

SECTION 4

AVIATION DEMAND FORECASTS

Aviation demand forecasts are estimates describing future activity levels associated with the air transportation of persons and property. These measures of demand are utilized to determine overall airport requirements and serve as a guide for planning the phasing of airport development. Forecasts are prepared for the last year in each five year period between 1976 and 1997, in support of facility planning which is phased by short-, intermediate-, and long-range planning periods.

This section begins with a summary of the forecast aviation demand, followed by a technical discussion of the economic background, the actual forecast of aviation demand, and lastly, the calculation of terminal area relationships.

4.1 AVIATION DEMAND FORECAST SUMMARY

The number of aircraft based in the Mesa area is forecast to grow from four in 1976 to nine in 1982, and 30 by 1997. The based aircraft fleet had one light multi-engine aircraft in 1976, and is projected to include eight light multi-engine aircraft by 1997. Exhibit 4-1 summarizes the forecast demand.

Aircraft movements are forecast to grow from 4,000 in 1976 to 9,800 in 1982, and 30,000 by 1997. Total itinerant movements as a percentage of total movements is expected to increase from 37.5 percent in 1976 to 66.7 percent by 1997, and transient itinerant movements are expected to grow from 20 to 25 percent of all itinerant movements. The activity estimates indicate an operational role of basic utility during the short-range planning period (1976-1982), increasing to and remaining a general utility role throughout the remainder of the planning period (1982-1997).

EXHIBIT 4-1

FORECAST AVIATION DEMAND
AND TERMINAL AREA RELATIONSHIPS
MESA AREA

AVIATION DEMAND	EXISTING	FORECAST			
	1976	1982	1987	1992	1997
BASED AIRCRAFT					
Single-Engine 1-3 seats	-	2	3	5	7
Single-Engine 4+ seats	3	5	8	11	15
Multi-Engine <12,500 lbs.	1	2	3	4	5
Multi-Engine ≥12,500 lbs.	-	-	-	-	-
Turboprop <12,500 lbs.	-	-	1	2	3
Turboprop ≥12,500 lbs.	-	-	-	-	-
Turbojet	-	-	-	-	-
Other	-	-	-	-	-
Rotor	-	-	-	-	-
TOTAL BASED	4	9	15	22	30
AIRCRAFT MOVEMENTS					
Single-Engine 1-3 seats	-	3,000	5,400	9,300	13,500
Single-Engine 4+ seats	2,300	4,600	7,300	9,600	12,800
Multi-Engine <12,500 lbs.	1,700	2,200	2,800	3,500	4,500
Multi-Engine ≥12,500 lbs.	-	-	-	-	-
Turboprop <12,500 lbs.	-	-	700	1,500	2,200
Turboprop ≥12,500 lbs.	-	-	-	-	-
Turbojet	-	-	-	-	-
Rotor	-	-	-	-	-
Other	-	-	-	-	-
LOCAL	2,500	4,100	6,500	8,900	11,000
ITINERANT - Based	1,200	4,100	7,300	11,300	16,500
- Transient	300	1,600	2,400	3,700	5,500
TOTAL MOVEMENTS	4,000	9,800	16,200	23,900	33,000
ANNUAL ENPLANEMENTS					
Itinerant Flights	3,100	11,800	20,200	31,200	45,700
Local Flights	2,400	3,900	6,200	8,500	10,500
TOTAL ENPLANEMENTS	5,500	15,700	26,400	39,700	56,200
FUEL CONSUMPTION					
Based Aircraft (Gals.)	-	28,000	44,000	108,000	174,000
Transient Aircraft (Gals.)	-	6,000	9,000	14,000	21,000
TOTAL FUEL (Gallons)	-	34,000	53,000	122,000	195,000

(cont.)

EXHIBIT 4-1

(Continued)

<u>TERMINAL AREA RELATIONSHIPS</u>	<u>EXISTING 1976</u>	<u>FORECAST</u>			
		<u>1982</u>	<u>1987</u>	<u>1992</u>	<u>1997</u>
<u>TOTAL AIRCRAFT MOVEMENTS</u>					
Peak Month (PM)	400	980	1,620	2,390	3,300
Average Day - PM	13	32	52	77	106
Busy Hour - ADPM	3	6	10	15	21
Peak Day (PD)	39	97	153	216	289
Busy Hour - PD	12	29	38	50	64
<u>TRANSIENT AIRCRAFT MOVEMENTS</u>					
Busy Hour - PD	1	5	6	8	11
<u>TOTAL ENPLANEMENTS</u>					
Busy Hour - ADPM	5	11	18	27	38
Busy Hour - PD	22	52	68	90	115
<u>FUEL FLOWAGE</u>					
Peak Month	-	4,400	6,900	15,900	25,400
Two Week Peak	-	2,700	4,100	9,500	15,200
ANNUAL INSTRUMENT APPROACHES	-	40	72	111	162

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

Annual enplanements are forecast to grow from 5,500 in 1976 to 56,200 by 1997, revealing a system role upgrade from feeder to secondary during the last five year period (1992-1997). If sold in the Mesa area, approximately 34,000 gallons of fuel are expected to be consumed annually by 1982, growing to 195,000 gallons by 1997.

The forecast of aviation demand presented herein was calculated based on historical economic trends; the incorporation of judgment based on experience was minimized. This action is supported by experience which has shown that even when judgment forecasts are correct, they rarely provide a consistent basis for planning. However, it should also be emphasized that forecasting aviation demand based on economic trends when the absolute numbers involved are as small as those considered in this analysis, results in a highly sensitive forecast. That is, a small change in the economy can create an accompanying large change in the forecasts. In the case of this study, changes to the economy which could result in a large change of the forecast aviation demand include a major tourism promotional campaign, an unusually high volume of jewelry and artifact sales, expansion of the Hopi Industrial Park in Winslow, and opening of manufacturing businesses on the reservation. Therefore, these forecasts should be viewed as a tool used by the planner, and not as strict guidelines. Actual planning will incorporate flexibility such that airport facilities will be capable of accommodating a much larger demand than forecast.

4.2 ECONOMIC BACKGROUND

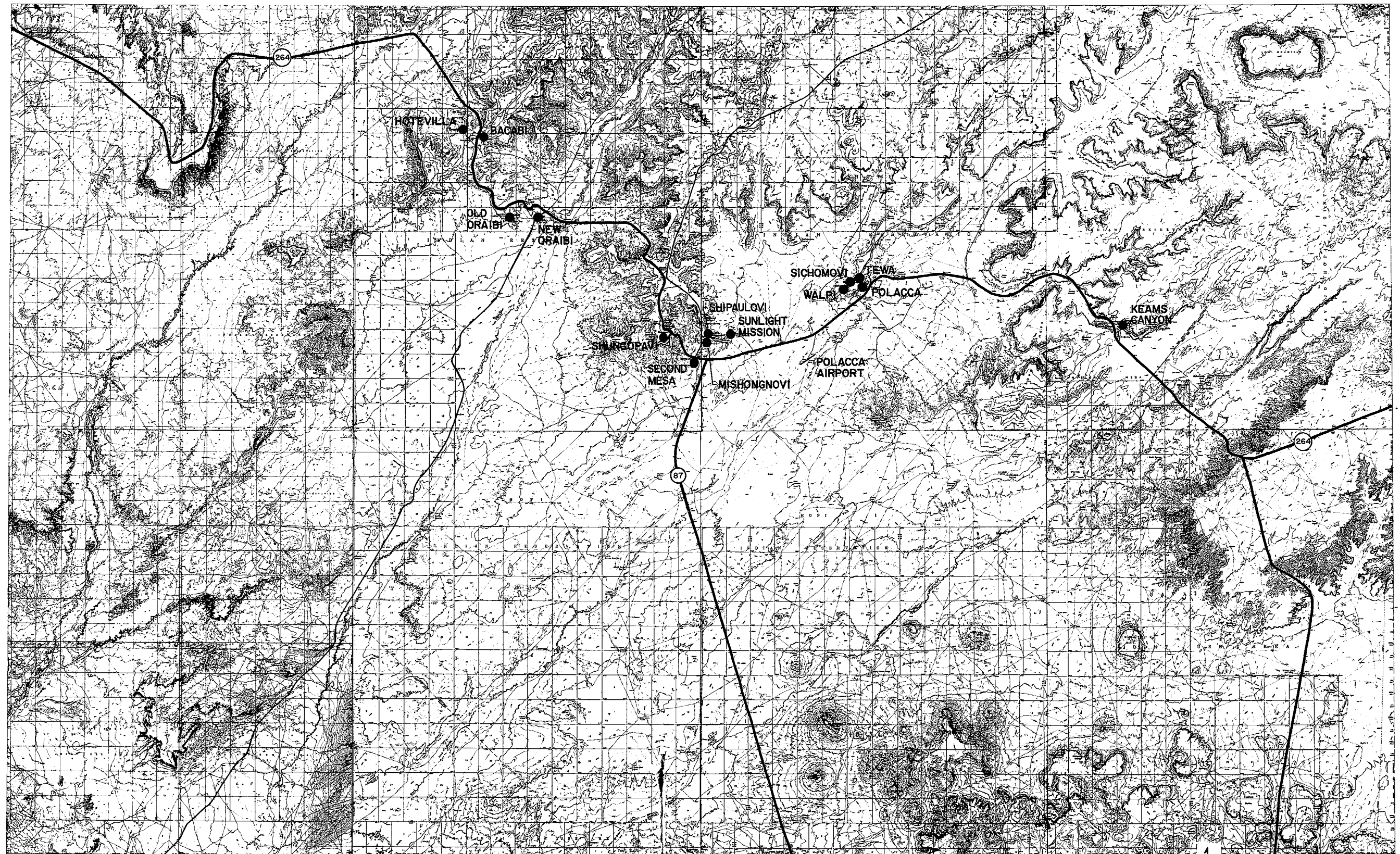
The demand for air transportation within a given area is generally dependent on the size and well-being of the area's economy. Therefore, to forecast aviation demand there must be a thorough understanding of the existing economy, and some insight as to what changes in the economy are forthcoming. The boundary of economic areas are usually

set by natural boundaries such as rivers or mountains, or by political boundaries; in the case of this study, the economic area of concern is described by the political boundary of the Executive Order 1882 Hopi Indian Reservation; illustrated in Exhibit 3-2.

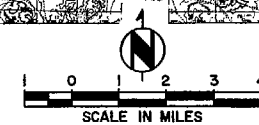
Historically, settlement of the reservation has been divided, the southern half having been settled by the Hopi Tribe and the northern half primarily by the Navajo. According to litigation now nearing an end, the Navajo are expected to be relocated off the reservation, the only extensive development remaining being that of the Hopi's on the southern half of the reservation. More specifically, the Hopi's have concentrated their development near Arizona State Highway 264 between Hotevilla on the west and Keams Canyon on the east, in an area that can be referred to as the "Mesa area". The United States Public Health Service and Bureau of Indian Affairs, combined with a motel and trading post, form the largest economic unit in the Mesa area located at Keams Canyon. Other major political or economic units in the Mesa area are found at New Oraibi where the Tribal Council Headquarters is located, and at Second Mesa where the Cultural Center is located. The Mesa area can be seen in Exhibit 4-2.

Investigation of data provided by the Hopi Tribe, the Bureau of Indian Affairs, and the State of Arizona Department of Economic Security, identified two economic indicators useful in the forecast of aviation demand. These are: population and per capita income. Excluding the Navajo, the population of the reservation is comprised of two groups, Hopi Tribe members and non-members. During recent years, the number of non-members has remained relatively constant, at approximately 500 persons. Although the number of non-members may grow in the future, their influence on the local economy will continue to diminish.

Hopi Tribe members living on the reservation are estimated to have increased in number from 4,900 in 1968 to 5,300 in 1973, and to 6,000 by 1976;



LEGEND
 --- RESERVATION BOUNDARY
 — PAVED ROADS
 - - - UNPAVED ROADS



No.	Revision	By	Appr.	Date

Approved
 By
 Date

R. DIXON SPEAS ASSOCIATES

Designed
 Checked

Drawn
 Date

HOPi TRIBE
ORAIBI, ARIZONA

MESA AREA

EXHIBIT
4-2

representing a 1.6 percent annual growth rate between 1968 and 1973, and a 4.2 percent growth rate for the 1973 to 1976 period. The increasing growth rate of the population can be partially attributed to a relatively young population coming to the age of wedlock, higher standards of living -- notably housing, and better health care. Immigration of members living off the reservation does not appear to be a factor, since their 1973-76 growth rate is estimated to have been 6 percent. Although the growth rate of the reservation population may continue to increase, the modest 1973-76 growth rate of 4.2 percent is assumed for the purpose of estimating the future population. Exhibit 4-3 tabulates the historical and projected population, which is expected to reach 14,200 by 1997.

Distribution of the Hopi population in the Mesa area is centered around 14 villages. These villages are depicted in Exhibit 4-2, and their respective estimated populations are tabulated in Exhibit 4-4.

Per capita income of the Hopi population (that is, the combined income of Hopi's and businesses on the reservation, divided by the Hopi population) was estimated by the Bureau of Indian Affairs to be \$811 in 1972, or 29 percent of the per capita income figure for all of Navajo County.

Given the development that is occurring on the reservation, the increasing demand for Indian jewelry and artifacts, the continuing growth of "See America" tourism, it is reasonable to assume that Hopi per capita income as a percentage of Navajo County per capita income will increase substantially in the near future. For the purpose of developing a forecast of Hopi per capita income, it is assumed that a 90 percent figure will be reached by the close of the long-range planning period (1997).

EXHIBIT 4-3
POPULATION FORECAST

	<u>HISTORICAL</u>
1968	4,907
1973	5,307
1976	6,000

	<u>FORECAST</u>
1982	7,700
1987	9,400
1992	11,500
1997	14,200

Population of Hopi Tribe members living on reservation.

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

EXHIBIT 4-4
POPULATION DISTRIBUTION

Estimated Village Population

Keams Canyon	252
Polacca	782
Walpi	74
Sichomovi	337
Tewa	218
Shungopavi	783
Shipaulovi	226
Mishongnovi	497
Sunlight Mission	74
Oraibi	818
Old Oraibi	206
Hotevilla	785
Bacavi	327
Moenkopi	<u>1,068</u>
TOTAL	6,447

Source: Hopi Tribe

Application of the percentage that Hopi per capita income is of Navajo County per capita income to a projection of the latter yields the forecast of Hopi per capita income. The resulting forecast of Hopi per capita income is tabulated in Exhibit 4-5, and is shown growing 7.7 percent annually, from \$1,086 in 1976 to \$5,197 by 1997. The projection of Navajo County per capita income was calculated by applying the long-term (1960-1970) real growth to the base year (1976).

Usually, total personal income is a better indicator of the growth in demand for air transportation, than per capita income. A forecast of total personal income is calculated by multiplying the forecast population by the forecast per capita income. The forecast of Hopi total personal income shows an annual growth rate of 12.3 percent, growing from \$6.5 million in 1976 to \$73.8 million by 1997. Exhibit 4-6 tabulates the forecast of Hopi total personal income.

In summary, it has been shown that the size, or population of the economy, is expected to grow 28 percent during the short-range planning period ending in 1982. Additionally, it is expected that the wealth, or total personal income of the economy will grow 124 percent during the short-range planning period. In general, there will be a stronger economy demanding increased air transportation services.

EXHIBIT 4-5
PER CAPITA INCOME FORECAST

<u>YEAR</u>	<u>PER CAPITA INCOME</u>		
	<u>NAVAJO COUNTY</u>	<u>HOPi AS % OF COUNTY</u>	<u>HOPi TRIBE</u>
1960	1,199	--	--
1970	2,020	--	--
1972	2,792	29%	811
1976	3,119	35%	1,086 (Estimated)
	<u>FORECAST</u>		
1982	3,719	51%	1,897
1987	4,306	64%	2,756
1992	4,986	77%	3,839
1997	5,774	90%	5,197

Per capita income of Hopi Tribe members living on reservation.

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

EXHIBIT 4-6
TOTAL PERSONAL INCOME FORECAST

<u>YEAR</u>	<u>POPULATION</u>	<u>PER CAPITA INCOME</u>	<u>TOTAL PERSONAL INCOME (000's DOLLARS)</u>
1976	6,000	1,086	6,516
1982	7,700	1,897	14,607
1987	9,400	2,756	25,906
1992	11,500	3,839	44,149
1997	14,200	5,197	73,797

Total personal income of Hopi Tribe members living on reservation.

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

4.3 AVIATION DEMAND

The forecast of aviation demand projects major measures of demand for airport facilities. Five major measures of demand are forecast in this study. These are: based aircraft, aircraft movements, enplanements, cargo, and fuel consumption. The following discussion presents and describes the methodology used for forecasting each major measure of demand in the Mesa area.

An overview study analyzing surrounding communities and their respective transportation systems was undertaken prior to the actual forecast of demand. The overview investigated existing and planned highways and railroads, but focused primarily on scheduled air carrier service in northeastern Arizona. Investigation revealed that the trend of scheduled air carrier service in northeastern Arizona has been to delete service to smaller communities, while at the same time centralizing services at larger communities such as Flagstaff. Given the trends identified and the potential growth for the Hopi Indian Reservation, it can only be concluded that scheduled air carrier service will not be provided to the Mesa area in the foreseeable future. However, this is not to say that service will never be provided, but instead to indicate that if provided, it will be of a low activity level having a negligible impact on airport facilities. Therefore, the ensuing discussion is limited to general aviation demand comprised primarily of business and personal flying.

4.3.1 Based Aircraft

Based aircraft are aircraft that require indoor or outdoor storage on an annual basis, as opposed to transient aircraft which require temporary storage for an hour, day, or perhaps as long as a week. During 1976, there were four aircraft based at Polacca Airport, which is located in the Mesa area approximately mid-way between New Oraibi and Keams Canyon. Three of the four aircraft were single-engine aircraft having four or

more seats, and one aircraft was a multi-engine aircraft weighing less than 12,500 pounds gross takeoff weight. The multi-engine aircraft is used by the Bureau of Indian Affairs for reservation patrol and personnel transportation; one of the single-engine aircraft is used by the Public Health Service to transport patients to hospitals, another single engine is used for flight training, and the third single-engine is privately owned and used.

There are three potential major sources that will generate a growing number of aircraft based in the Mesa area, these are: the local government -- Hopi Tribal Council, the Federal government -- Public Health Service and Bureau of Indian Affairs, and lastly private ownership. The greatest potential source of additional based aircraft during the short-range planning period is the Hopi Tribal Council, which is currently having pilots trained for the purpose of developing the Tribe's own capability in air transportation. During the latter portion of the short-range planning period (1976-82), growth in private aircraft ownership that will last throughout the long-range planning period (1987-97) is expected to occur.

To calculate the short-range (1982) forecast of aircraft based in the Mesa area, the annual growth rate of Hopi total personal income between 1976 and 1982 is used. Applying the 14.4 percent annual growth rate to the number of 1976 based aircraft, yields a 1982 forecast of 9 based aircraft. The 1982 to 1997 11.4 percent annual growth rate of total personal income is used to calculate the 1987 forecast of 15 based aircraft. It is expected that by the end of the intermediate-range planning period (1987), the based aircraft market will mature, and accordingly the rate of growth will slow down. Therefore, the growth rate of per capita income between 1976 and 1992, roughly 8.2 percent, is used to calculate the 1992 forecast of 22 based aircraft. And finally, the 1992 to 1997 growth rate of 6.2 percent is used to calculate the 1997 forecast of 30 based aircraft.

The type, or mix of based aircraft is forecast assuming that the present relationship of 25 percent multi-engine/75 percent single-engine will continue throughout the planning period. Although the figure of 25 percent multi-engine appears high, it is believed to be reasonable because of the remoteness of the Mesa area from major metropolitan areas, and the high land elevations ranging from 5,000 to 7,000 feet above mean sea level. As private aircraft ownership increases, there is expected an introduction and increasing number of small single-engine aircraft having less than four seats. Near the end of the intermediate-range (1982-87) planning period, the introduction of turboprop powered aircraft in lieu of reciprocating powered multi-engine aircraft is expected. There is no foreseeable introduction of heavy aircraft weighing more than 12,500 pounds, turbojet aircraft, or rotorcraft, in the based aircraft fleet. A summary of the forecast based aircraft and based aircraft mix is presented in Exhibit 4-7.

4.3.2 Aircraft Movements

An aircraft movement is a single landing or takeoff, and is classified as either local or itinerant. Local movements are landings and takeoffs of training or sightseeing flights that usually depart and arrive at the same airport. Itinerant movements on the other hand, are landings and takeoffs associated with aircraft in transit between one airport and another, and are referred to as transient itinerant movements if performed at an airport other than where the aircraft is based.

Local aircraft owners and pilots reported that during 1976 aircraft based in the Mesa area performed approximately 1,200 itinerant and 2,500 local movements at Polacca Airport. Of these, 100 itinerant and 1,500 local movements were performed by light ($\leq 12,500$ lbs.) multi-engine aircraft, the remainder being performed by large (4+ seats) single-engine aircraft. Furthermore, it was estimated that transient aircraft performed approximately 300 transient itinerant movements at Polacca Airport during 1976, less than 1 percent of the movements by based aircraft.

EXHIBIT 4-7
 BASED AIRCRAFT FORECAST
 MESA AREA

BASED AIRCRAFT	EXISTING 1976	FORECAST YEAR			
		1982	1987	1992	1997
Single-Engine 1-3 seats	-	2	3	5	7
Single-Engine 4+ seats	3	5	8	11	15
Multi-Engine <12,500 lbs.	1	2	3	4	5
Multi-Engine ≥12,500 lbs.	-	-	-	-	-
Turboprop <12,500 lbs.	-	-	1	2	3
Turboprop ≥12,500 lbs.	-	-	-	-	-
Turbojet	-	-	-	-	-
Rotor	-	-	-	-	-
Other	-	-	-	-	-
TOTAL BASED AIRCRAFT	4	9	15	22	30

Source: R. Dixon Speas Associates
 Forecast prepared January 1977.

Transient activity is generally the result of businessmen or tourists landing at an airport having the outlying area as their destination, or just stopping while enroute to some other destination. In deciding to fly or use ground transportation to a particular destination, the businessman or tourist is concerned with whether there is ground transportation available from the airport to nearby lodging, the place of business, or tourist attractions. Similarly, persons onboard an aircraft to some other destination and considering stopping are concerned with whether there is food available at the airport. In both cases, they are interested in whether the airport is reported as public or private, if it is attended, and most of all -- if there is fuel available. The lack of all these services has resulted in the extremely low level of transient activity at Polacca Airport, in comparison to other airports having paved runways.

The master plan will include recommendations and alternative methods of introducing some of the above-mentioned airport services. Furthermore, it is reasonable to expect that transient activity will grow dramatically at the time these services are introduced, and thereafter grow in line with the growth of business and tourism. It is expected that introducing some of the above-mentioned services would increase the 1976 average of 2.5 transient landings per week to 10 by the end of 1977. Using the 10 landings per week as a base figure, transient aircraft movements in the Mesa area are forecast by applying the historical growth rate of tourism reported by Nava-Hopi Tours -- 8.7 percent annually. This calculation results in a 1997 forecast of 5,500 transient itinerant movements.

The forecast of aircraft movements performed in the Mesa area by based aircraft is calculated by multiplying the forecast of based aircraft by the 1976 average number of movements per based aircraft. Multiplying the 916 aircraft movements per based aircraft to the forecast aircraft yields a 1997 forecast of 27,500 aircraft movements. Itinerant movements performed by based aircraft, as a percentage of total movements are expected to increase rapidly during the short-range from 32 percent in 1976 to

50 percent by 1982. This projection is a result of the expectation that the amount of training will decrease and business trips increase as the Tribe's pilots become qualified. Throughout the remainder of the planning period, itinerant movements as a percentage of total movements is expected to gradually grow until reaching 60 percent in 1997.

The forecast of aircraft movements by aircraft type and flight type is presented in Exhibit 4-8.

4.3.3 Enplanements and Cargo

As discussed earlier, scheduled air carrier service to the Mesa area is not anticipated. Therefore, the only enplanements in the Mesa area will be "general aviation enplanements," which include the number of passengers plus pilots boarding aircraft.

The forecast of annual enplanements for the Mesa area is calculated by applying an average number of enplanements per aircraft departure to the forecast of aircraft departures (one-half the annual aircraft movements). A survey of local pilots revealed that on the average there are 4.5 persons aboard a departing itinerant flight. This relatively high number in comparison to the national average of 3.0 persons is mostly due to the Public Health Service flights, which normally depart with 6.0 persons aboard. Additionally, it is estimated that on the average there are 3.2 persons aboard a departing transient itinerant flight, and 1.9 persons aboard a departing local flight. Applying these passenger loads to the forecast of departures yields a forecast of enplanements growing from 5,500 in 1976 to 56,200 by 1997, or an annual growth rate of 11.7 percent. The forecast of enplanements is tabulated in Exhibit 4-9.

Potential for air cargo in the Mesa area lies primarily in the contract carriage of mail. Other possibilities of air cargo include medical supplies, perishable food staples, and specialized equipment. The volume of air cargo that will develop in

EXHIBIT 4-8
AIRCRAFT MOVEMENTS FORECAST
MESA AREA

AIRCRAFT MOVEMENTS	BASE YEAR 1976	FORECAST YEAR			
		1982	1987	1992	1997
Single-Engine 1-3 seats	-	3,000	5,400	9,300	13,500
Single-Engine 4+ seats	2,300	4,600	7,300	9,600	12,800
Multi-Engine <12,500 lbs.	1,700	2,200	2,800	3,500	4,500
Multi-Engine ≥12,500 lbs.	-	-	-	-	-
Turboprop <12,500 lbs.	-	-	700	1,500	2,200
Turboprop ≥12,500 lbs.	-	-	-	-	-
Turbojet	-	-	-	-	-
Rotor	-	-	-	-	-
Other	-	-	-	-	-
LOCAL	2,500	4,100	6,500	8,900	11,000
ITINERANT - Based	1,200	4,100	7,300	11,300	16,500
- Transient	300	1,600	2,400	3,700	5,500
TOTAL MOVEMENTS	4,000	9,800	16,200	23,900	33,000

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

EXHIBIT 4-9

ANNUAL ENPLANEMENTS FORECAST
MESA AREA

<u>ANNUAL ENPLANEMENTS</u>	<u>BASE YEAR 1976</u>	<u>FORECAST YEAR</u>			
		<u>1982</u>	<u>1987</u>	<u>1992</u>	<u>1997</u>
Itinerant Flights	3,100	11,800	20,200	31,200	45,700
Local Flights	<u>2,400</u>	<u>3,900</u>	<u>6,200</u>	<u>8,500</u>	<u>10,500</u>
TOTAL ENPLANEMENTS	5,500	15,700	26,400	39,700	56,200

Source: R. Dixon Speas Associates
Forecast prepared January 1977

the Mesa area cannot be forecast with any reasonable degree of reliability. However, it can be generalized that the volume of cargo will probably not grow to a level requiring more than a small storage shed at the airport, and will clearly not affect the planning and design of the airport.

4.3.4 Fuel Consumption

Fuel consumption in this text refers to the number of gallons of aviation fuel consumed in the Mesa area. The forecast of fuel consumption is a three phase calculation: first, an average number of hours flown per aircraft is applied to the forecast of based aircraft; second, an average fuel burn in gallons per hour is applied to the forecast of aircraft hours; and lastly, the percentage of fuel that is purchased at an aircraft's home base is applied. Average figures obtained from other studies where such information was available is used in this forecast. The average figures and the forecast of fuel consumption is presented in Exhibit 4-10.

4.4 TERMINAL AREA RELATIONSHIPS

Terminal area relationships are detailed measures of aviation demand used in determining the required size of airport facilities. The relationships are quantities calculated by applying ratios to the basic measures of demand, and represent peak numbers such as occupants in a room or flows such as movement thru a doorway. Since no historical statistics are available for Polacca Airport, ratios used herein are those gathered from other studies and nationally accepted planning guidelines.

Approximately 10 percent of the annual aircraft movements are expected to occur during the peak month of the year, most likely July, August, or September when there is generally fair weather and many people go on vacation. Furthermore, it is estimated that 20 percent of the aircraft movements during the average day of the peak month will occur during the busy hour. The

EXHIBIT 4-10
FUEL CONSUMPTION FORECAST
MESA AREA
(Gallons)

<u>ANNUAL CONSUMPTION</u>	<u>EXISTING 1976</u>	<u>FORECAST</u>			
		<u>1982</u>	<u>1987</u>	<u>1992</u>	<u>1997</u>
Based Aircraft	Not Available	28,000	44,000	108,000	174,000
Transient Aircraft	Not Available	6,000	9,000	14,000	21,000
TOTAL FUEL CONSUMPTION	--	34,000	53,000	122,000	195,000

ASSUMED AVERAGE FIGURES

<u>AIRCRAFT TYPE</u>	<u>HOURS FLOWN</u>	<u>FUEL BURN GPH</u>	<u>PERCENT PURCHASED AT HOME BASE</u>
Single-Engine 1-3 seats	220	8.8	96
Single-Engine 4+ seats	170	15.4	92
Multi-Engine <12,500 lbs.	270	24.2	95
Turboprop <12,500 lbs.	470	100.0	99

Source: R. Dixon Speas Associates
Forecast prepared January 1977.

number of busy hour movements during the peak day of the year is calculated using FAA terminal area relationships for various years.

Busy hour enplanements are estimated by applying a factor of 1.8 occupants to the forecast of busy hour movements during the average or peak day. Fuel flowage during the peak month will peak slightly more than aircraft movements, approximately 13 percent. It is also estimated that 60 percent of the fuel sold during the peak month will be sold within a two week period.

Although instrument approaches are not terminal area relationships in the strictest sense, they are similar and are accordingly presented together. An instrument approach is an approach to an airport, with intent to land, by an aircraft flying in accordance with an IFR flight plan, when the visibility is less than three miles and/or when the ceiling is at or below the minimum initial altitude. Investigation of a weather analysis performed for Pulliam Airport at Flagstaff, and historical instrument approach activity at Winslow indicate that IFR conditions prevail 5 percent of the time. To calculate the forecast of annual instrument approaches it is assumed that 50 percent of IFR weather occurs during normal airport operating hours, and that 75 percent of the itinerant approaches by based aircraft during these hours will be performed and recorded as instrument approaches.

The calculated terminal area relationships and annual instrument approaches are presented in Exhibit 4-1.