 3,114 in 2025, an average annual increase of 3.1 percent. All the growth in regional jets over the forecast period occurs in the larger 70 and 90-seat aircraft. During the forecast period, more than 1,000 regional jets of 50 or less seats are removed from the fleet. The turboprop/piston fleet, which is the aircraft currently servicing PRC, is expected to decline from 1,033 in 2007 to 355 in 2025. Turboprop/piston aircraft are expected to account for just 10.2 percent of the regional fleet in 2025, down from a 36.4 percent share in 2007. For this reason, the 30 seat turboprop and/or regional jet of 50 or less seats are factored into PRC's BRL equation.

The greater number of the larger 70 and 90-seat regional jets in the fleet coupled with 50-seat jet retirements increases the national load factor to 81.6 percent in 2025. However, due to the limited services offered through the EAS program, the LF at PRC has historically been lower than the national average and, according to the Arizona SANS 2000, has been projected to increase from 45 percent in 2007 to 50 percent in 2027.

Table 2.20 depicts the anticipated airline operations based upon various seating capacities of commercial aircraft.

Table 2.20
PRC Commercial Operations Forecast

Seating Capacities	2007	2012	2017	2027
= 19 (Beech 1900)	100%			
= 30 Brasilia		100%	50%	
= 50 (RJ)			50%	100%
Total	**100%**	**100%**	**100%**	**100%**
Average Seats, Enplanements, and Commercial Operations Forecasts				
Average Seats per Departure	19	30	40	50
Load Factor	45%	46.5%	48%	50%
Enplanements per Departure	8.55	13.95	19.2	25
Forecast Annual Enplanements	4,233	7,262	12,459	36,673
Annual Departures	495	521	649	1,467
Annual Commercial Operations	**990**	**1,042**	**1,298**	**2,934**
Source: Arizona SANS 2000 and Consultant Calculations				

2.4 Instrument Operations Forecast

Forecasts of Annual Instrument Approaches (AIA) provides guidance in determining an airport's requirements for navigational aid facilities. An instrument approach is defined as an approach to an airport with the intent to land by an aircraft in accordance with an Instrument Flight Rule (IFR) flight plan, when the visibility is less than three miles and/or the ceiling is at or below the minimum initial approach altitude.

In determining the number of AIA's conducted at PRC, the number of itinerant operations must be reviewed. Utilizing all commuter operations and only itinerant general aviation operations, the number of AIAs was estimated.

According to historical FAA TAF data for the last 10 years, actual instrument approaches were approximately 2.4 percent of annual itinerant operations. The number of AIAs are expected to increase slightly throughout the planning period as itinerant operations increase. Table 2.21 depicts the AIA forecast through the planning period.

Table 2.21
PRC Annual Instrument Approach Forecast

Operations	2007[1]	2012	2017	2027
Annual Itinerant Operations	81,359	93,418	104,332	132,968
Annual Instrument Approaches	1,627	2,242	2,504	3,191

Source: FAA TAF; Berger Forecast Tables 2.12 and 2.20 [1]/Base Year

2.5 Peaking Characteristics

Peak period forecast are required for airport capacity and facility analysis. Forecasts are required for: Peak Month and Average Day Peak Month (ADPM) for enplanements and operations. Table 2.22 summarizes the results.

- **Enplanements**: A review of monthly enplanement data over the last 5 years reveals that commuter peak months are in October and in the range of 10 percent. The peak year over the last five years was 2004. The peak month for 2004, which comprised about 10 percent, appears typical and will be used for planning purposes. The ADPM was calculated by dividing the peak month level by 31.

- **Operations**: As with enplanements, peak month operations over the last five years have varied, but range between eight to ten percent of total operations. For consistency, the 2007 peak month of 10 percent for November will be used for forecast purposes.

Table 2.22
Peak Period Forecast

		2007[1]	2012	2017	2027
Enplanements:	Annual	4,233	7,262	12,459	36,673
	Peak Month	794	726	1,245	3,667
	ADPM	25	23	40	118
Operations:	Annual	230,615	250,706	273,961	328,018
	Peak Month	23,061	25,070	27,396	32,801
	ADPM	744	809	884	1,058

2.6 Summary

The recommended forecasts for Prescott Municipal Airport are summarized below in Table 2.23. The forecast as presented in this chapter will be used throughout the remainder of the master planning effort. The next step in the Master Planning process is to assess the capacity of the existing facilities, including a clear description of the design aircraft, and to determine what facilities will be necessary to meet future aviation demand.

Table 2.23
Summary of Recommended Forecasts

Forecast	2007[1]	2012	2017	2027
Passenger Enplanements	4,233	7,262	12,459	36,673
Annual Operations	230,615	250,706	273,961	328,018
• **Commuter**	990	1,042	1,298	2,934
• **GA Operations**	229,625	249,664	272,663	325,084
- **Local**	149,256	157,288	169,051	195,050
- **Itinerant**	80,369	92,376	103,612	130,034
- **Single Engine**	151,553	164,778	179,958	214,556
- **Multi-Engine**	36,740	39,947	43,626	52,013
- **Business Jet**	22,962	24,966	27,266	32,508
- **Rotorcraft**	18,370	19,973	21,813	26,007
Annual Instrument Approaches	1,627	2,242	2,504	3,191
Based Aircraft	340	380	425	535
• **Single Engine**	301	329	368	463
• **Multi-Engine**	26	30	34	43
• **Business Jet**	3	7	8	11
• **Rotorcraft**	10	13	15	18

Source: Berger Calculations [1]/Base Year