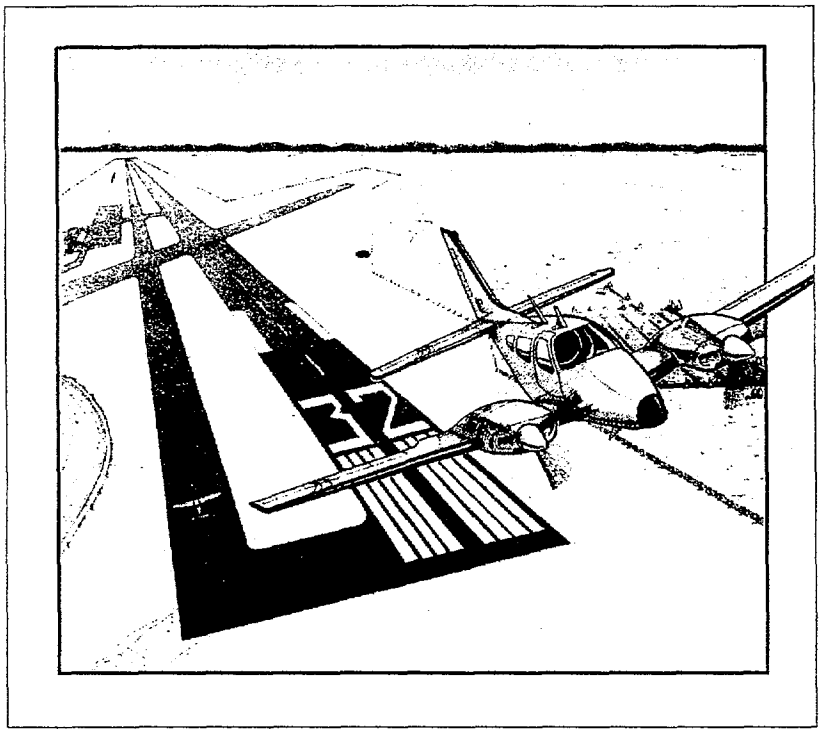
# Chapter Three
# AVIATION DEMAND FORECASTS




## Chapter Three
# AVIATION DEMAND FORECASTS

The proper planning of any type facility must begin with a definition of the needs that the facility can reasonably be expected to serve over the specified planning period. At St. Johns Industrial Air Park, this involves the development of a set of forecasts that best define the potential future aviation demands. The forecasts of general aviation activity at the airport will form the basis for determining the types, quantities and sizes of aviation facilities required to meet the aviation needs of St. Johns and the surrounding area through the year 2015.

The forecasts developed in this chapter will be applied to several phases of the master plan study. Initially, they are used to analyze the capacity of the airfield, and the terminal area. They are also used to evaluate the role of the airport in the regional airport system, which may affect the need for improved navigational systems. Later in the study, they will be used in the alternative development actions and financial program. Finally, the aviation forecasts are used to develop various measurements of aircraft noise.

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 normalized growth curve can be established to predict the overall long-term growth potential.

While a single line is often used to express the anticipated growth, it is important to remember that actual growth will almost certainly fluctuate above and below this line

during the forecast period. For this reason, graphical depictions of aviation forecasts in this chapter will include a forecast envelope, serving 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 enough to respond to unforeseen events.

*Factors that may influence airport activity*

Aviation activity at any airport is affected by many external influences, as well as by the facilities and services available at the airport. Few industries have seen as dynamic a change as the aviation industry since the first powered flight.

- Major technological advancements as well as regulatory actions and economic conditions have resulted in erratic growth in various segments of the aviation industry. These unstable growth patterns have resulted in periods of expansion and contraction in the aviation industry throughout the country.

- Judicial and regulatory actions (e.g. product liability, G.I Bill flight training, aviation fuel taxes, etc.) combined with economic expansion and contractions have created significant impacts upon general aviation activity patterns at most airports.

The following sections attempt to define the historical trends and discuss how other influences may affect future trends in establishing forecasts of aviation activity for St. Johns Industrial Air Park.

## FORECAST PROCEDURES

The systematic development of aviation forecasts involves both analytical and judgmental processes. A series of mathematical relationships between aviation activity and other demographic characteristics are tested to establish the rationale and logic to support the projections. However, the judgment of the forecast analyst, based upon professional experience and knowledge of the situation, is also 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 aircraft operations, based and registered aircraft, and fuel sales records were obtained for analyses.

Similarly, socioeconomic factors such as population, and employment were analyzed in order to determine their influence on aviation activity at St. Johns Industrial Air Park. The comparison of the relationships between these various indicators provides the initial step in the development of realistic forecasts of aviation demand.

As part of the analytical process, trend lines based upon historic relationships are extended into the future assuming that what has happened in the past will continue to happen in the future. Forecasts developed through the use of this technique are called projections. After preparing several such projections, the analyst is able to identify a range of activity within which the actual trend will probably lie.

## FORECAST METHODOLOGY

The most reliable approach to estimating future aviation demand is to use several different analytical models, and then compare the results. A few of the more common statistical techniques used in forecasting include; linear and multiple regression analysis, time-series extrapolation, and market-share analysis. Time-series extrapolation is probably the simplest, most widely used method of forecasting. This technique involves the fit of historical growth trends to future years. In utilizing this technique, an assumption is made that the same factors will continue to affect future demand in approximately the same way as they have in the past. While this can be a rather broad assumption, it does provide a reliable benchmark upon which to compare the results of other analyses.

*Correlation 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 variables. These sets can then be evaluated further using several types of regression analyses.

*Regression Analysis*

In regression analysis, projections of a specific aviation demand element (dependent variable) are prepared based upon its relationship to one or more other factors (independent variable) which may influence the aviation demand element in question. Aircraft operations and based aircraft are examples of dependent variables, while population, per-capita income, or other socioeconomic factors are examples of independent variables. Linear, curvilinear, and multiple regression analyses all can be tested to attempt to define the best relationship from which future activity can be projected.

*Market Share Analysis*

The market-share technique involves a review of the aviation activity element at the airport in terms of a larger aviation market. The local share-of-the-market factor is then multiplied by forecasts of the larger total market for a projection of the local activity. This top-down approach usually proves quite accurate and serves as a check on the reasonableness of other analytical techniques.

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

- General Aviation Based Aircraft
- General Aviation Aircraft Operations
- Military Aircraft Operations
- Operational Peaking Characteristics
- Based Aircraft and Operational Mix

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 climate.

- State-of-the-art advances in technology.
- Impact of new facilities or improved services.
- Policies of the airport owner and operator.

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 even a simple facilities development program, and at least twenty years is necessary to assure the proper return on the investment and depreciation of the asset.

The second consideration is the level of optimism reflected in the forecasts. The planning effort must design in sufficient flexibility so that the Master Plan will be relatively insensitive to minor fluctuations in the forecasts. The master plan must also preserve the capability to respond to significant changes in aviation demand or to take advantage of market opportunities.

## GENERAL AVIATION DEMAND

General Aviation is defined as that portion of aviation which encompasses all facets of aviation except commercial airline and military operations. To determine the types and sizes of facilities that should be planned to handle general aviation activity, certain elements of this activity must be forecast. These indicators of general aviation demand include the following:

- Based Aircraft
- Aircraft Fleet Mix
- Annual Aircraft Operations
- Peaking Characteristics

The number of based aircraft at an airport is the primary indicator of general aviation demand. By first developing a forecast of the number of based aircraft, the growth in the other demand indicators can then be projected. The other demand factors are directly related to the type and number of based aircraft at an airport. Other factors such as the economy of recreation may also have a bearing on aviation demands.

### BASED AIRCRAFT

Because activity at an airport will depend largely upon the number of based aircraft, the factors that influence basing potential are examined closely. This data has been examined on state and local levels in the past. Forecasts based upon current local conditions will be developed and compared to the projections in previous studies. The local forecasts will examine various economic and demographic factors along with historical trends.

The historical data on based aircraft at St. Johns Industrial Air Park is somewhat incomplete. Because of this limited data, developing a completely accurate based aircraft trend is not possible. The lack of historical data tends to reduce the accuracy and reliability of any regression analysis between aviation demand indicators and other related factors.

*Forecast Methodology*

The trend analysis technique although not totally disregarded, does have limited use. The trend curves developed from the available data will be shown primarily for comparison with the other projections. *Table 3.1* shows the historical data on registered aircraft for the State of Arizona, Apache County and based aircraft at St. Johns Industrial Air Park dating back to 1970.

The number of registered aircraft in Apache County has fluctuated widely since 1970. Registered aircraft have risen from a low of 18 in 1971 to a high of 67 in 1978. Since 1978, registered aircraft have fallen to 25 in 1993. The volatility in the number

of registered aircraft compared to consistent increases in population indicates significant external factors bearing on this relationship and makes a statistical correlation invalid. Several external factors have had significant impacts on the general aviation industry during the period covered by the historical data. Economic recessions, fuel prices, product and general liability insurance, and changes in tax laws have all had dramatic impacts on aircraft ownership. These factors are believed to be responsible for the irregular data on county aircraft registrations and based aircraft at St. Johns Industrial Air Park.

The limited and irregular data together with a small sample size combine to make a statistical analysis (Trend and Correlation) unreliable and invalid. Therefore, a more subjective and judgmental approach to forecasting aviation activity at St. Johns has been employed.

The total Arizona registered aircraft would not normally exert a significant influence on the number of based aircraft at a single airport, particularly one located in a rural county. The based aircraft totals for the state are however heavily influenced by the number of aircraft in Maricopa and Pima counties. Registered aircraft in these two counties comprise approximately 70 percent of total registered aircraft in the state. Meanwhile, the number of aircraft based at St. Johns represents a large portion of aircraft registered in Apache County. Therefore, St. Johns' market-share of county aircraft should have a direct relationship to one another. St. Johns' share of the county aircraft may be constant, increasing or decreasing depending on other market forces. The effect of these other market forces are intuitive and cannot be determined through empirical means.

Historical trends were developed for registered aircraft in Apache County. The aircraft registered in Apache County tripled in the 20-year period from 1970 to 1990. More recently, however, the 1993 county aircraft population is about the same as it was in 1975. During the late 1980's the county aircraft population had climbed as high as 66. These are the cyclical peaks and valleys that will occur over short periods. The long term trend however, is for continued growth at approximately 1.6 percent per year. Based on this data Apache County would be expected to have a registered aircraft population of 88 aircraft by 2015.

**Table 3.1**
**Aircraft Population**
**St. Johns Industrial Air Park**

| Year | State of Arizona [1] | Apache County [1] | St. Johns Airport [2] |
|---|---|---|---|
| 1970 | 2,399 | 19 | NA |
| 1971 | 2,405 | 18 | NA |
| 1972 | 3,356 | 36 | 20 |
| 1973 | 3,081 | 36 | NA |
| 1974 | 3,215 | 21 | NA |
| 1975 | 3,431 | 25 | NA |
| 1976 | 3,740 | 26 | NA |
| 1977 | 4,444 | 50 | NA |
| 1978 | 5,058 | 67 | NA |
| 1979 | 5,544 | 63 | 43 |
| 1980 | 5,832 | 63 | 40 |
| 1981 | 5,863 | 63 | NA |
| 1982 | 5,874 | 61 | 49 |
| 1983 | 6,025 | 66 | 49 |
| 1984 | 6,158 | 64 | NA |
| 1985 | 6,182 | 62 | 73 |
| 1986 | 6,235 | 58 | 73 |
| 1987 | 6,272 | 62 | NA |
| 1988 | 6,194 | 66 | 81 |
| 1989 | 6,354 | 63 | 75 |
| 1990 | 6,307 | 57 | NA |
| 1991 | 6,317 | 50 | NA |
| 1992 | 5,230 | 36 | NA |
| 1993 | 4,965 | 25 | NA |
| 1994 | NA | NA | NA |
| 1995 | NA | NA | 12 |

[1] FAA Census of U.S. Civil Aircraft
[2] FAA Airport Master Record (Form 5010-1)
NA = Not Available

The Apache County aircraft registrations were compared to the county p Due to the gaps in the based aircraft figures for St. Johns Industrial Air Park, it is not possible to track the peaks and valleys as clearly as on the county level. Therefore, what effects economic cycles or other factors may have had on the number of based aircraft at St. Johns Industrial Air Park could not be determined empirically.

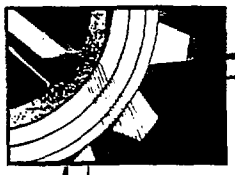
opulation for the period 1970 through 1993. The population growth within Apache County has been very consistent since 1970. However, aircraft registrations in the county have not been nearly as consistent. A comparison of the county population with the registered aircraft provides a per capita aircraft registration rate. The per capita aircraft registrations have averaged 1.1 aircraft per 1,000 population. Based on the population projections for Apache County, this would result in 94 registered aircraft by 2015. The Apache County per capita aircraft rate is identical to the national average of 1.1 but falls well below the state average of 3.0 aircraft per 1,000 population.

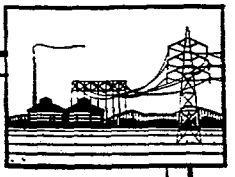
As stated earlier, continuous historical data on based aircraft at St. Johns Industrial Air Park was not available. However, based on a cursory review of the available data, it is estimated that 20 to 40 percent of county registered aircraft have been based at St. Johns Industrial Air Park.

The market-share analysis resulted in two projections of based aircraft at St. Johns. The projection based on a 20 percent share of county registered aircraft resulted in a low forecast of 25 based aircraft by 2015, while the high forecast based on a 40 percent market-share resulted in a projection of 50 based aircraft by 2015.

The preferred forecast for based aircraft resulted in a total projection of 25 based aircraft by the year 2015. This forecast was derived by taking the average of the Apache County Registered Aircraft Forecast Models (Historical Trend, Per Capita- Population, and Market-Share of State) and projecting an increasing market share to reach 20 percent of the County by the year 2015. While the 1996 SASP projected a total of 12 based aircraft by the year 2015, airport staff have stated that the current (1997-98) based aircraft count is at 12. This currently falls in line with the preferred planning forecast (shown in Table 3.2) which projects that St. Johns will have a total of 14 based aircraft by the year 2000.

*Table 3.2* compares the various projections of based aircraft determined from the above analyses. Also included in the table are the projections from the current state airport system plan and the previous airport master plan for St. Johns Industrial Air Park, which was completed in 1978. The preferred planning forecast used for this study is in bold.





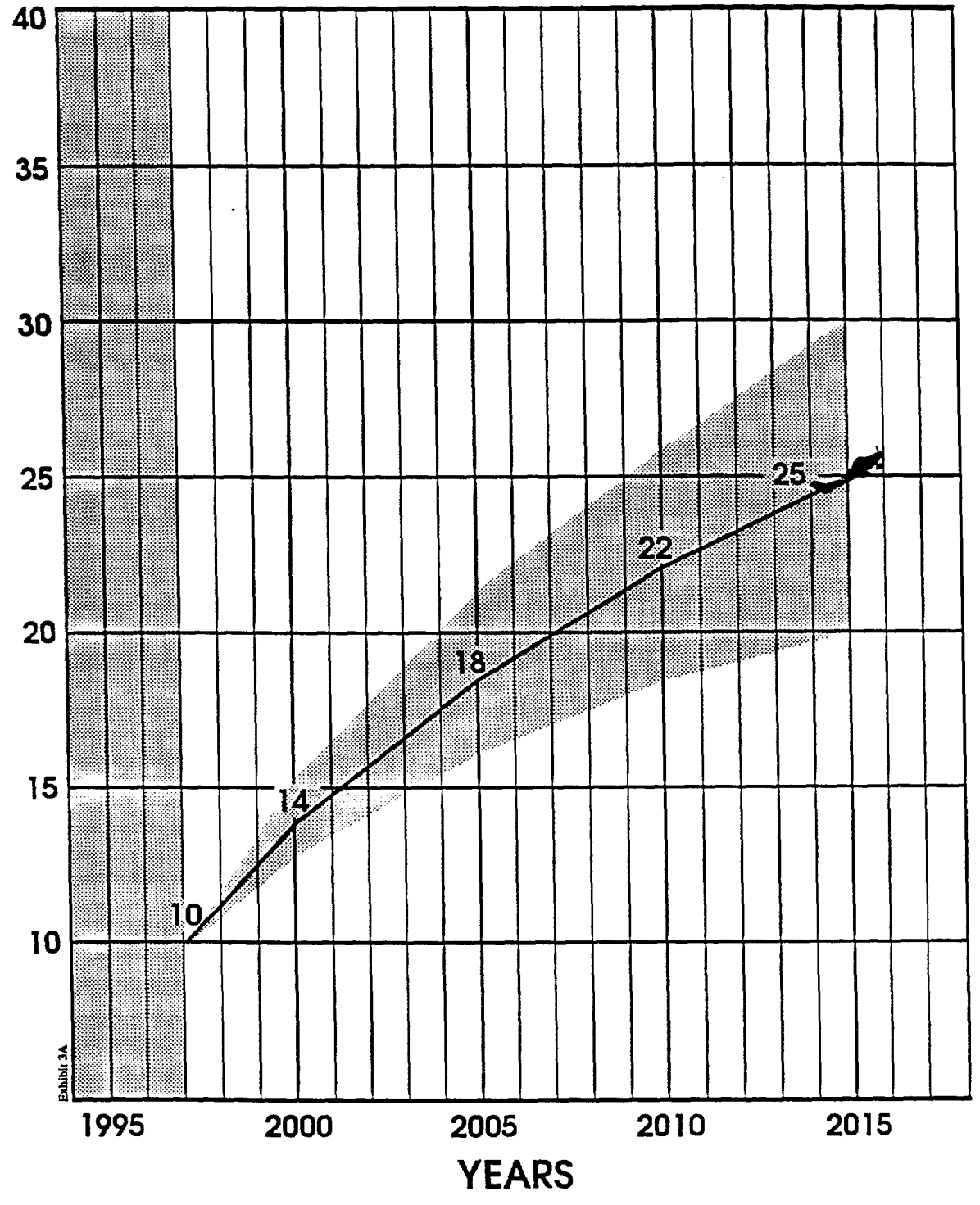



**EXHIBIT 3A**
**BASED AIRCRAFT PROJECTIONS**



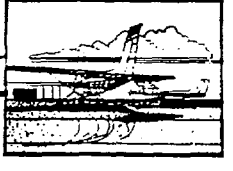


**Table 3.2**
**Based Aircraft Projections - St. Johns Industrial Air Park**

| | Existing | 2000 | 2005 | 2010 | 2015 |
|---|---|---|---|---|---|
| **Apache County Registered Aircraft** | | | | | |
| 1995 SASP | 25 | 28 | 30 | 33 | 36 |
| Historical Trend | NA | 70 | 76 | 82 | 88 |
| Per Capita - Population | NA | 71 | 77 | 85 | 94 |
| Market-Share of State | NA | 109 | 126 | 145 | 175 |
| **St. Johns Industrial Air Park** | | | | | |
| 1995 SASP | 10 | 10 | 10 | 11 | 12 |
| 20 Percent of County | NA | 17 | 19 | 21 | 25 |
| 40 Percent of County | NA | 67 | 72 | 78 | 50 |
| **Planning Forecast** | **10** | **14** | **18** | **22** | **25** |
| **Previous Studies** | | | | | |
| Previous Master Plan (1978) | 44 | 52 | NA | NA | NA |
| 1988 SASP | 12 | 14 | 16 | 18 | NA |

The planning forecast for based aircraft was based on several of the more significant factors that will influence the future of St. Johns Industrial Air Park. However, this is not to say that other factors will not play a role in the future activity at St. Johns Industrial Air Park. These external factors could influence the basing of aircraft, and could cause significant fluctuations in aviation activity. *Exhibit 3A* illustrates the preferred forecast and a reasonable margin of deviation in the number of based aircraft.

## AIRCRAFT FLEET MIX

The aircraft fleet mix expected to utilize the airport is necessary in order to plan the facilities that will best serve not only the level of activity but also the type of activities occurring at the airport. The mix of based aircraft at St. Johns Industrial Air Park was determined by an inventory of the types of aircraft currently based at the airport. This was compared with the FAA statistical records of existing and forecast general aviation fleet mix in order to determine national trends. The national trend forecasts an increasing percentage of more sophisticated and higher performance aircraft in the future.

The local fleet mix and the national fleet mix have not been the same, however, the trends for both have followed similar patterns. That is, both have experienced decreases in the percentage of single engine piston aircraft and increases in the percentage of other aircraft types. These trends were applied to the forecast of based aircraft for St. Johns Industrial Air Park to determine the forecast fleet mix. The existing and forecast fleet mix is shown in *Table 3.3*.

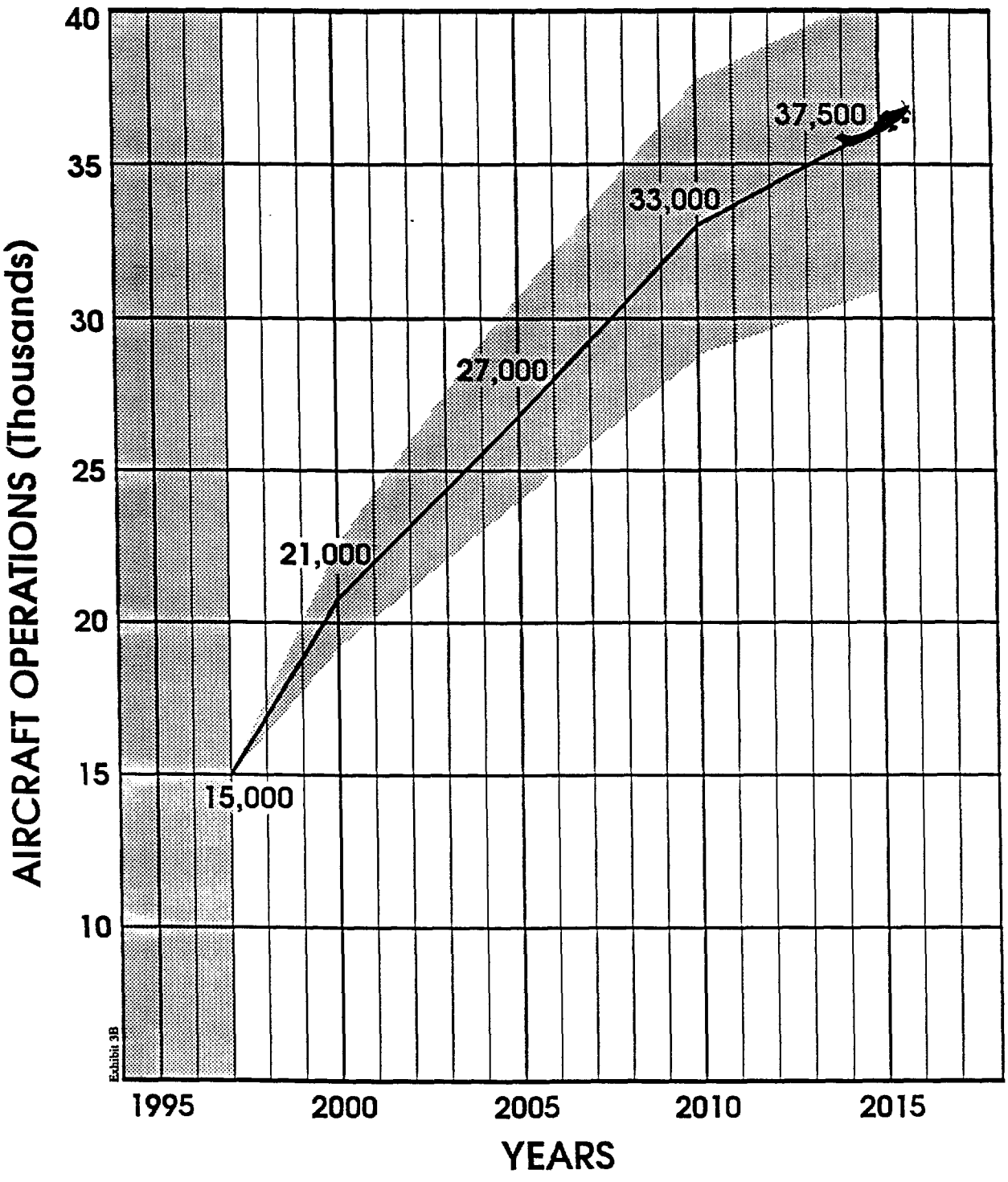



**EXHIBIT 3B**
**PROJECTIONS OF**
**ANNUAL AIRCRAFT OPERATIONS**

St. Johns Industrial Air Park Airport Master Plan

## AIRCRAFT OPERATIONS

An airport operation is defined as any takeoff or landing performed by an aircraft. There are two basic types of aircraft operations; Local and Itinerant. A local operation is a takeoff or landing performed by an aircraft that will operate within the local traffic pattern within site of the airport, or will execute simulated approaches or touch-and-go operations at the airport. Itinerant operations are all arrivals and departures that originate or terminate at another airport.

Generally, local operations are characterized as training operations and itinerant operations are those aircraft operating with a specific destination away from the airport. Typically, itinerant operations increase with increases in business or industrial activity since business aircraft are primarily used to carry company employees from one location to another and are flown by professional pilots.

Traditionally, the amount of general aviation activity has had a very high correlation with the number of based aircraft at an airport. Generally, an airport of the size and character of St. Johns Industrial Air Park can have a broad range of activity levels anywhere from 200 to 1000 annual operations per based aircraft. The level of activity at an airport in a rural area can vary significantly because of flight training (GA student pilots, military, etc.) conducted at the airport or businesses with corporate aircraft that fly in regularly rather than drive from large commercial service airports.

The activity records were obtained for St. Johns Industrial Air Park from the UNICOM operation and have been examined to determine historic and current operational levels at the airport. The monthly variation in activity and annual totals are presented in *Table 3.4*.

The data presented in *Table 3.4* represent the recorded aircraft activity during the period the UNICOM was operating. The 1989 total was extrapolated based on the first ten months of the year. The annual totals were then adjusted upward by a factor of ten percent to compensate for the activity that occurs when the UNICOM is not manned.

3The adjusted operations were then compared to the number of based aircraft for that period to establish an operations per based aircraft ratio. Two periods emerged with slightly different values.

One for the 1982-1983 time frame where the operations per based aircraft averaged almost 140. The other more recent periodfrom 1986 through 1989 (excluding 1987) demonstrated an activity level averaging 230 operations per based aircraft. More recent operations estimates for 1997-98 indicate that operations have dropped off from their 1989 levels, but based aircraft have also decreased. New estimates indicate that although operations and based aircraft have decreased, operations per based aircraft have increased.

**Table 3.3**
**Based Aircraft Fleet Mix**
**St. Johns Industrial Air Park**

| Type | Existing | 2000 | 2005 | 2010 | 2015 |
|---|---|---|---|---|---|
| Single Engine | 10 | 14 | 16 | 19 | 21 |
| Multi-Engine | 0 | 0 | 1 | 2 | 2 |
| Turboprop | 0 | 0 | 0 | 0 | 1 |
| Turbojet | 0 | 0 | 0 | 0 | 0 |
| Rotorcraft | 0 | 0 | 1 | 1 | 1 |
| TOTAL | 10 | 14 | 18 | 22 | 25 |

**Table 3.4**
**Operational Activity**
**St. Johns Industrial Air Park**

| Month | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|---|---|---|---|---|---|---|---|---|---|
| January | 239 | 229 | 372 | 400 | 630 | 892 | 948 | 1,272 | 932 |
| February | 309 | 281 | 380 | 403 | 668 | 1,080 | 1,054 | 1,130 | 936 |
| March | 294 | 234 | 389 | 477 | 600 | 1,046 | 1,060 | 1,154 | 1,018 |
| April | 379 | 497 | 426 | 392 | 505 | 963 | 1,320 | 1,466 | 1,402 |
| May | 368 | 674 | 648 | 735 | 1,129 | 1,318 | 1,660 | 1,632 | 1,604 |
| June | 550 | 713 | 746 | 757 | 1,302 | 1,870 | 1,912 | 2,074 | 1,697 |
| July | 720 | 795 | 722 | 786 | 1,256 | 1,836 | 2,302 | 1,988 | 1,736 |
| August | 531 | 638 | 774 | 608 | 1,220 | 1,682 | 1,932 | 1,716 | 1,542 |
| September | 478 | 585 | 588 | 803 | 948 | 1,452 | 1,952 | 1,654 | 1,628 |
| October | 367 | 447 | 470 | 513 | 1,301 | 1,140 | 1,808 | 1,450 | 1,136 |
| November | 344 | 298 | 424 | 499 | 989 | 977 | 1,166 | 1,108 | N/A |
| December | 312 | 354 | 445 | 512 | 1,096 | 963 | 1,106 | 1,133 | N/A |
| TOTAL | 4,891 | 5,745 | 6,384 | 6,885 | 11,644 | 15,219 | 18,220 | 17,777 | 16,357 |

The earlier period is at the low end of the normally expected activity levels at an airport such as St. Johns. The later period is more consistent with industry norms and was felt to more accurately reflect existing conditions at St. Johns Industrial Air Park. It should further be noted that the increase in the operations per based aircraft factor is also consistent with a growing and developing airport. The comparison of the adjusted annual activity and based aircraft records is illustrated in *Table 3.5*.

**Table 3.5**
**Operations Per Based Aircraft**
**St. Johns Industrial Air Park**

| Year | Operations | Based Aircraft | Operations Per Based Aircraft |
|---|---|---|---|
| 1982 | 6,320 | 49 | 130 |
| 1983 | 7,020 | 49 | 145 |
| 1986 | 16,740 | 73 | 230 |
| 1988 | 19,555 | 81 | 240 |
| 1989 | 16,350 | 75 | 220 |

Note: Based aircraft and operations figures may vary significantly between various sources of data.

As can be se4en from *Table 3.5,* there is some fluctuation from year to year in the operations from based aircraft figures, however, all the figures are within expected limits. An increase in the level of operations per based aircraft can be expected in the future as the region and the airport continue to grow. According to recent FAA Form 5010 data, operations per based aircraft are in excess of 1,200 annually.

For planning purposes and the community's desire to attract additional activity, an operations per based aircraft factor of 1,500 annually was used to project operations. This results in an annual operational demand of 37,500 operations by 2015. *Exhibit 3B* illustrates the projected growth in aircraft activity at St. Johns Industrial Air Park.

Since there is no tower at the airport, there are no records of *Local versus Itinerant* operations. Therefore, comparison to industry norms and local estimates will be used to determine a local/itinerant split of the total airport activity.

It is currently estimated that approximately 25 percent of the total operations would be classified as local traffic. This level of local traffic is somewhat reasonable based on the level of training activity currently conducted at the airport.

The higher level of Itinerant traffic would indicate that St. Johns Industrial Air Park is being utilized more for business and tourism and less for training and recreational use. The level of Itinerant traffic is expected to remain high or decrease slightly during the planning period.

By 2015, this percentage could decline to approximately 60 percent. The 40/60, Local/Itinerant split is normal for a rural general aviation airport.

*Table 3.6* illustrates the projected annual activity levels and the Local/Itinerant splits that can be expected at St. Johns Industrial Air Park throughout the planning period.

**Table 3.6**
**Annual Aircraft Activity**
**St. Johns Industrial Air Park**

| Year | Total Ops | Local Ops | Itin Ops |
|---|---|---|---|
| Existing | 15,000 | 4,500 | 10,500 |
| 2000 | 21,000 | 7,000 | 14,000 |
| 2005 | 27,000 | 9,900 | 17,100 |
| 2010 | 33,000 | 13,200 | 19,800 |
| 2015 | 37,500 | 15,000 | 22,500 |

## PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The peak periods that will be used in developing future facility requirements for St. Johns Industrial Air Park are:

- *Peak Month* - The calendar month when peak aircraft operations occur. This indicator provides an indication of the seasonality of the traffic volumes and a measure of the peak month in relation to an average month.

- *Design Day* - The average day within 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 general aviation ramp space needs.

- *Design Hour* - The peak hour within the design day. Design Hour is used particularly in airfield capacity/delay analysis as well as for terminal building and access requirements.

It is important to note that only the peak month is an absolute peak within a given year. All other peaking factors are relative and could easily be exceeded at various times during the year. However, these factors do represent reasonable planning standards that can be applied without over building or being too restrictive.

At St. Johns Industrial Air Park, the peak month activity levels have averaged 12.2 percent of annual operations over the past three years.

*Peak Month*

This peak month factor is considerably higher than the standard ten percent. However, this is to be expected given the busy summer time activity in the region. The peak month percentage can be expected to remain relatively constant over the planning period as the seasonal population continues to contribute greatly to the peak summer periods. For planning purposes, the peak month has been projected at an even 12.0 percent of annual operations.

*Design Day*

The Design Day, also called the average day of the peak month, will vary from year to year depending on the number of operations during the peak month. However, for planning purposes, it was assumed that the average day of the peak month will be one thirtieth of the peak month activity. This translates to a Design Day factor of 0.40 percent of annual operations.

*Busy Day*

The Busy Day operations for a general aviation airport typically will run ten to twenty percent greater than an average day. Since all the other activity characteristics are consistent with the norms at general aviation airports, the busy day operations factor has been assumed to be 115 percent of design day activity. This peaking factor has been projected to remain constant throughout the planning period.

*Design Hour*

Design Hour operations are used to establish the peak hourly demand affecting airfield and terminal facilities. Currently, the Design Hour operations were estimated to be approximately 12.5 percent of the design day operations. This is normal for an active general aviation airport. Design Hour operations will normally range from 10 to 15 percent of average day depending on the total activity. The Design Hour factor will tend to decrease as total activity increases. The Design Hour activity at St. Johns Industrial Air Park has been projected to remain at its current 12.5 percent level throughout the planning period.

The peaking characteristics were applied to the forecast annual operations to obtain future peak operations at St. Johns Industrial Air Park. Experience has shown that as activity begins to increase, peak periods will begin to level out. A summary of these four peaking characteristics for the planning period is presented in *Table 3.7.*

## SUMMARY

This chapter has provided forecasts for those indicators of aviation demand that are essential to the effective analysis of future facility requirements of St. Johns Industrial Air Park. The next step in the master planning process is to assess the capacity of the existing facilities and to determine the size and quantities of various aviation facilities that will be necessary to meet future aviation demands.

Based upon the projections of aviation demands developed in this chapter, a determination of future facilities will be examined in the next chapter. *Table 3.8* is provided to summarize the various forecast information and for easy reference in later portions of the Master Plan Study.

**Table 3.7**
**Peak Operations**
**St. Johns Industrial Air Park**

| | Existing | 2000 | 2005 | 2010 | 2015 |
|---|---|---|---|---|---|
| Annual Operations | 15,000 | 21,000 | 27,000 | 33,000 | 37,500 |
| Peak Month | 1,800 | 2,520 | 3,240 | 3,960 | 4,500 |
| Design Day | 60 | 84 | 108 | 132 | 150 |
| Busy Day | 69 | 97 | 124 | 152 | 173 |
| Design Hour | 8 | 11 | 14 | 17 | 19 |

**Table 3.8**
**Summary of Aviation Forecasts**
**St. Johns Industrial Air Park**

| | Existing | 2000 | 2005 | 2010 | 2015 |
|---|---|---|---|---|---|
| **Annual Operations** | | | | | |
| Itinerant | 10,500 | 14,000 | 17,100 | 19,800 | 22,500 |
| Local | 4,500 | 7,000 | 9,900 | 13,200 | 15,000 |
| **Total Operations** | **15,000** | **21,000** | **27,000** | **33,000** | **37,500** |
| **Based Aircraft** | | | | | |
| Single Engine | 10 | 14 | 16 | 19 | 21 |
| Multi-Engine | 0 | 0 | 1 | 2 | 2 |
| Turboprop | 0 | 0 | 0 | 0 | 1 |
| Turbojet | 0 | 0 | 0 | 0 | 0 |
| Rotorcraft | 0 | 0 | 1 | 1 | 1 |
| **Total Based Aircraft** | **10** | **14** | **18** | **22** | **25** |