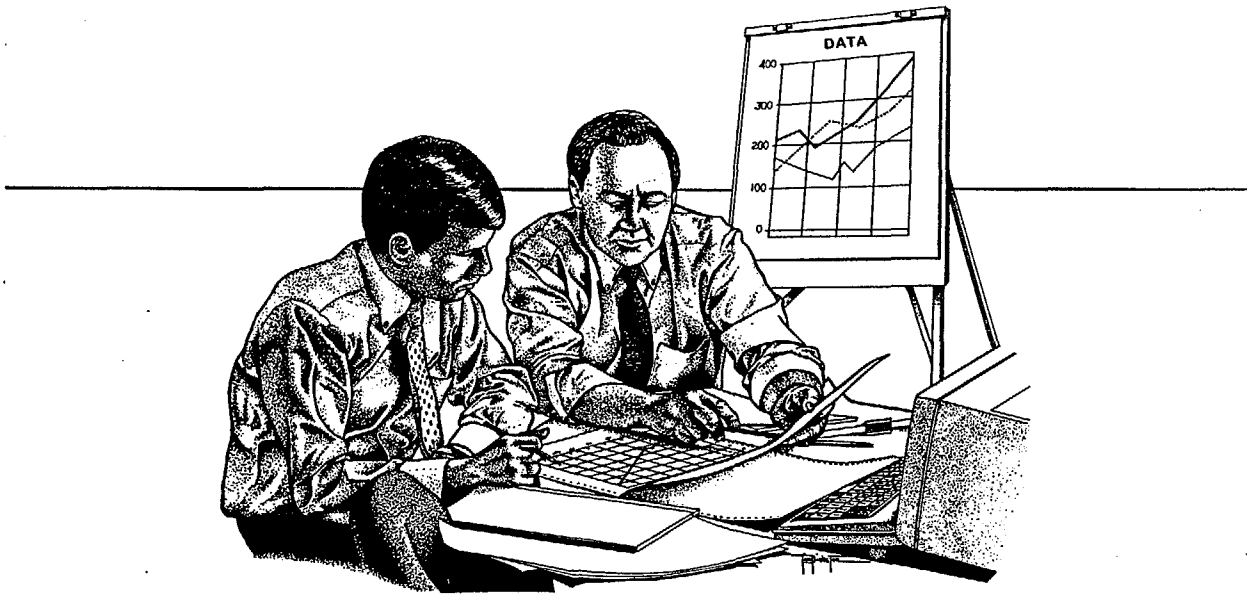
Chapter Three
FORECASTS



Chapter Three
FORECASTS

Flagstaff Pulliam Airport

The proper planning of a facility of any type must begin with a definition of the need that it can reasonably expect to serve over the specified planning period. At Flagstaff Pulliam Airport, this involves the development of a set of forecasts that best define the potential of future aviation demand. Forecasts of air carrier, general aviation, and military activity at the airport can be used as a basis for determining the types and sizes of aviation facilities required to accommodate the aviation needs of the region through the year 2010.

Forecasts are applied to several phases of the study. Initially, they are used to analyze the capacity of the airfield, the terminal area, and the access system. They are also used to evaluate the airport's role in the Arizona State Aviation System Plan, which may effect the need for improved capacity or navigational systems. Later in the study, they will be used in the financial analysis of alternative development actions.

The primary objective of a forecasting effort is to define the magnitude of change that can be expected over time. Because of the cyclical nature of the economy, it is virtually impossible to predict with certainty, aviation activity on a year-to-year basis over an extended period of time. However, a growth curve can be established to predict the long-term growth potential. While a single line is often used to express the anticipated growth, it is important to remember that actual growth may fluctuate above and below this line.

For this reason, one should keep in mind when reviewing graphical depictions of aviation forecasts in this chapter the **preferred forecast** line represents a **forecast envelope**. It should serve as a reminder that

actual growth in activity seldom follows a simple straight line or mathematical curve. The primary point to remember about forecasts is that they serve only as guidelines, and planning must remain flexible around its guidelines.

Aviation activity is affected by many external influences, as well as by the aircraft and facilities available. Few industries have seen as much dynamic change as the aviation industry since the first powered flight. Major technological breakthroughs as well as regulatory and economic actions have resulted in erratic growth patterns and have had significant impacts upon activity. More recently, regulatory and economic actions have created very significant impacts upon the aviation activity patterns at most airports. The following sections attempt to define the historical trends and discuss how external influences may affect future trends in establishing forecasts of aviation activity for Flagstaff Pulliam Airport.

FORECAST PROCEDURES

The systematic 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 and knowledge of the situation, is important in the final subjective determination of the preferred forecast.

The analysis begins with the assessment of historical trends as data is collected and sorted on a variety of aviation indicators at the local, regional, and national level. Aviation-related factors such as airline enplanements, operations, and based or registered aircraft are prepared for analyses. Similarly, socioeconomic factors such as population, income, and employment are analyzed for the effect they have had on aviation growth. The comparison of relationships between these various indicators provides the initial step in the development of realistic forecasts of aviation demand.

As part of the analytical process, time-series extrapolations (based upon historic relationships) are extended into the future based upon a variety of techniques and assumptions. Trend lines developed through the use of a variety of techniques are called projections. After preparing several such projections, the analyst is able to identify a range of growth within which the true trend will probably lie.

FORECAST METHODOLOGY

The most reliable approach to estimating future aviation demand is the use of several analytical techniques, then comparing the results. The most common techniques used include correlation analysis, regression analysis, time-series extrapolation, and market share analysis. Correlation analysis examines the direct relationship between two or more sets of historical data. Used primarily as a statistical test on a multiplicity of variables, this analysis will detect significant correlations between sets of data. These sets can then be evaluated further using regression analysis.

In **regression analysis**, projections of an aviation demand element, the dependent variable, are prepared based upon its relationship to one or more aviation indicators, known as the independent variables. Enplaned passengers and based aircraft are examples of dependent variables, while population, per capita income, gross national product, and other socioeconomic factors are examples of independent variables. Included in the forecast methodology for

Flagstaff will be a comparison of aviation factors with visitors to the national parks and monuments in the Flagstaff area. Linear, curvilinear, and multiple regression analyses all can be tested to attempt to define a relationship from which future activity can be projected.

Time-series, least squares extrapolation is probably the simplest, most widely used method of forecasting. This technique involves the fit of classical growth curves to future years. In utilizing this technique, an assumption is made that the same factors will continue to affect future demand. While this can be a rather broad assumption, it often provides a reliable benchmark for comparing the results of other analyses.

The **market share** technique involves a review of the airport's activity versus a larger aviation market. The local share-of-the-market factor is multiplied by forecasts of the larger market for a projection. This *top-down* approach proves useful as a check on the validity of other forecasting techniques.

Using a broad spectrum of local, regional, and national socioeconomic data, surveys and aviation trends, forecasts are developed in the following sections for several key aviation activity categories, including:

- Commercial Service passenger enplanements and aircraft operations.
- General Aviation based aircraft operations and military activity.
- Military Activity.
- Peaking Characteristics.
- Annual Instrument Approaches.

At this point, the second phase comes into play. The analyst must study the various growth elements and utilizing experience and professional judgment, weigh several other intangible factors before finalizing a forecast. These factors include:

- Uses for which the forecast is being developed.
- Character of the community.
- Potential changes in the general business environment.
- State-of-the-art technological advances.
- Impact of new facilities or improved services.
- Policies of the airport owner.

Two important considerations bear upon the finalization of forecasts for planning purposes. First, one cannot assume a high level of confidence in forecasts that extend beyond five years. However, more than five years is often needed to complete a facilities development program and at least twenty years is necessary to assure the proper return on the investment. The second consideration is the level of optimism reflected in the forecasts. The planning effort must design in a flexibility that is relatively insensitive to fluctuations in forecasts. This section will provide forecasts of aviation activity anticipated to occur at Flagstaff Pulliam Airport during the planning period, 1995-2010.

POPULATION FORECASTS

Historical as well as forecast population data normally provides a good indicator of future aviation demand at an airport. Since the population growth of a community or service area can be tracked historically, past growth trends can be correlated to airport activity. A community/service area revealing a substantial

growth rate in population will normally produce a growth in demand for airport services. Conversely, a community/service area with little growth or a net population decrease will generally not produce an increased demand for airport services.

An analysis of the population of Flagstaff, Coconino County and the service area should begin with current trends within the State. In 1989, population growth in the state continued at twice the national rate of growth a rate that has been steady for the past two years.[1] The non-urban areas of Arizona have been growing at a faster rate than the urban areas (Maricopa and Pima County are the urban areas) of the state. Although most of the economic trend indicators in the State generally follow the national indicators, population growth has been the exception to this rule.

A moderate population growth rate has been forecast for the state which will be driven by net migration and natural increases. Net Migration, a population increase due to the net change in population due to migration of people from other states, has been a significant factor in above average population growth for Arizona the past 20 years. The Sunbelt states will continue to attract people 3even when the economy is weaker than average. Between 16 and 20 percent of the nation's population change their residence in any given year, according to the annual survey of geographical mobility by the U.S. Census Bureau. The net migration rate into Arizona has been relatively stable at between 2.6 and 3.7 percent. This rate has been lower in the 1980's and higher in the late 1960's and early 1970's. While the overall migration rate is unlikely to change very much, the total number of interstate migrants may approach 10 percent over the next few years. [2]

As indicated in **Table 3A,** the population growth rate for the State, County, City and service area are all projected to decline. On the surface this may appear a negative projection for population growth, however, the forecast growth rates still indicate a growing population. Although the rate of growth projected for the City and service area are less than current rates, these rates are adjusted annually. The 1990 national census will influence the current forecasts and adjustments are likely.

The predominant factor influencing the future population growth rate has been the recent slowdown in the Arizona economy. Historically, Arizona's population has been less influenced by the state's economy than it has by other factors. In fact, it appears that population growth in the non-urban areas of the state (such as Flagstaff) may well be the next economic boom area in the state.

1 Arizona Business, Vol. 37, No. 1, January 1990

2 Arizona Business, Vol. 37, No. 2, February 1990

Table 3A
Population Forecasts
Flagstaff Pulliam Airport

Population	Existing (1989)	1995	2000	2010	1980-1989 Average Annual Growth rate	1995-2010 Growth rate
Arizona	3,654,700	4,209,900	4,800,700	5,940,300	2.05%	3.83%
Coconino County	95,500	112,400	126,600	154,400	1.87%	3.03%
Flagstaff	43,780	49,615	55,815	68,075	1.86%	2.89%
Service Area	71,980	81,615	91,645	110,980	1.79%	3.14%

Source: Arizona Department of Economic Security, Population Statistics Unit, February 1990.

ARIZONA'S ECONOMY

There are mixed reviews on the projected behavior of the Arizona Economy. This problem has been created by attempting to determine the impact and long term effect that the three declining sectors of the Arizona industry, **Finance, Real Estate** and **Construction**, will have on the State's overall economy. Arizona's long track record of rapid growth led to a disproportionate dependence on the construction and real estate development process to create jobs, pay checks and increase tax revenues. The recent failure of many financial institutions (a nationwide as well as a State problem), the five year decline in the construction industry and the depressed real estate market will definitely have an impact on economic growth within Arizona.

Although it appears that the Coconino County financial institutions have escaped the financial crisis that has struck the financial institutions in the urban centers, the impact of the savings and loans failures in Maricopa and Pima counties will be felt statewide. The federal regulators control so many of the real estate assets in the state (as a result of the Savings and Loan institution failures) that the fate of the real estate market in Arizona rests in their hands.

In spite of these negative influences, Arizona's economy is in reasonably good shape, even when the depressed construction and real estate sectors are taken into account. The state's economy is moving along at respectable rate, growing somewhat faster than the national average. **Manufacturing's** personal income and gross product have not slowed. The **Construction** industry, although still depressed, is showing signs of recovering. The population increase and in-migration will continue to keep the economy expanding although that expansion will be slower than in the past. Preliminary estimates appear to indicate that after all is said and done, job growth in 1989 will be about two percent greater than in 1988. [3] [4]

Much of the Arizona workforce has been little affected by local conditions and personal incomes have continued to rise. Coconino

[3] Arizona Business, Vol. 36, No. 9, September 1989

[4] Arizona Business, Vol. 37, No. 1, January 1990

County's total personal income has had an average annual growth of 11 percent during the period 1977-1987, and ranked seventh highest of all the counties. Earnings growth during this same period was at 9.9 percent annually while per capita income for the County was the fourth highest in the state. The projections for the County are that this growth will continue but at a more moderate level than in the most recent past.

Manufacturing that is based upon military or government spending should stabilize but the short term outlook is for little or no growth within these areas. Non-defense high tech industries will continue to expand but at much slower rates of growth with little impact on employment growth.

Tourism, a major influence on the County's economic viability is projected to continue its strong influence, however, it will not be as strong an economic stimulus to the general economy due to the lower wages paid within this sector. Tourism will benefit from the recent developments in the European political arena. Europeans should face fewer obstacles to travel now that the political barriers appear to have been removed. As the European economy improves, people with moderate incomes will be able to afford international air travel. The establishment of a Tourism Department in the City's management structure places Flagstaff in an excellent position to capitalize on the anticipated increase in tourism in this country.

Services, the largest industry within Coconino County and the State, contributes 23 percent of the income received from non-agricultural industry in Coconino County. Services has been the fastest growing industry in the state since 1982. Personal income received from the three top sectors of Coconino's industry are Government, Services and Trade (the same as in Arizona, however, Services is the number one industry in the State). The forecast is for Services to continue to grow in the short to mid term at only a slightly reduced rate of growth than experienced during the past nine years.

In summary, the positive population growth will continue to fuel the basic industrial sectors and these sectors will continue to grow, although at slower rates than in the past. Tourism should continue to be an important catalyst to those areas, such as Flagstaff and Coconino County, where tourism is a major influence in the economy. The airport, a major transportation resource, will be an important factor in ensuring that the economic fuel (tourism) for Flagstaff's economy continues to be delivered to the Flagstaff area.

AIRLINE ACTIVITY FORECASTS

Airline activity at Flagstaff Pulliam Airport has included both the major airlines and commuter air carriers. At the present time, the airport is being served by a major air carrier (America West Airlines) and a commuter airline (Skywest Airlines). Skywest is also affiliated with Delta Airlines and serves as the Delta connection. To determine the type and size of facilities necessary to accommodate airline activity at any airport, several elements of this activity must be forecast. The two most important elements are:

- Annual Enplaned Passengers
- Annual Commercial Aircraft Operations

Of the two, annual enplaned passengers is the most basic indicator of the demand for airline activity. By developing a forecast of annual enplanements, the other element (commercial operations) can be projected based on

airline activity factors characteristic to Flagstaff Pulliam Airport.

ENPLANEMENTS

Historical Enplanements

Enplaning passengers are those who board and depart in a commercial service aircraft from the airport. The historical trend of annual airline enplanements since 1965 at Flagstaff Pulliam Airport has been characterized by a growing enplanement rate (average annual growth of over 18 percent) with periods of decline or minimal growth. Enplanements were rising gradually until airline deregulation in 1978, when enplanement levels either declined or held steady. In 1984, enplanements made a sharp rise, (an increase of nearly 50 percent in one year) and have been increasing steadily ever since. The average enplanement annual growth rate during 1985-1989 has been approximately 43 percent.

Airline activity during the early 1980's had some influence on the enplanement levels. Prior to airline deregulation, the airport was served by a regional airline (Frontier Airlines) and a commuter (Cochise Airlines). Shortly after airline deregulation, Frontier Airlines terminated service to Flagstaff. During 1981-1984 Flagstaff was served by small commuter airlines (Skywest, Sunwest, and Cochise Airlines) but only Skywest Airlines is still in business at the airport today. In 1987, a major air carrier, America West Airlines, began service to Flagstaff with Boeing 737 and De Havilland Dash-8 aircraft. Since that time, the City has been served continually by America West and Skywest. It is not difficult to see how forecasting enplanement levels during this period would be a major undertaking.

Current and Future Trends

Several major developments have occurred that will influence the future pattern of enplanement levels at Flagstaff Pulliam Airport. First of all, the market factors are changing. The long term goals of the airline industry in the 1970's and their long term goals during the 1990's are vastly different. Long haul, large aircraft, large hub transportation networks (the goals of the 1970's) are being replaced by many mini-hub networks, dominated by one or two major air carriers and served by medium to short range aircraft equipment. Deregulation has resulted in new markets for airlines, markets which are rapidly being filled by small as well as large airlines.

Airlines are changing their aircraft equipment and focus of attention to provide service to smaller market areas where passengers can be funnelled into the air carrier's hub. The critical economic factor in some cases, is not on boarding load factors (obtaining the highest number of passengers for the available aircraft capacity) but on bringing passengers into an airlines hub in order to encourage the passenger to use their aircraft to their final destination. The myriad of interline agreements between small commuter airlines and major regional airlines (Skywest and Delta Airlines, for example) is a good example of this new market tactic.

Another, is the establishment of mini-hubs and a single airline dominating a selected market area. America West is employing this concept at Flagstaff, which is between America West's mini-hub in Las Vegas, Nevada and its major hub in Phoenix. The quality and type of air service available at Flagstaff may change dramatically, but as long as there is a demand in the market area (which is indicated by the growing enplanement levels), the airlines will try to secure all or a portion of that market.

Recent developments within the airline industry indicate that the large numbers of independent airlines (so prevalent shortly after deregulation) have decreased in number through acquisitions and failures. The future appears to belong to the few major airlines that can segment their operations and aircraft most efficiently and economically for the markets they are operating in. Of course airline consolidation provides an opportunity for monopolization, increased fares to the public and a return to a regulated environment, a fact not lost on many within the airline industry. How to measure the impact of these developments on enplanement levels at Flagstaff Pulliam Airport is the focus of the remainder of this section.

Forecast Enplanements

Several **trend line** forecasts were analyzed, based on various historical periods. Each of these trend lines produced a growth rate over a period of time. The lowest enplanement growth rate occurred with a trend line over the 1965-1989 period, a rate of approximately 5 percent. The highest enplanement growth rate, 14 percent, was produced by the shortest trend line period (1985-1989). The enplanement growth rate calculated from the 1980-1989 period, approximately 9 percent, produced the most logical future trend of enplanements at Flagstaff and is illustrated in **Table 3B** and on **Exhibit 3A**.

Another method used to analyze future enplanement levels was **linear regression** analysis. Several independent variables such as population, personal income, operations, etc., were used in these calculations. The correlation factor "R", is used to measure the confidence level of projections made with linear regression models. The closer the R-value is to 1 or zero, the higher the confidence level that the independent variable bears a direct relationship with the dependent variable (enplanements).

The highest population correlation projection, .95, was derived using the Coconino County Population during the period 1985-1989. Although this population projection had the highest correlation, enplanement levels during the forecast period are not anticipated to grow at the rate projected (an annual growth rate of approximately 17 percent). However, the projection is illustrated in **Table 3B** for comparison purposes.

As indicated earlier in this chapter, the relationship of visitors to national parks and monuments in the Flagstaff area would be tested against aviation factors. Using the number of visitors to the national parks and monuments as the independent variable during the period 1985-1989, produced a projection of enplanements for Flagstaff with a high correlation value (.96). The average annual growth rate of enplanements projected with this method was approximately 7 percent, a figure that nearly paralleled the trend line projection. The projection of enplanements using Park Visitors as the dependent variable is also included in **Table 3B.**

The last projection of enplanements to be discussed is based on the number of enplanements projected per 1,000 population. Again, in comparing several population segments, the Coconino County population was used to produce a projection of future enplanements at the airport. This forecast can also be found in **Table 3B** and **Exhibit 3A.**

Also included in the table and exhibit are forecasts of enplanement levels produced by the National Plan of Integrated Airport Systems, 1986-1995 (NPIAS), the Terminal Area Forecasts, 1989-2000 (TAF), and the previous Airport Master Plan.

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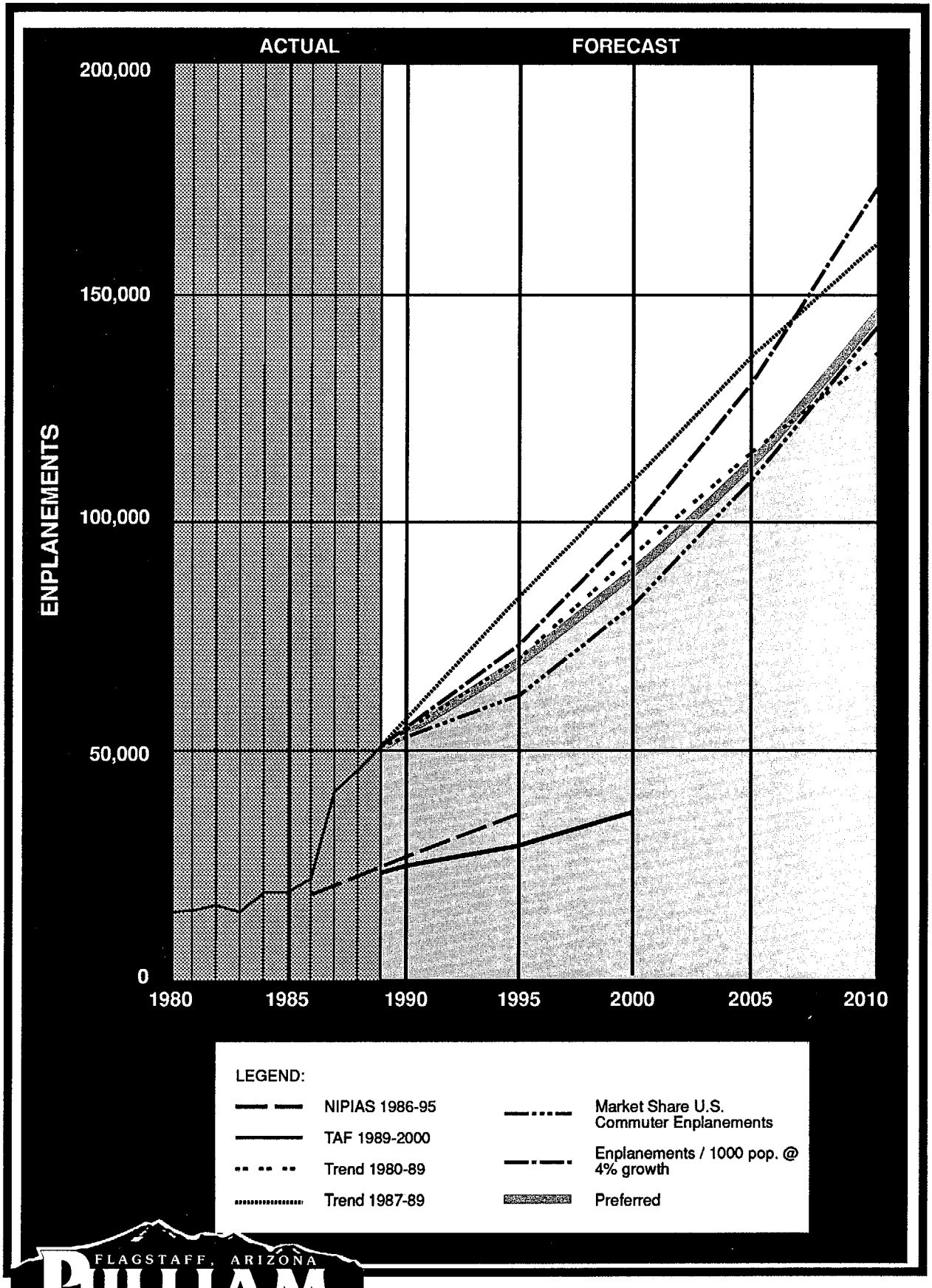

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 3A
ENPLANEMENTS

Preferred Enplanement Forecast

The growth rate of approximately 5 percent during the 20 year planning period was selected as the **preferred** enplanement level forecast for Flagstaff Pulliam Airport. Although the past ten years indicate a higher growth rate, it is most improbable that this high growth rate can be sustained over a long period. The most recent trend is for a slower rate of growth in enplanement levels as the airlines serving the airport adjust their operations to the available market. Turbulence within the airline industry is expected to continue into the next 10 years and the smaller markets such as Flagstaff must be attentive to industry changes. The slowdown in the economy has brought a measure of stability to the present enplanement market, a factor that had a significant influence on the selected forecast enplanement level.

Table 3B
Forecast Enplanment Levels 1995-2010
Flagstaff Pulliam Airport

	Forecast							
Year	NPIAS 1986-1995	FAA TAF 1989-2000	Airport Master Plan 1984	Trendline 1980-89	Trendline 1985-89	Market Share[1] U.S. Enplanement	Enplanement[2] 1,000 Population	Preferred 5% (Growth)
1995	34,000	29,000	26,500	71,900	83,300	62,400	73,200	**69,500**
2000	NA	34,000	31,500	93,700	109,400	82,600	98,900	**88,700**
2005	NA	NA	35,800	115,600	135,400	109,500	131,200	**113,300**
2010	NA	NA	NA	137,400	161,500	142,300	173,700	**144,500**

Note: NA = Not Available
[1] Based upon a static market share for 1989
[2] Forecast of future Coconino County Population obtained from Arizona Department of Economic Security, 1990, September 1989.

AIRLINE OPERATIONS AND FLEET MIX

In addition to passenger enplanements, there are other factors which affect forecasts of airline facilities. The number of airline operations can be determined from the average ratio of passenger enplanements per departures. However, this ratio is dependent upon the size of the aircraft and the average percentage of seats that are filled for each departure. This percentage of enplanements to available seats is called the **boarding load factor (BLF).**

The boarding load factor is important to the airline because it has been the measure of the ability of an airline to profit from a given market. When the BLF is high and profitable, an airline will consider increasing the number of seats available or the number of flights. This factor affects each airline to

varying degrees depending upon the diversity of aircraft equipment available and the market strategy of the airline. However, within the mini-hub philosophy, BLF does not play as important a role. In determining the market strategy for the airline serving the market, the ability to keep the passenger within the airline's system plays a more important tole.

At Flagstaff Pulliam Airport, both airlines have average boarding load factors for the market they are serving. As the enplanement levels rise, a change to larger equipment or more frequent flights may occur. This factor needs to be analyzed in order to determine the number of operations the airlines will conduct.

The type of aircraft used in passenger service at Flagstaff Pulliam Airport has undergone several changes over the years. Jet aircraft service to the airport began with the Douglas DC-9 but lasted only until airline deregulation. Since that time the airport has been served with a variety of small commuter aircraft ranging from the Beech 99, 14-passenger twin engine piston aircraft to Fairchild Metroliners, with twin engine turboprops. Current commercial air service is being provided by 19-passenger Metroliners (Skywest), 35-passenger DeHavilland Dash-8's (America West) and occasional 115-130 passenger Boeing 737 jet service (America West). In developing the forecast of airline operations in **Table 3C**, an indication of the future trend in airline equipment is necessary.

The general trend in commuter aircraft has been to provide a wide variety of seating capacities to meet the individual market demands. Regional air carriers have indicated a desire for smaller aircraft to meet the demands of the markets that require between the 30 and 100 seats. Both of these factors will have an impact in determining the type of equipment that is used at Flagstaff Pulliam Airport.

Another factor, probably as important, is the relationship of Flagstaff to America West Airlines' hub airports (Las Vegas and Phoenix). Flagstaff, approximately half way between the two America West hubs, is served by schedules that tie the two hubs together. The routes are dominated by the 115-130 passenger Boeing 737 aircraft, a situation that make it quite feasible to increase service to Flagstaff by utilizing these aircraft rather than by increasing the size of the commuter aircraft. However, utilizing an aircraft of the Boeing 737 size requires an increase in the airport's security requirements, especially in the terminal area. At present, the FAA is limiting the number of these aircraft that can operate at the airport to ten per month until terminal security procedures are improved.

Forecast Airline Fleet Mix

The boarding load factor is in the profitable range for the airlines and is anticipated to rise only slightly during the planning period. Equipment changes are more likely to occur than an increase in the frequency of flights. There is an opportunity for smaller aircraft in the 5-10 passenger range to enter the market and provide short haul service to the cities without commercial air service (Williams and Winslow) as well as air tour operations, which have a highly successful enterprise at the Grand Canyon National Park Airport. It is not unlikely that aircraft in the 50-87 passenger seat range are also introduced into the market when the Dash-8 is unable to provide an adequate number of seats to meet the demand.

Taking these factors into consideration, the percentages of aircraft anticipated to operate at the airport during the planning period have

been projected in Table 3C. Table 3C summarizes the commercial operation forecasts according to aircraft seating capabilities, passenger demand,and boarding load factors. To compute annual operations, the average seats per aircraft was first multiplied by the BLF to obtain the average enplanements per departure. Next, annual departures were obtained by dividing annual enplanements by enplanements per departure.

Finally, total airline operations are obtained by multiplying departures by two. It was determined in the Inventory phase (Table 2F, Chapter Two) that the number of operations recorded by the ATCT only includes those operations conducted during the hours that the ATCT is in operation. Approximately 10 percent of the airport's operational activity occurs after the tower is closed. In order to properly account for the actual demand at the airport, the total operations were adjusted by a factor of 10 percent.

Table 3C
Forecast Fleet Mix and Commercial Service Operations
Flagstaff Pulliam Airport

Seating Range	Average Seats	Existing 1989	1995	2000	2010
0-10	5	0%	1%	2%	2%
11-19	15	44%	41%	38%	36%
20-50	35	55%	54%	53%	51%
51-87	70	0%	0%	2%	4%
Over 87	100	1%	4%	5%	7%
Seats/Departure		27	29	31	33
Boarding Load Factor		.42	.53	.45	.45
Enplanements/Departure		11.42	12.51	13.84	14.92
Annual Enplanements		51,891	69,500	88,700	144,500
Annual Departures		4,542	5,554	6,410	9,687
Annual Commercial Service Operations[1]		9,100	11,100	12,800	19,400

Note: [1] Totals rounded to nearest 100

GENERAL AVIATION ACTIVITY

General aviation activity comprises the vast majority of aircraft operations at Flagstaff Pulliam Airport . General aviation is defined as that portion of civil aviation which encompasses all facets of aviation except commercial airline operations. 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. These indicators of general aviation demand include:

- Based Aircraft
- Aircraft Fleet Mix
- Annual Aircraft Operations

NATIONAL TRENDS

The single most important factor in the development of aviation activity forecasts at a general aviation airport is the number of based aircraft. To quickly review what has been addressed in Chapter One, general aviation activity in the United States has not followed the national economic growth trend in the United States in the past ten years. In most cases, those elements that make up general aviation activity (aircraft, pilots, operations and flying hours) have all been in decline.

Historically, the economic cycle of the general aviation industry closely paralleled that of the national economy. Theories abound as to why the decline in sales and pilots has not responded to recent economic growth. Some cite high aircraft costs, which have continued to increase even during periods of relatively modest inflation. Others cite high operating costs and interest rates, the changes in the tax law and high product liability costs. There are those who believe the overvalued dollar severely depressed the export market. It appears safe to say that the combination of these factors is surely responsible, and the negative impact of all of these factors has outweighed the positive effects of a growing economy.

On the positive side, use of general aviation aircraft by business increased. As a result, the character of the general aviation fleet continues to change. The more expensive and sophisticated turbine-powered component of the fixed-wing fleet is expected to grow much faster than piston aircraft between 1988 and 1999. A total of 10,500 turbine-powered aircraft were in the fixed-wing general aviation fleet in 1987, representing roughly 5.4 percent of the total fixed-wing fleet. By 1999 it is estimated that roughly 7.8 percent of the total fixed-wing fleet will be comprised of turbine-powered aircraft.

Using a forecast model which accounts for many of the preceding factors, the FAA has developed national projections for general aviation. The active general aviation fleet is projected to decline by 0.2 percent through 1992, and then grow by 0.2 percent for the remainder of the forecast period. Active single engine piston aircraft is projected to decline at an annual rate of 0.4 percent, falling from 171,800 in 1987 to 162,500 in 1999. The number of multi-engine piston aircraft is expected to decline through 1993, and then to increase at about 100 aircraft per year until the total reaches the present level of 23,900. Turbine powered aircraft are projected to increase from 10,500 in 1987 to 15,700 in 1999, growing at the rate of approximately 1.2 percent a year. The forecast for the turbine rotorcraft fleet shows a yearly rate of increase of 1.9 percent.

Recent trends in the sale of general aviation aircraft appear to contradict the FAA long range forecast. In 1989, the sale of general aviation airplanes were up 26.7 percent over

the previous year and reversed a 10 year downward trend. Most of the increase was in the sale of single engine piston aircraft, again reversing a downward trend. Shipments of single engine aircraft rose an impressive 44.4 percent over the previous year. The increase in the sale of single engine piston aircraft appears to have been due to an increase in student training and aggressive marketing by many in the a general aviation industry. It appears that possibly, the downward trend in the sale of general aviation aircraft may be over, however, it is much too early to make that statement.

It also appears that stronger competition from overseas manufacturers has affected the previous growth in sales of jet and turboprop aircraft, the high flyers in the previous downward trend cycle. Sales of these aircraft in 1989 were relatively flat, showing little or no growth from the previous year.[3] This again is a reverse in the trend forecast which indicates a continuing demand for this category of general aviation aircraft. However, the backlog (two years) in delivery of previously ordered equipment and the foreign sales will probably offset this recent fluctuation.

The interesting factor in comparing the national trends in general aviation with the experience at Pulliam Airport is that the complete opposite has occurred. Flagstaff Pulliam Airport has not reflected this decrease in general aviation activity at the airport and the general aviation sector has been growing at a moderate pace since 1984. In 1984 the number of aircraft based at the airport was 84 and the 1989 Master Plan projected a 109 based aircraft forecast for 1990. The number of actual based aircraft in 1989 is 107. The forecast certainly appears to be on target.

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the other general aviation indicators (operations and fleet mix) can be calculated based upon those factors characteristic to Flagstaff Pulliam Airport and the area it serves. The rationale behind the general aviation activity forecasts is presented in the following paragraphs.

BASED AIRCRAFT FORECASTS

Several **trend line** forecasts were analyzed, based on various historical periods. Each of these trend lines produced a growth rate over a period of time. The lowest based aircraft growth rate resulted from a trend line over the shortest period analyzed, 1985-1989 period, a rate of approximately 2.6 percent. The highest based aircraft growth rate, 10.5 percent, was produced by the longest trend line period (1962-1989). The ten year period, 1980-1989, produced an annual growth rate of 4.7 percent, the most logical future trend of based aircraft growth at Flagstaff and illustrated in **Table 3D** and on **Exhibit 3B.**

Another method used to project future based aircraft levels was through **linear regression** analysis. Several independent variables such as population, personal income, operations, etc., were used in these calculations. In examining the population segments to determine the population base with the highest correlation ("R-value"), two population bases, Arizona's population and Coconino County population, had the highest R-values, .94 and .93 respectively. These linear regressions projected future rates of growth that were very similar, although only the Coconino County population linear regression is illustrated in **Table 3D** and **Exhibit 3B.**

[3] AOPA, March 1990, The State of the Industry

The linear regression using personal income as the independent variable also had a high correlation as well but produced a lower rate of growth in based aircraft and was not included in the analysis.

Using the number of visitors to the national parks and monuments as the independent variable also produced a projection of based aircraft for Flagstaff, however, the correlation value (.80) was not very high and this regression was also discarded.

A **market share** analysis, a popular method of projecting based aircraft, was also performed. This analysis was based on a comparison of the historical based aircraft during the period 1979-1989 and the Coconino County and Arizona registered aircraft markets. Shares of each market were averaged during three distinct periods (1979-1989, 1985-1989 and 1989) and projections made for the planning period staging points (1995, 2000, 2005 and 2010) using these average market shares. The projections of future registered aircraft in Arizona was derived from the Arizona Airports System Plan, 1988, forecast while the projected Coconino County registered aircraft were produced from a 1962-1989 trend line projection. The results of using a 1985-1989 average market share to project future based aircraft from both the Arizona and Coconino County markets are included in **Table 3D** and **Exhibit 3B.**

Also included in **Table 3D** and **Exhibit 3B** are forecasts of based aircraft levels produced by the National Plan of Integrated Airport Systems, 1986-1995 (NPIAS), the Arizona Airports System Plan, 1988, (AASP) and the previous Airport Master Plan.

Preferred Based Aircraft Forecast

The 1962-1989 trend line projection of future based aircraft was selected as the **preferred** forecast for Flagstaff Pulliam Airport, and illustrated in **Table 3D** and **Exhibit 3B.** This forecast represents a based aircraft growth rate of approximately 3.5 percent during the 20 year planning period. It is anticipated that the projected population growth rate in conjunction with moderate economic growth in the community, the level of forecast based aircraft will be attained throughout the planning period.

Table 3D
Based Aircraft Forecasts
Flagstaff Pulliam Airport

	Forecast							
Year	NPIAS 1986-1995	Airport Master Plan 1984	AASP 1988	Preferred Trendline 1962-89	Trendline 1980-89	L.R. Coconino Cty Pop. (R=.93)	Market Share Arizona Reg. Acft	Market Share Coco. Cty Reg. Acft
1995	129	125	112	120	129	133	142	110
2000	NA	142	127	133	147	155	168	131
2005	NA	158	143	146	165	176	193	152
2010	NA	NA	162	160	183	199	219	167

Note: L.R. = Linear Regression
Reg. Acft. = Registered Aircraft
NA = Not Available

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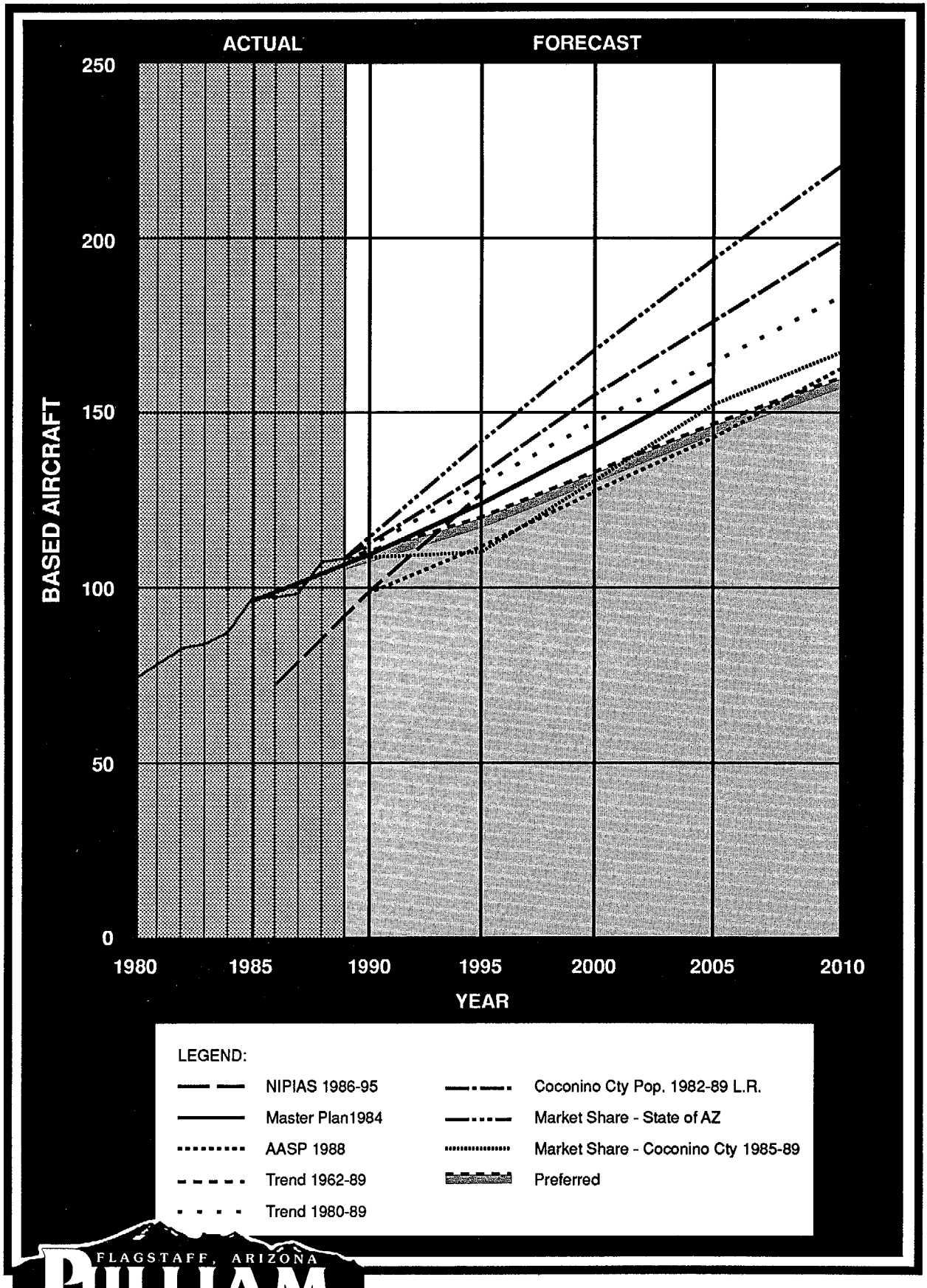

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 3B
BASED AIRCRAFT

FLEET MIX

The aircraft fleet mix expected to use the airport must be known in order to properly size future airport facilities. The existing based aircraft fleet mix at Flagstaff Pulliam Airport is made up primarily of single engine aircraft (89 percent). Multi-engine aircraft, comprised of twin engine piston, turboprop and jet aircraft, combine to about 8 percent of the fleet. One helicopter and two glider aircraft comprise the remainder of the based aircraft fleet.

The overall trend in general aviation is towards a slightly higher percentage of larger, more sophisticated aircraft. A similar trend can be expected to occur at Flagstaff Pulliam Airport.

The **FAA Aviation Forecasts, FY 1989-2000,** forecasts a declining ratio of single engine aircraft to total aircraft throughout the planning period. The rate of decline varies annually, but the trend is, nonetheless, downward (from 21.8 percent of the fleet in 1989 to 17.2 percent of the fleet in 2000). The predicted decline for multi-engine piston aircraft is much smaller, declining from 13.6 percent in 1989 to 11.0 percent in 2000. The aircraft categories that are increasing in numbers are the turbine powered aircraft, helicopter, and the "Other" aircraft category which includes balloons, ultralights, etc.

As the Flagstaff community continues to grow, it will continue to attract more industry as well as the more sophisticated corporate aircraft (such as turboprop and turbojet aircraft). Helicopters are anticipated to grow as well, providing a short range, rapid transit capability in a highly complex airspace environment. The existing runway length and width will make the airport attractive to jet aircraft owners. **Table 3E** shows the aircraft mix forecasts for Flagstaff Pulliam Airport.

Table 3E
Based Aircraft Fleet Mix Forecast
Flagstaff Pulliam Airport

	Aircraft Type						
Forecast	Single Piston	Twin Piston	Twin Turbo-P.	Jet	Helo	Other[1]	Total
Existing (1989)	95	4	4	1	1	2	107
1995	101	10	4	2	2	2	121
2000	108	9	5	3	2	2	133
2005	110	15	9	4	6	2	146
2010	117	16	11	6	10	2	161

Note: [1] Includes balloons, gliders, sailplanes, ultralights, etc.

GENERAL AVIATION OPERATIONS

Historical Trends

An airport 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 take off or landing performed by an aircraft that will operate within the local traffic pattern in sight of the airport or will execute simulated approaches or touch-and-go (an aircraft that performs a landing and takeoff without coming to a complete halt on the runway) operations. **Itinerant** operations are all arrivals and departures other than local.

Generally, local operations are comprised of training operations and itinerant operations are those aircraft with a specific destination away from the airport. Typically, itinerant operations increase with business and industry use since business aircraft are used primarily to move people from one location to another.

At airports where there is an operational Airport Traffic Control Tower (ATCT) the ATCT records the operational activity at the airport. The ATCT has been located on the airport since 1975, however, ATCT service was interrupted when the tower was closed down temporarily during the period 1981-1984 . The tower is only operational for 12 or 15 hours per day (depending on the season of the year) which means that aircraft operating at the airport when it is closed are not included in the operations statistics. The City estimates that approximately 10 percent of the airport's operational activity occurs after the tower is closed. In order to insure that facilities are designed to meet the actual operational demand, a 10 percent adjustment was made to all forecast operational levels in **Table 3F.**

Commercial service operations are also included in the operational statistics recorded by the ATCT but as the commercial service operational levels had been forecast earlier in this chapter, they will not be considered in this analysis.

General Aviation Operations Forecast

Several **trend line** forecasts were analyzed, based on various historical periods. The lack of accurate operational data during the period 1981-1984, when the ATCT was not in service, produced fluctuations in the number and type of operations that may or may not have been due to actual circumstances. These fluctuations resulted in a poor trend line analysis of any historical period containing the 1981-1984 data. However, the trend line established during the 1985-1989 period, produced an average annual growth rate in operations of nearly 13 percent. This trend line forecast an average annual increase in operations of 8 percent during the planning period. The trend line forecast is illustrated in **Table 3F** and **Exhibit 3C.**

Another method used to project general aviation operational levels was through **linear regression** analysis. The same independent variables such as population, personal income, etc., were used in these calculations as well. In examining the population segments to determine the population base with the highest correlation ("R-value"), three population bases (Arizona, Coconino County and Flagstaff) all produced high R-values (.98, .97 and .96 respectively). Forecast growth rates using these three linear regressions ranged from an average annual growth rate in general aviation operations of 9.8 percent (Coconino County population) to 7.3 percent (Flagstaff Population).

A linear regression using the number of visitors to the national parks and monuments in the area as the independent variable also produced a projection of operations. Although this projection had the highest

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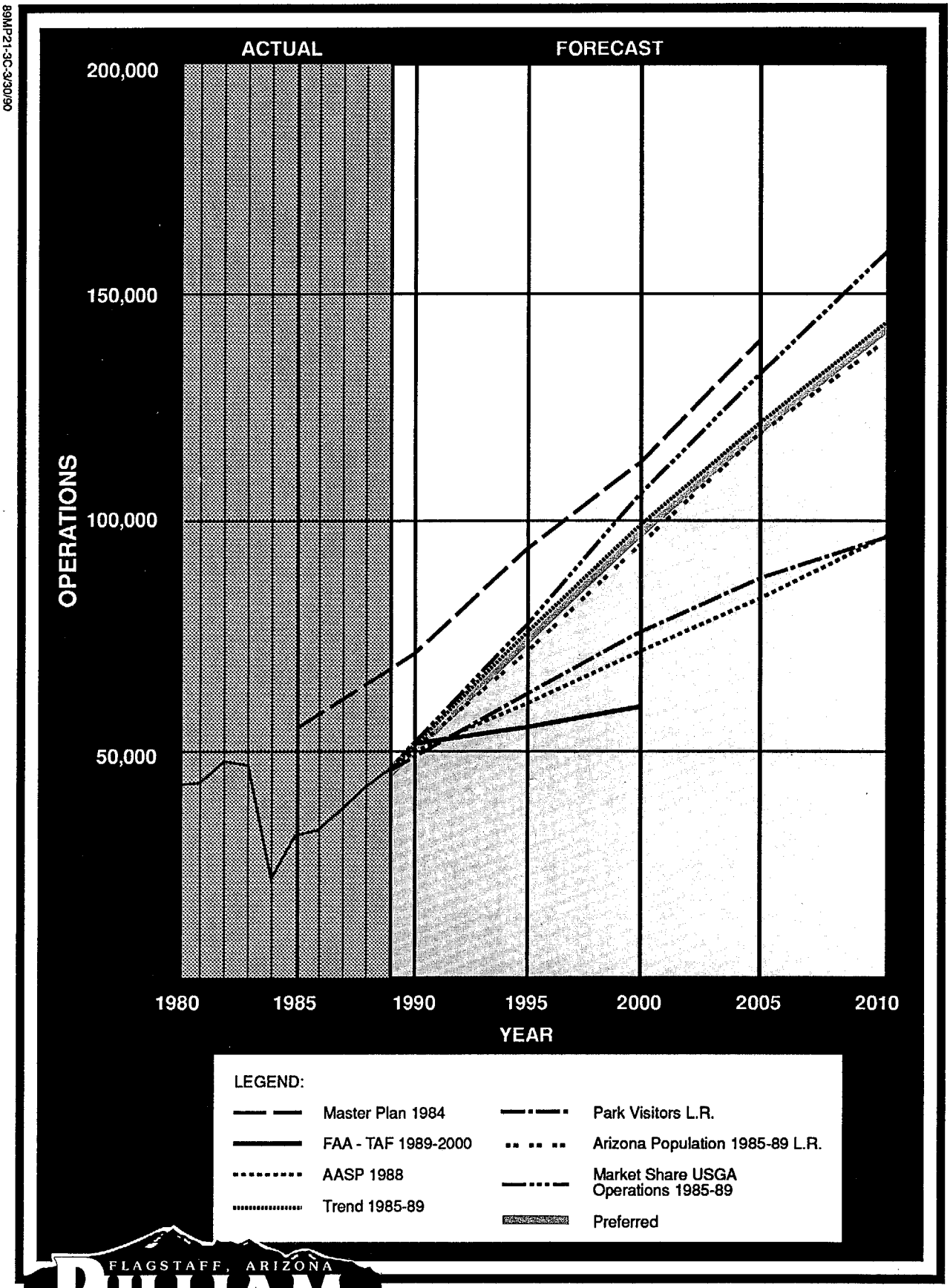

FLAGSTAFF, ARIZONA
PULLIAM
AIRPORT

Exhibit 3C
OPERATIONS

correlation value (.99), the growth rate forecast for the future was somewhat low (3.4 percent). A representative projection from each of these regression types (population and visitors to national parks and monuments), are illustrated in **Table 3F** and **Exhibit 3C.**

A **market share** analysis with the national operational levels was also performed. Shares of each market (general aviation local, itinerant and military operations) were averaged during three distinct periods (1980-1989, 1985-1989 and 1989) and projections made for the planning period staging points (1995, 2000, 2005 and 2010) using these average market shares. A projected increase in market share was anticipated during the planning period and entered in the calculations for future general aviation operations.

The general aviation market forecast was obtained from the **FAA Aviation Forecasts, 1989-2000.** Although the FAA Aviation forecasts did not cover the period from 2001 to 2010, operations projections were made for this period based upon the federal average annual growth rates. By extrapolating projections for the planning period planning points (2005 and 2010), a complete forecast was obtained. The market share forecast is also illustrated in **Table 3F** and **Exhibit 3C.** Also included in **Table 3F** and **Exhibit 3B** are forecasts of operational levels produced by the National Plan of Integrated Airport Systems, 1986-1995 (NPIAS), the FAA Terminal Area Forecast, 1989-2000 and the Arizona Airports System Plan, 1988, (AASP) as well as the previous Airport Master Plan.

Preferred General Aviation Operations Forecasts

The **preferred** general aviation operations forecast for the Flagstaff Pulliam Airport, which is illustrated in **Table 3F** and **Exhibit 3C,** represents a modest general aviation operations growth rate of approximately 3.7 percent during the 20 year planning period. This growth rate is less than the airport is currently experiencing but it suggests that the current growth rate has been above average and the economic slowdown predicted during the next few years will influence the growth in operational levels. It is anticipated that a positive population growth rate in conjunction with a moderate growth in the economy will be able to sustain this level of operational activity.

Table 3F
Forecast of General Aviation Operations
Flagstaff Pulliam Airport

				Linear Regression 1985-89[1]					
Forecast	Airport Master Plan 1984	FAA-TAF 1989-2000	AASP 1988	Trendline[1] 1985-89 R=.99	Park Visitors R=.99	Flagstaff Population R=.95	Arizona Population R=.98	1985-89 Market[1] Share U.S.G.A. Operations	Preferred[1] Forecast
1995	93,800	56,000	60,503	76,700	62,200	71,500	72,300	76,800	**75,000**
2000	113,800	59,000	70,577	98,900	74,700	93,300	95,900	107,000	**98,000**
2005	139,000	NA	82,329	120,800	86,000	114,000	118,000	131,400	**120,000**
2010	NA	NA	96,037	142,800	96,800	136,500	141,700	159,000	**140,000**

Notes: [1] All of these forecasts contain a 10 percent upward adjustment in projected operations to account for operations conducted during the hours the ATCT is not operating.

NA = Not Available

Table 3G
Forecast General Aviation Operations
Flagstaff Pulliam Airport

	Annual General Aviation Operations[1]				
	Itinerant		Local		
	General Aviation	Military	General Aviation	Military	Total Operations
Existing (1989)	29,863	437	19,681	274	50,225
Forecast					
1995	43,600	500	30,600	300	75,000
2000	57,100	500	40,000	400	98,000
2005	69,700	400	49,300	400	120,000
2010	81,400	600	57,600	400	140,000

Notes: [1] Includes those operations conducted when the tower is not operating.

ANNUAL INSTRUMENT OPERATIONS FORECAST

Forecasts of annual instrument approaches (AIA) provide guidance in determining an airport's requirements for navigational aid facilities. An instrument approach is defined by FAA as "...an approach to an airport with *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 when the ceiling is at or below the minimum initial approach altitude.*"

Nearly all the commercial aircraft conduct instrument approaches to the airport (100 percent of air carrier and 80 percent of the air taxi operations). Approximately 15 percent of the military and 3 percent of the general aviation aircraft conduct instrument approaches to the airport. Although 95 percent of these operations are conducted during visual flight rule conditions, the percentages are representative of the number of actual instrument approaches that might be conducted during IFR conditions.

The airport experiences actual IFR conditions approximately 4.5 percent of the year. During these conditions, local general aviation operations generally cease. Therefore, to calculate the number of AIA's that occur during these conditions, only itinerant operations were considered. Table 3H summarizes the forecast of AIA's for Flagstaff Pulliam Airport.

Table 3H
Forecast of Annual Instrument Operations
Flagstaff Pulliam Airport

	Existing[1] (1989)	1995	2000	2005	2010
Total Operations	59,339	86,100	110,800	136,100	159,400
Itinerant Operations	38,648	55,100	70,100	85,500	100,300
Annual Instrument Approaches					
Commercial Service		2,200	2,800	3,400	3,900
Military		50	80	100	100
General Aviation		250	320	400	500
Total Instrument Approaches	**2,271**	**2,500**	**3,200**	**3,900**	**4,500**

Note: [1] Includes additional operations conducted when the tower is closed.

AIR CARGO ACTIVITY

Airline deregulation affected the air cargo industry as well as the airline passenger industry. Most notably has been the growth of the overnight express package delivery industry. This has resulted in a continuing decline in the amount of cargo carried by the airlines. The U.S. Postal Service has entered into the overnight package competition by contracting an overnight hub operation. This further decreased the volume of priority mail previously shipped exclusively through airline channels. In 1988, the airlines enplaned 211 tons of air mail and 87 tons of freight compared to 317 tons of mail and 430 tons of freight in 1980.

Several overnight package carriers operate aircraft into Flagstaff Pulliam Airport, some of them scheduled and most unscheduled. Scheduled airline cargo is recorded by the FAA, however, unscheduled airline cargo is not. The majority of the cargo handled at Flagstaff Pulliam Airport was estimated from the company's reported enplaned/deplaned cargo operations during interviews. United Parcel Service, Federal Express and Valley National Bank are among the company's operating at the airport.

Because of the lack of complete enplaned cargo volumes for the overnight package carriers, it is difficult to accurately project future cargo volumes. With the decline in airline cargo volumes, additional airline space for cargo should grow only gradually and be easily accommodated at the airport through periodic expansion of terminal facilities. Federal Express has indicated a desire to increase the size of its operation at the airport but it does not require facilities located on the airfield surfaces and can meet most of its needs through larger storage and cargo makeup facilities that can be located anywhere on or near airport property.

The overnight cargo carriers presently load/unload directly into vans/trucks directly from the aircraft on the ramp. In the future,

some of these carriers may require additional ramp space for parking aircraft overnight. This possibility should be considered in planning future aircraft apron.

Table 3I depicts the historical and future enplaned cargo requirements estimated from interviews with the air cargo carriers presently serving or anticipated to serve the airport.

Table 3I
Historical and Forecast Enplaned Air Cargo
Flagstaff Pulliam Airport

	Tons			
Year	Freight	Express	Mail	Total
1975	31.42	-	17.83	55.15
1976	35.24	.01	37.35	72.59
1977	43.31	-	33.89	77.21
1986	49.3	-	-	49.3
1987[1]	94.62	-	.18	94.8
1988[2]	120.39	-	8.14	128.53
Forecast				
1995				243.2
2000				425.6
2005				600.0
2010				700.0

Source: FAA Airport Activity Statistics, 1988

Notes: [1] America West enplaned freight and mail equal to 5.6 tons.
[2] America West enplaned 26.52 tons of freight and mail. Federal Express enplaned 102.28 tons of freight.

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used to develop facility requirements for this study are as follows:

- **Peak Month** - The calendar month when peak aircraft operations occur.
- **Design Day** - The average day in the peak month. Normally this indicator is easily derived by dividing the peak month operations by the number of days in the month.
- **Busy Day** - The busy day of a typical week in the peak month. This descriptor is used primarily to determine ramp space requirements.

- **Design Hour** - The peak hour within the design day. This descriptor is used particularly in airfield demand/capacity analysis, as well as in determining terminal building and access road requirements.

- **Busy Hour** - The peak hour within the busy day. This descriptor is used particularly in passenger facility requirement determinations.

It is important to note that only the peak month is an absolute peak within a given year. All the others will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without over-building or being too restrictive.

An analysis of enplanement and operations data for Flagstaff Pulliam Airport was made to determine the airport's peaking characteristics. By reviewing the peaking characteristics of similar type general aviation and commercial service airports in Arizona and relating them to the characteristics of Pulliam Airport, a reasonable forecast can be made.

COMMERICAL SERVICE PEAKING ACTIVITY

At Flagstaff Pulliam Airport, the peak month for enplanements over the last seven years has been the month of August with the average range in percentage of total annual enplanements being between 10-12 percent. This range in percentage can be expected to remain relatively constant over the planning period, rising as a percentage of total enplanements during the latter half of the planning period.

Ideally hourly enplanements should be used to examine changes in peak hour passengers as a percentage of the design day activity. Currently peak hour conditions occur whenever Skywest and America West have departures scheduled at approximately the same time. This condition represents approximately 30 percent of the design day enplanements. It can also be anticipated that the percentage of passengers during the peak hour will remain fairly constant or decrease slightly as the annual enplanements increase. **Table 3J** outlines the peak period enplanement levels for the forecast period and the peak operations expected at Flagstaff Pulliam Airport.

Table 3J
Commercial Service Peaking Factors
Flagstaff Pulliam Airport

Peaking Factors	Existing (1989)	Forecast 1995	2000	2005	2010
Commercial Service Operations					
Annual	9,084	11,100	12,800	16,100	19,400
Peak Month	908	1,000	1,300	1,700	2,300
Design Day	30	32	40	54	75
Design Hour	4	5	6	8	11
Commercial Service Enplanments					
Annual	51,891	69,500	88,700	113,300	144,500
Peak Month	5,654	8,300	11,500	14,700	19,500
Design Day	182	269	371	475	629
Design Hour	27	40	56	71	94

GENERAL AVIATION PEAKING CHARACTERISTICS

Design Hour Operations

The number of Design Hour operations at this airport are approximately 15 percent of the design day. At most general aviation airports, the design hour can represent as much as 25 percent of the design day operations. However, at the levels of operational activity, both existing and forecast, the design hour is expected to rise only modestly from its present level (15.7 percent) to approximately 20 percent by the end of the planning period.

The ATCT records were used to derive the peaking characteristics for the airport. From tower logs, November was the peak month of the year in 1989, however, the peak month of the year varied considerably from year to year. Peak month operations ranged from 9.3 percent of total operations in 1989 to 10.9 percent in 1987, representing about 9.6 percent, on average, of the annual operations. The peak month operations as a percentage of annual operations is expected to remain at about 10 percent throughout the planning period.

The design day activity was anticipated to be approximately 18 percent greater than the average daily operations at the end of the planning period. The factors that affect future general aviation facilities plans are shown in **Table 3K**.

Design Hour Passengers

The definition of general aviation passengers, as used in this section, refers to the average number of pilots and passengers expected to utilize the airport's terminal facilities during a given time.

This would essentially involve all operations except touch-and-go's as this type of

operation only makes use of the runway to land and immediately takeoff. Pilots conducting touch-and-go operations would not utilize the terminal facilities except at the start and finish of their training activity.

In order to ensure that space requirements were not overestimated in the planning effort, these operations were not considered in determining design hour passengers. It is estimated that touch-and-go activity presently contributes approximately 35 percent of the peak hour operations. Touch-and-go activity is expected to rise slightly, to 45 percent of total operations in the future, as more local training occurs with the airport growth. In calculating the design hour passengers, an average of 1.8 passengers per operation (excluding touch-and-go operations) was assumed for existing conditions since much of the current traffic consists of smaller general aviation aircraft. This average, incorporated into the design passengers illustrated in **Table 3K**, is anticipated to increase gradually throughout the planning period as larger general aviation aircraft utilize the airport.

Table 3K
General Aviation Peaking Factors
Flagstaff Pulliam Airport

	Existing	Forecast			
Peaking Factors	1989	1995	2000	2005	2010
General Aviation Operations					
Annual	50,255	75,000	98,000	120,000	140,000
Peak Month	4,777	7,500	9,800	12,000	14,000
Design Day	159	241	316	387	450
Design Hour	26	59	77	96	111
Design Hour Passengers	36	52	70	80	89

FORECASTS SUMMARY

In this chapter, the forecasts of aviation demand that are essential to effectively analyze the future facility needs of the airport have been developed. The next step in this master plan update is to assess the capacity of the existing facilities and determine what facilities will be necessary to meet both the existing and future demands. **Table 3L** provides a summary of the key aviation forecasts that were analyzed and formulated in this chapter.

Table 3L
Summary of Forecasts 1995-2010
Flagstaff Pulliam Airport

Descriptor	Existing (1989)	Forecast 1995	2000	2005	2010
Based Aircraft	107	121	133	146	161
Single-Engine Piston	95	101	108	110	116
Multi-Engine Piston	4	10	13	15	16
Turboprop	4	4	5	9	11
Turbojet	1	2	3	4	6
Helicopters	1	2	2	6	10
Other	2	2	2	2	2
Aircraft Operations	59,339	86,100	110,800	136,100	159,400
Itinerant					
Commercial	9,084	11,100	12,800	16,100	19,400
General Aviation	29,863	43,600	57,100	69,700	81,400
Military	437	500	500	600	600
Local					
General Aviation	19,681	30,600	40,000	49,300	57,600
Military	274	300	400	400	400
Annual Instrument Operation	2,271	2,500	3,200	3,900	4,500
Peaking Factors					
General Aviation Operations					
Peak Month	4,777	7,500	9,800	12,000	14,000
Design Day	159	241	316	387	450
Design Hour	25	59	77	96	111
Busy Day	265	400	515	620	700
Busy Hour	45	70	93	121	136
Design Hour Passengers	29	52	70	80	89
Commercial Service					
Operations					
Annual	9,084	11,100	12,800	16,100	19,400
Peak Month	908	1,000	1,300	1,700	2,300
Design Day	30	32	40	54	75
Design Hour	4	5	6	8	11
Enplanements					
Annual	51,891	69,500	88,700	113,300	144,500
Peak Month	5,654	8,300	11,300	14,700	19,500
Design Day	182	269	371	475	629
Design Hour	27	40	56	71	94