III. AVIATION AND AIRPORT FORECASTS

This section presents the methodology employed and results of forecasting aeronautical activities at the airport. Forecasts are provided for the 5, 10, and 20 year planning periods.

Introduction

Forecasts of aviation activity serve as an indication of the relative timing for airport investments. Forecasts are useful for planning future expansions, making land acquisitions and guiding land use decisions to avoid future conflicts between the airport and surrounding residents. Such information is critical for comprehensive airport planning although forecasts are only approximations of future aviation activity.

The existing Chinle Airport is composed of graded earth runway with no tower or terminal. Because records of aviation activity are non-existent, forecasts for the Chinle Airport are difficult to make.

The FAA (1987) publishes a national plan for the development of public use airports in the United States called The National Plan of Integrated Airport Systems (NPIAS) which presents airport development data, including forecasts. The NPIAS forecasts are designed to reflect local and regional trends, and resultant figures are adjusted based on coordination with state, regional and local officials. Forecasts are derived from internal area forecasts completed by the FAA and are based on local projects. The NPIAS forecasts from the 1987 publication for the Chinle Airport are presented in Table 3.0 below.

TABLE 3.0

Based Aircraft and Operations
NPIAS Forecasts

Year	Based Aircraft	Local Operations	Itinerant Operations	Total Operations
1990	1	--	1,000	1,000
1995	2	--	1,000	1,000
2000	2	--	1,000	1,000

As reported by local pilots (Brady 1990), the NPIAS data does not represent the current activity levels at Chinle. There are currently three aircraft based at Chinle. Observed operations exceed the NPIAS estimates.

It is also expected that the programmed development for a general aviation facility will increase operations, both local and itinerant. Therefore, the development of a new forecasting model was necessary.

Forecast Methdology

The forecast methodology developed for this project uses population data, statewide aircraft registration data and FAA aviation forecast data. The following is a discussion of the methodology employed and a chart summarizing the forecast results.

The 1980-1984 annual compounded percentage change for the Navajo Reservation was 3.0 percent. According to Mr. Kelling (1990) of Valley National Bank, the projected annual growth rate for the reservation is 2.5 to 3.0 percent. National growth for general aviation hours is expected to average only .7 percent per year according to the FAA Aviation Forecasts (FAA 1986). Based on the Navajo Nation's past growth rate, population projections and the FAA's projected general aviation growth rate, 3.0 percent appears to be most applicable for projecting aviation growth on the reservation for the purpose of this report.

Based aircraft counts for Chinle Airport were determined by first determining the State of Arizon's population (Kelling 1990) and number of registered aircraft statewide (Nasipak 1990) excluding the major metropolitan areas of Phoenix and Tucson for both variables. By eliminating the cities of Phoenix and Tucson, a more meaningful distribution of population and aircraft can be determined. Using the following aircraft-to-population equation, an index for the number of registered aircraft per person was computed.

$$\frac{1,621}{\text{(Registered Aircraft Statewide Excluding Phoenix \& Tucson)}} \Big/ \frac{998,430 =}{\text{(Population Statewide Excluding Phoenix \& Tucson)}}$$

.001623
(Number of Aircraft per Person Statewide
Excluding Phoenix & Tucson)

The 1990 population of Chinle (Valley National Bank 1990) was then multiplied by this index to calculate the number of based aircraft:

$$
\begin{array}{cccc}
3,530 & & & \\
\text{(1990 Population} & & & 5.73 \\
\text{for Chinle)} & X & 0.001623 & = \\
& & \text{(index)} & \text{(Based Aircraft)}
\end{array}
$$

Annual operational activity is defined as the number of take-offs and landings that occur during a one-year period at an airport. The approach utilized to forecast local operations involves an examination of the total general aviation fleet. According to the FAA Aviation Forecasts (FAA-APO-87-1) (FAA 1986a), as of January 1, 1986, the general aviation fleet of the United States consisted of 210,655 aircraft. Of that total aircraft number, 188,280 are single and multi-engine piston aircraft. Single and multi-engine piston aircraft are predicted to be the primary users of the Chinle facility. Of the total, 33.8 million general aviation hours flown in fiscal 1986, single and multi-engine piston aircraft account for 27.04 million, or 80 percent of those hours. By using the following equation, the number of hours flown per aircraft can be determined.

$$
\begin{array}{cccc}
27,040,000 & / & 188,280 & = & 144 \\
\text{(Hours flown} & & \text{(Number of single \&} & & \text{(Hours flown per} \\
\text{by single \& multi-} & & \text{multi-enjgine} & & \text{single \& multi-} \\
\text{engine piston} & & \text{aircraft} & & \text{engine piston} \\
\text{aircraft)} & & \text{nationwide)} & & \text{aircraft)}
\end{array}
$$

Local operations were arrived at based on three assumptions: 1) the average 144 hours flown annually for single and multi-engine piston aircraft is valid everywhere; 2) the average flight length for this type of aircraft is one hour; and 3) each departure results in an arrival for the based aircraft. With the integration of these assumptions, there are an estimated 288 operations per based aircraft (144 x 1 x 2 = 288).

Determination of itinerant operations is based on information obtained through an interview with Mr. James Brady (1990), a pilot with Monument Valley Air Service. Mr. Brady is based at Chinle Airport and has observed the following aircraft at Chinle: a Cessna 340, three Cessna 414, two Beechcraft King Airs and a Turbo Commander. Mr. Brady estimated that together these aircraft comprise approximately 1,000 itinerant operations per year. The forecast data in Table 3.1 was derived by applying the population growth rate model to the 1,000 operation base.

TABLE 3.1

Aviation Activity Forecasts
Chinle Airport

	1990	1995	2000	2010
Population - Chinle*	3,530	4,100	4,700	6,400
Based Aircraft	6	7	8	10
Based Aircraft Operations	1,700	2,000	2,300	2,900
Intinerant Aircraft Operations	1,000	1,200	1,300	1,800
Total Operations	**2,700**	**3,200**	**3,600**	**4,700**

*Growth rate of 3% per year.

Source for population figures: Kelling 1990
Source for itinerant operations: Brady 1990