SECTION 2
AVIATION DEMAND FORECASTS

SUPERIOR AIRPORT MASTER PLAN - 2001

AVIATION DEMAND FORECASTS

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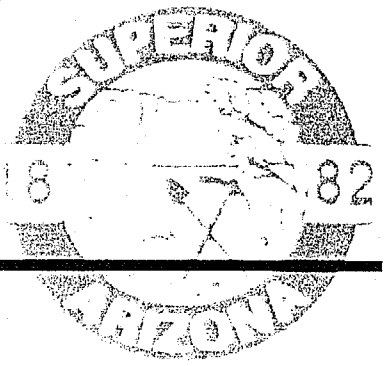


INTRODUCTION

Forecasts of aviation activity serve as a guideline for the timing required for implementation of airport improvement programs. While such information is essential to successful comprehensive airport planning, it is very important to recognize that forecasts are only approximations of future activity, based upon historical data and from the standpoint of present situations. They therefore must be used with careful consideration, as they may lose their validity through the passage of time. For this reason, an ongoing program of examination of local airport needs, as well as national and regional trends, is recommended and encouraged in order to promote the orderly development of the Superior Airport.

Air Traffic Control (ATC) personnel maintain records of aircraft operations at towered airports. However, at airports which are not served by air traffic control towers, estimates of existing aviation activity are necessary in order to form a basis for the development of realistic forecast projections. These estimates are usually based upon a review of available historical data, as well as observations of activity, and contacts with airport users.

Following the development of the estimated current demand, projections are made based upon established growth rates, area demographics, industry trends or other important indicators.

Forecasts are prepared for the Initial Term (five-year), the Intermediate Term (ten-year) and the Ultimate Term (fifteen and twenty-year) time frames. Having forecasts within these time frames will allow the construction of airport improvements to be timed to meet demand, but not so early as to remain idle for an unreasonable length of time.

TYPES OF OPERATIONS

There are four general types of aircraft operations which are considered in the planning process. These are termed local, based, itinerant, and transient. They are defined as follows:

- **Local operations** are defined as aircraft movements (departures or arrivals) for the purpose of training, pilot currency or pleasure flying, within the immediate area of the local airport. These operations typically consist of touch-and-go operations, practice instrument approaches, flights to and within local practice areas, and pleasure flights which originate and terminate at the airport under study.

- **Itinerant operations** are defined as arrivals and departures other than local operations, as described above. This type of operation is closely tied to local demographic indicators, such as local industry and business use of aircraft and usage of the facility for recreational purposes.

- **Based aircraft operations** are defined as the total operations made by aircraft based at the airport under study, with no attempt to classify the operations as to purpose.

- **Transient operations** are defined as the total operations made by aircraft other than those based at the airport under study. These operations typically consist of business or pleasure flights originating at other airports, with termination or a stopover at the study airport.

EXISTING REGIONAL AND NATIONAL PLANS

The Federal Aviation Administration (FAA) and the Arizona Department of Transportation - Aeronautics division (ADOT) maintain regional airport system plans as an aid to distribution and prioritization of grants-in-aid funding of airport improvements. These documents include the FAA's National Plan of Integrated Airport Systems (NPIAS) and Terminal Area Forecasts (TAF), and the ADOT 1995 Arizona State Aviation Needs Study (SANS).

Some of these documents include forecasts of aviation activity for existing Superior Airport, as well as some other nearby airports. The contents of each of these system plans as they relate to the Superior Airport are summarized as follows:

FAA National Plan of Integrated Airport Systems (NPIAS):

The National Plan of Integrated Airport Systems (NPIAS) identifies 3,294 existing airports that are significant to U.S. air transportation and provides estimates of development costs for its 5-year planning period. The purpose of NPIAS development is primarily to bring existing airports up to current design standards and to add capacity to congested airports.

The Superior Airport is not included as the federal system airport in the NPIAS. Therefore, it is not specifically addressed in the FAA's system planning. However, several nearby airports are included in the NPIAS that would be affected by development of the Superior Airport, either at its present site or at a new location. These NPIAS airfields are Falcon Field in Mesa, Williams Gateway Airport, Coolidge Municipal Airport, and San Carlos Apache Airport at Globe.

The current NPIAS role of each of these airports is "General Aviation" (GA). A NPIAS GA facility is an airport with no scheduled airline service and at least 10 based aircraft. As a general rule, GA airports included on the NPIAS must be at least 30 miles from another NPIAS airport. Because of the existing Superior site's proximity to another NPIAS airfields (Globe), it is doubtful that it would qualify as a component of the national system. However, if a new site is selected to the west of the present site, NPIAS qualification may be possible. This would make the airport eligible for FAA AIP grant funding.

FAA Terminal Area Forecasts (TAF):

The FAA Terminal Area Forecasts (TAF) database includes estimated Air Taxi & Commercial, General Aviation, Military, Itinerant and Local operations, as well as estimated numbers of based aircraft for 1976 through 1998 (historical) and 1999 through 2015 (forecasts). The current TAF (updated in March, 1999) includes data for the four nearby airfields mentioned above.

The TAF projections for these airports are summarized in the two tables that follow.

1999 TAF Forecasts for 4 NPIAS Airports in the Vicinity of Superior

BASED AIRCRAFT

Airport	1995	2000	2005	2010	2015
Mesa / Falcon Field	768	835	901	960	1,020
Williams Gateway	—	44	48	52	54
Coolidge Municipal	1	1	1	1	1
San Carlos Apache	48	48	48	48	48
TOTAL	817	928	998	1,061	1,123
Trend				+1.61% / year Average	

1999 TAF Forecasts for 4 NPIAS Airports in the Vicinity of Superior

TOTAL ANNUAL GENERAL AVIATION OPERATIONS

Airport	1995	2000	2005	2010	2015
Mesa / Falcon Field	182,668	229,026	263,914	298,092	332,293
Williams Gateway	112,258	232,514	264,667	296,821	328,975
Coolidge Municipal	91,500	91,500	91,500	91,500	91,500
San Carlos Apache	16,200	16,200	16,200	16,200	16,200
TOTAL	402,626	569,240	636,281	702,613	768,968
Trend					+3.29% / year Average

Source: 1999 FAA Terminal Area Forecasts (TAF)
Calculations by Gannett Fleming

Examination of the TAF forecasts of operations for the airports in the region suggests a very aggressive growth environment. This is mainly a result of the tremendous growth in the Phoenix/Mesa Metropolitan area.

The TAF also includes statewide operations data. Statewide forecasts indicate that air carrier passenger enplanements in Arizona increased from 12.5 million in 1992 to 16.9 million in 1996, a 7.8% increase over five years. The TAF forecasts that enplanements will continue to grow at the rate of about 4.5% per year through the year 2010.

Total commercial operations within Arizona increased from 698,412 in 1992 to 813,815 in 1996, a 3.9% increase over the five-year period. The TAF predicts that commercial operations will continue to increase at the rate of about 2.65% per year through 2010.

The TAF indicates that total aircraft operations within Arizona were steady at about 3.7 million between 1992 and 1996, and predicts that total operations will increase at the rate of about 1.38% per year through the year 2010.

This rate of growth and apparent health in the Arizona aviation economy, as presented in the TAF, will affect the future demands placed upon the State's airport system and the Superior Airport.

1995 Arizona State Aviation Needs Study (SANS):

The 1995 Arizona State Aviation Needs Study (SANS) also includes operations and based aircraft forecasts for the nearby airports listed above, and also for the existing Superior Airport.

Superior Airport is included on the State plan as a Secondary Airport. A Secondary Airport is one that is recognized by the FAA as an airport (per Form 5010), and is open to the public. Inclusion on the NPIAS is not a prerequisite for inclusion as a component of the State system. Although non-NPIAS airports are not eligible for FAA funding, all SANS airports are eligible for ADOT-Aeronautics grant participation.

The SANS projections for Superior indicate 216 total annual operations in 1995, which is projected to increase to 1,080 by 2015. Forecasts of based aircraft indicate one based aircraft in 1995, forecast to increase to 5 aircraft by the year 2015.

The SANS includes three alternate capital improvement programs for the Arizona airport system:

- Scenario A assumes that the 1995 funding level will remain unchanged for the 5- and 10-year periods. For the most part, only maintenance items were included in this alternate.

- Scenario B presented a program which would accommodate projected growth in the aviation system, but not necessarily provide funding to bring all airports up to current standards for safety and capacity.

- Scenario C provides for a condition in which all airports would be brought up to minimum development standards and improved such that they will meet forecast demand.

The following is a summary of the recommended SANS Scenario C improvements and estimates of cost for development at Superior Airport:

1995 Arizona State Aviation Needs Study (SANS)
Scenario C Improvement Program for Superior Airport

1995-2000	Pavement Maintenance	$ 186,090
	Construct Pilot Waiting Area	$ 45,000
	Construct Partial Parallel Taxiway	*
2001-2005	Pavement Maintenance	$ 32,090
	Install MIRL (runway lighting)	$ 190,750
	Extend Runway 4-22 by 860'	$ 94,600
	Complete Full Parallel Taxiway	$ 60,000
2006-2015	Pavement Maintenance	$ 64,200

** No estimated costs were included for this recommendation*

Source: 1995 Arizona State Aviation Needs Study (SANS)

The SANS recommendation for expenditures for pavement maintenance seems ill-advised since the existing runway is not paved. Development of a parallel taxiway is generally considered to be a lower priority item, usually not undertaken until annual operations reach about 20,000. Section 1 of this report has indicated that the maximum length of the runway that will fit on the present site is 3,500 feet, based on existing topographic constraints.

This Master Plan will provide a schedule of recommended improvements for the airport that will be included in the SANS update (currently being prepared by ADOT).

The following tables are summations of the projections of based aircraft and total annual operations for the 6 nearby SANS airports.

1995 SANS Forecasts for 6 Regional Airports

BASED AIRCRAFT

Airport	1995	2000	2005	2010	2015
Superior	1	3	3	4	5
Coolidge Municipal	9	10	11	12	13
Kearny	3	3	4	5	6
Falcon Field	610	635	660	687	710
Williams Gateway	50	70	95	125	149
San Carlos Apache	20	21	22	22	23
TOTAL	**693**	**742**	**795**	**855**	**906**
Trend for 6 Airports in Region:				+1.35% / year Average	
State Total	6,105	6,582	7,186	7,728	8,335
Trend (Arizona)				+1.57% /year Average	

Source: 1995 Arizona State Aviation Needs Study (SANS)
Calculations by Gannett Fleming

1995 SANS Forecasts for 6 Regional Airports

TOTAL ANNUAL GENERAL AVIATION OPERATIONS

Airport	1995	2000	2005	2010	2015
Superior	216	648	648	864	1,080
Coolidge Municipal	8,513	9,459	10,405	11,351	12,296
Kearny	5,318	5,318	7,091	8,864	10,637
Falcon Field	202,300	213,700	255,700	238,300	252,200
Williams Gateway	37,600	75,800	95,300	128,500	159,500
San Carlos Apache	5,264	5,528	5,791	5,791	6,054
TOTAL	**259,211**	**310,453**	**374,935**	**393,670**	**441,767**
Trend for 6 Airports in Region:			+2.71% / year Average		
State Total (Millions)	3.025				4.256
Trend (Arizona)			+1.73% /year Average		

Source: 1995 Arizona State Aviation Needs Study (SANS)
Calculations by Gannett Fleming

The SANS projections of numbers of based aircraft appear to present a fairly accurate picture of the number of based aircraft currently based in the area. The based aircraft growth rate presented in the SANS for the these airports is projected to be very close to that of the state as a whole.

The SANS forecasts of operations also indicate a relatively healthy growth in aviation activity within the region, exceeding the rate of growth for the state.

The general rate of economic and aviation growth is highly influenced by the Phoenix/Mesa Metropolitan area, and this is a significant factor in the development pressure that is beginning to be felt by the Town of Superior and its surrounding area.

AREA DEMOGRAPHIC AND ECONOMIC INDICATORS

Activity at any airport is in some way related to key demographic and economic indicators. This is true regardless of the class of airport, or the type of aeronautical activity that occurs at the airport. The planner's task is to find the indicators that are the specific "drivers" for the activity at the airport under study. The current or planned role of the airport is a key determining factor in this process. For instance, an airport with activity that is heavily business oriented will be affected by economic activity and economic health within the service area, and probably will also be influenced by changes in work force population. Air carrier airports (those with scheduled airline service) will be directly influenced by such factors as a combination of population changes and per capita income within the service area. Activity at airports in areas that are largely tourism oriented may be influenced by seasonal weather patterns and national economic trends.

The airport at Superior has existed for many years as a minimum service facility, offering only basic improvements and no pilot or passenger services. The majority of activity has consisted of occasional visits by pleasure aircraft.

Without significant improvement, it is highly probable that this airport will continue to function in a similar role into the future. Without an aggressive maintenance effort, it is probable that the airfield will become unusable in the near future. The existing facilities severely limit the present usefulness of the airport. The present site has inherent topographic and geographic constraints that will limit the available runway length (see Section 1). This will constrain the future role of the airport to providing service to only small single and twin engine propeller aircraft.

Since the airport is located very near the Boyce Thompson Arboretum and other nearby tourist attractions in the area, tourism may influence future airport utilization. However, this will occur more as a result of improvements to the airport rather than being a "driver" for increased demand at the airport. That is, if the airport is improved (with a paved runway and some level of security for parked aircraft and creature comforts), it will possibly attract tourists who travel by personal aircraft. The impact of future tourism should be viewed as a minor factor in planning for the Superior Airport's improvements.

If it is accepted that the tremendous rate of growth of the nearby Phoenix/Mesa Metropolitan area is causing suburban "sprawl" in the direction of Superior, with increased pressure to provide infrastructure for new housing and business opportunities, it follows that the logical primary "driver" for this growth, and for increased aviation activity, will be population.

Growth in population alone does not necessarily mean that the demand for aviation services will increase. Businesses must be prosperous in order to utilize air transportation for travel, employ people, and provide a reasonable level of job security to instill confidence for employees to make major purchases. Personal and recreational use of aircraft demands a relatively high level of "disposable" income. A reliable measure of the economic condition of a service area is per capita income, which provides a baseline of comparison between communities.

With this in mind, research of available historical population and economic data, and projections has been undertaken in order to form a basis for forecasts of aeronautical activity.

The following is a summary of relevant demographic data for the Maricopa, Pinal and Gila Counties, the Town of Superior, the nearby communities of Apache Junction, Miami, Globe, Queen Creek, and Florence, and the State of Arizona.

Population History - Regional Data
SUPERIOR AIRPORT

Region	1980 Census	1990 Census	1998 Estimate	Avg Annual Change
Cities and Towns in Vicinity [1]				
Town of Superior	4,600	3,468	3,485	-1.54%
Apache Junction	9,935	18,100	23,005	4.78%
Florence	5,331	7,510	13,845	5.45%
Miami	2,716	2,018	2,045	-1.57%
Globe	6,886	6,062	8,020	0.86%
Queen Creek	1,378	2,667	3,445	5.23%
Total:	30,846	39,825	53,845	3.15%
Counties [1]				
Maricopa County	1,509,175	2,122,101	2,806,100	3.51%
Pinal County	90,918	116,379	157,675	3.11%
Gila County	37,080	40,216	49,175	1.59%
Total:	1,637,173	2,278,696	3,012,950	3.45%
State of Arizona [1]	2,718,546	3,665,228	4,764,025	3.17%
Non-Metro Arizona Counties [1]	677,720	876,247	n/a	2.61%

[1] *Source: Arizona Department of Economic Security.*

Per Capita Income History - Regional Data
SUPERIOR AIRPORT

Region	1995	1996	1997	1998	Avg Annual Change
Pinal County	$14,886	$15,359	$15,706	$15,930	2.29%
Maricopa County	$22,858	$24,032	$25,634	$27,254	6.04%
Gila County	$16,049	$16,919	$17,333	$18,178	4.24%
State of Arizona	$20,634	$21,611	$22,839	$24,206	5.47%

Source: Arizona Department of Economic Security / Research Administration - June, 2000.

Examination of the population trends in the region reflect the influence of the Phoenix/Mesa Metropolitan area's growth. Although the population of the Towns of Superior and Miami have actually decreased over the past two decades, the beginning of a moderate increase is projected by the DES. Pinal County's population growth has kept pace with the state's rate of growth, and the communities of Queen Creek, Florence and Apache Junction have experienced population growth rates approaching or exceeding 5% per year. The average rate of growth of the six communities within the region is 3.15%, which equals the growth in the state as a whole, and exceeds that of the non-metro Arizona counties.

Per capita income within Pinal County lags behind the metropolitan Maricopa County level, and also falls short of the state's average.

ALTERNATE FORECASTS OF AERONAUTICAL ACTIVITY

Because the Superior Airport is an minimum service facility at the present time, with very little activity, it is not possible to base estimates of future activity on any historic trend of past activity at the airport.

Because of the existing airport's location, both present and future activity will be constrained. Development of the existing site is limited due to topographic constraints. The maximum runway length that could be developed on the present site is 3,500 feet, and approaches and departures in both directions are hampered by rising terrain that surrounds the site (see Section 1).

The population and economic data presented above indicates that the Phoenix/Mesa Metropolitan area is experiencing significant growth. This growth is precipitating suburban "sprawl" in the direction of Superior. As new residential and business development occurs, demand for aviation services will increase. The existing airports in Mesa (Falcon Field), Coolidge, and Chandler (Williams Gateway) will have to provide for this demand.

The existing airport in Superior is far enough removed from this development to make it an impractical venue to accommodate a portion of the demand. For this reason, two alternate demand projections have been made, each based on a different set of growth indicators. This approach will provide a basis of evaluating for the question of whether to develop the present site or select a new site.

The Gannett Fleming Airport Development Group has developed a computer model (the Adjusted Regional Model for Arizona Small Airports, or ARM) in order to facilitate estimation of the number of based aircraft and operations that can be expected at a new airport facility in the State of Arizona. This model is based on a database of existing available data for airports within the state, including location, economic indicators of the area, the actual number of based aircraft at each airport in the system, population of the airport's nearest community, airport elevation, and the airport's location in relation to other airports and to the state's major metropolitan areas. The alternate forecasts are based on the ARM computer model.

The ARM software calculates the expected number of based aircraft with regard to the population of the new or emergent airport's service area and the per capita income of the county where the airport will reside. The result of this initial calculation is then adjusted based on the elevation of the airfield (a measure of aircraft performance limitations that might affect utilization), the airport's distance from the nearest major metro area (Phoenix or Tucson), the airport's distance from any other airport that might compete

for operations, and whether or not fuel will be available at the study airport.

The initial number of annual aircraft operations (itinerant, local and total) is then computed based on a set of equations that are calibrated to the size of the community served, and the number of based aircraft, number of operations and population are projected for a 20 year planning period, based on the growth rates for Arizona counties.

The ARM v1.20 software uses population and economic data from the Arizona Department of Economic Security for the 1990 through 1998 period, as updated in June of 2000.

For the Superior Airport, two scenarios were examined. Model 1 assumes that the present site will be developed to its full potential, as illustrated in Section 1 of this report. Model 2 assumes that a new airport site will be selected and that it will be located near Florence Junction.

Forecast Model 1: For the projections for the Model 1 scenario, the following parameters were used. It was assumed that the population that would use the airport will be limited to that of the Town of Superior.

Population (Town of Superior)	3,485
Region	Pinal County
Airport Elevation	2,646' MSL
Highway miles from Phoenix	63 miles
Highway miles to nearest competing airport (Globe)	30 miles

Aviation fuel will be available at the airport.

Forecast Model 2: The Model 2 scenario assumed that moving the airport to a site near Florence Junction will increase the population of the service area that will use the airport, since it will be closer to the population center. The new service area population was approximated as follows:

Town of Superior	100%	x	3,485	=	3,485
Florence	30%	x	13,845	=	4,154
Apache Junction (including Gold Canyon)	25%	x	23,005	=	5,751
Total Service Area Population - Relocated Airport				=	13,390

It was assumed that the populations of Globe and Miami will continue to use the San Carlos Apache airport, Coolidge residents and the majority of Florence residents will continue to use Coolidge Municipal, Queen Creek residents will use Williams Gateway, and most Apache Junction residents will utilize Falcon Field.

The following parameters were used for the Model 2 forecast.

Population (Town of Superior) 13,390
Region ..... Pinal County
Airport Elevation ..... 2,000' MSL
Highway miles from Phoenix ..... 54 miles
Highway miles to nearest competing airport (Coolidge) ..... 25 miles
Aviation fuel will be available at the airport.

In both alternate scenarios, it is assumed that a certain number of existing aircraft that are based at nearby airfields will "migrate" to either the improved existing site, or to a new airport site, after improvements are made. Figure 2-1, at the end of this section, illustrates the number of aircraft registered by the FAA to owners with addresses in each of the communities within 25 miles of Superior. These aircraft include the following types:

	Single Engine	Twin Engine	Home Built	Rotor Craft	Sail Plane	Other (balloon)
Globe	19	2	1	1	—	1
Miami	5	—	—	—	—	—
Florence	3	—	3	—	—	—
Apache Junction	20	—	4	1	—	—
Gold Canyon	4	—	2	—	—	—
Coolidge	9	—	2	1	2	—
Kearny	2	—	—	—	—	—
Queen Creek	11	—	2	—	—	—

Figure 2-2 and 2-3 illustrate the aircraft migration concept.

The forecasts also assume that improvements are in place at the beginning of the planning period . This is assumed to be 2002 in the Model 1 scenario and 2005 for Model 2. This delay is built in to the projections in order to allow for completion of the planning process, the environmental review process, land acquisition (for Model 2), design and construction of initial improvements. The detailed results of the modeling are presented on the following pages. *(See also Figure 2-4, at the end of this Section, for a summary graphic comparison of the forecasts)*

MODEL 1: Existing Superior Airport Site

ADJUSTED REGIONAL MODEL FOR ARIZONA SMALL AIRPORTS
v1.20
c2000 NJ Pela / Gannett Fleming, Inc.

Service Area Population	3485
Pinal County per capita income = $ 15930	
Airport elevation (MSL) to establish performance limitation	2646
Approximate highway miles from airport to a major metro area	63
Approximate highway miles to closest neighboring airport	30
Fuel is available at the airport.	
Unadjusted Based Aircraft	8.66
Based aircraft adjusted for performance limitation	6.01
Based Aircraft adjusted for Per Capita Income	5.51
Based Aircraft adjusted for influence of metro area	5.57
Based Aircraft adjusted for influence of nearby airport	5.20
Based Aircraft adjusted for service availability	5.20
ADJUSTED PROJECTED BASED AIRCRAFT	5

20 YEAR FORECAST OF AIRPORT ACTIVITY

Population growth rate for Pinal County = 2.95%/YR

			OPERATIONS		
Year	Population	Based AC	Itinerant	Local	Total
2002	3485	5	6234	3666	9900
2003	3588	5	6418	3774	10192
2004	3694	6	6607	3886	10493
2005	3803	6	6802	4000	10803
2006	3915	6	7003	4118	11121
2007	4030	7	7210	4240	11449
2008	4149	7	7422	4365	11787
2009	4272	7	7641	4494	12135
2010	4398	8	7867	4626	12493
2011	4527	8	8099	4763	12861
2012	4661	8	8338	4903	13241
2013	4798	9	8584	5048	13631
2014	4940	9	8837	5197	14033
2015	5086	9	9098	5350	14447
2016	5236	10	9366	5508	14874
2017	5390	10	10906	7661	18568
2018	5549	11	10999	7761	18760
2019	5713	11	11092	7862	18955
2020	5881	11	11187	7965	19151
2021	6055	12	11282	8068	19349
2022	6233	12	11378	8171	19549

MODEL 2: New Airport Site Near Florence Junction

ADJUSTED REGIONAL MODEL FOR ARIZONA SMALL AIRPORTS
v1.10
c2000 NJ Pela / Gannett Fleming, Inc.

Service Area Population	13390
Pinal County per capita income = $ 15930	
Airport elevation (MSL) to establish performance limitation	2000
Approximate highway miles from airport to a major metro area	54
Approximate highway miles to closest neighboring airport	25
Fuel is available at the airport.	
Unadjusted Based Aircraft	28.72
Based aircraft adjusted for performance limitation	26.72
Based Aircraft adjusted for Per Capita Income	24.51
Based Aircraft adjusted for influence of metro area	29.04
Based Aircraft adjusted for influence of nearby airport	26.72
Based Aircraft adjusted for service availability	26.72
ADJUSTED PROJECTED BASED AIRCRAFT	27

20 YEAR FORECAST OF AIRPORT ACTIVITY

Population growth rate for Pinal County = 2.95%/YR

			OPERATIONS		
Year	Population	Based AC	Itinerant	Local	Total
2005	13390	27	14978	12056	27034
2006	13785	27	15137	12227	27365
2007	14192	28	15301	12404	27704
2008	14610	29	15469	12584	28053
2009	15041	29	15641	12770	28411
2010	15485	30	15818	12961	28779
2011	15942	31	16000	13157	29157
2012	16412	32	16187	13357	29545
2013	16896	32	16379	13564	29943
2014	17395	33	16576	13775	30352
2015	17908	34	16778	13993	30771
2016	18436	35	16986	14216	31202
2017	18980	36	17199	14445	31643
2018	19540	37	17417	14679	32097
2019	20116	38	17642	14920	32562
2020	20710	38	17872	15167	33039
2021	21321	39	18108	15421	33529
2022	21950	40	18350	15680	34031
2023	22597	41	18599	15947	34546
2024	23264	42	18854	16220	35074
2025	23950	44	19115	16500	35615

IDENTIFICATION OF CRITICAL AIRCRAFT

The "critical", or "design", aircraft for any given airport facility is defined as that aircraft (or group of aircraft) whose dimensional and/or performance characteristics are the basis for selection of facilities design criteria. The critical aircraft must be demonstrated to account for a minimum of 500 annual actual or forecast operations (an "operation" is either a landing, a takeoff, or a touch-and-go procedure).

Different aircraft may govern the requirements for runway design, and for lateral and vertical separation standards. The factors usually considered are the aircraft maximum gross takeoff weight, approach speed category, wingspan, and tail height.

Based on a comparison between the design criteria contained in FAA Advisory Circular AC 150/5300-13 and the existing airport facilities, the Superior Airport is presently able to accommodate only small aircraft, probably limited to Approach Category A (less than 91 knot approach speeds), and Airplane Design Group I (wingspan less than 49 feet).

Therefore, an ARC A-I reference code is indicated as the airport's present role.

The existing airport only experiences occasional use. The aircraft currently using the airport is a mix of small piston singles such as the Cessna 180, 182 and 206 and the Piper PA-32. Total use does not currently approach 500 annual operations. According to local sources, the use of the existing airfield is limited to possibly 20 to 30 operations per year.

The Model 1 forecasts presented above indicate that after initial improvements are made to the existing site, the annual operations may increase to as many as 9,900 per year, with 5 based aircraft. After improvements are made (including a paved and lighted runway), a greater range of aircraft types will be able to use the airport. These may include light single and twin engined piston types and possibly very small business jets. The range of aircraft that may be accommodated will, however, be restricted because of the topographic constraints limiting runway length.

The Model 2 forecasts indicate a significant level of activity as based aircraft migrate to the new facility from other nearby airports. Initially, there may be as many as 27 based aircraft, and annual operations may reach 27,000. A greater range of aircraft would be able to utilize an airport at a new site because it is assumed that runway length development would not be restricted.

A representative "design fleet" of ARC A-I, A-II, B-I and B-II aircraft with takeoff weights of less than 12,500 pounds is presented for each of the forecast models in the

tables on the following pages. The tables are output files from the AcData v6.10 aircraft database, which provides aircraft dimensional and approximate performance criteria for 465 aircraft types and configurations. For Model 1, the runway length was restricted to 3,500'. The resulting list of aircraft are those that can operate from the 3,500' runway with a density altitude of 5,635', which was derived by using a pressure altitude of 2,646' MSL at 97° Fahrenheit. The Model 2 runway length requirements for the various aircraft were computed based on a density altitude of 4,843', which was derived by using a pressure altitude of 2,000' MSL at 97° Fahrenheit.

In the tables, critical design elements are indicated by **Bold** type.

The Model 2 critical aircraft listings indicate that a 5,100' long runway would accommodate all of the selected database aircraft at the 4,843' density altitude. Most of the listed types could be accommodated by a 4,500' runway.

CRITICAL AIRCRAFT LIST - MODEL 1 FORECASTS
EXISTING SUPERIOR AIRPORT SITE
ARC A-I through B-II

P A R A M E T E R S :
DENSITY ALTITUDE : 5635 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	0.00	0.00	0.00	0.00	0.00	0.00
& Less Than:	121.00	79.00	50.00	25.00	12500.10	3501.00

Model	AppSpeed	WingSpan	ACLength	TailHite	TOweight	RWindex
Beechcraft A35	72	32.75	25.08	6.50	3500	**3190**
Cessna 152	56	33.20	24.10	8.50	1670	2403
Cessna 170	65	36.00	25.00	6.42	2200	3056
Cessna 172	60	36.00	26.90	8.80	2400	2625
Cessna 177B	60	35.50	27.25	8.58	2500	2248
Cessna 182Q	64	36.00	28.00	9.20	2950	2167
Cessna 210N	73	36.80	28.20	9.70	3800	1723
Cessna 340A	92	38.10	34.30	12.60	5000	2776
Cessna 402C	95	44.12	36.38	11.45	5500	2790
Cessna 421C	96	41.10	36.40	11.50	6200	2912
Cessna Citation I/SP	**107**	**47.10**	**43.50**	**14.33**	**11850**	2509

C R I T I C A L P A R A M E T E R S

Runway Length Index.....	(3190)	Beechcraft A35	@	3500 #
WingSpan.....	(47.10)	Cessna Citation I/SP		
Tail Height.....	(14.33)	Cessna Citation I/SP		
Aircraft Length.....	(43.50)	Cessna Citation I/SP		
Takeoff Weight.....	(11850)	Cessna Citation I/SP		
Approach Speed.....	(107)	Cessna Citation I/SP		

CRITICAL AIRCRAFT LIST - MODEL 2 FORECASTS
AIRPORT SITE NEAR FLORENCE JUNCTION
ARC A-I through B-II

P A R A M E T E R S :
DENSITY ALTITUDE : 4843 MSL
GENERAL TYPE CODE : General
U.S CUSTOMARY UNITS : Speed in knots.....Lengths in Feet.....Weight in Pounds

Greater Than:	0.00	0.00	0.00	0.00	0.00	0.00
& Less Than:	121.00	79.00	50.00	25.00	12500.10	10000.00

Model	AppSpeed	WingSpan	ACLength	TailHite	TOweight	RWindex
Beechcraft 65 Queen Air	90	45.88	33.33	14.17	7700	3811
Beechcraft B200	98	**54.50**	**43.80**	15.00	**12500**	3869
Beechcraft E-18S	87	49.20	35.10	10.50	9300	3874
Beechcraft B100	**111**	45.90	39.90	**15.40**	11500	4613
Beechcraft A35	72	32.75	25.08	6.50	3500	2953
Cessna 152	56	33.20	24.10	8.50	1670	2194
Cessna 170	65	36.00	25.00	6.42	2200	2811
Cessna 172	60	36.00	26.90	8.80	2400	2422
Cessna 177B	60	35.50	27.25	8.58	2500	2087
Cessna 182Q	64	36.00	28.00	9.20	2950	2012
Cessna 210N	73	36.80	28.20	9.70	3800	1651
Cessna 310R	93	36.92	31.96	10.67	5500	4904
Piper PA-12	65	35.33	22.75	6.75	1750	3587
Cessna 425	103	44.10	35.90	12.60	8600	4652
Cessna 425	103	44.10	35.90	12.60	8200	4523
Cessna 441	99	49.30	34.70	12.80	9850	4447
Cessna 340A	92	38.10	34.30	12.60	5990	4105
Cessna 402C	95	44.12	36.38	11.45	6850	4480
Cessna 414A	94	44.10	36.40	11.50	6750	**5055**
Cessna 421C	96	41.10	36.40	11.50	7450	4325

C R I T I C A L P A R A M E T E R S

Runway Length Index.....	(5055)	Cessna 414A	@ 6750 #
WingSpan.....	(54.50)	Beechcraft B200	
Tail Height.....	(15.40)	Beechcraft B100	
Aircraft Length.....	(43.80)	Beechcraft B200	
Takeoff Weight.....	(12500)	Beechcraft B200	
Approach Speed.....	(111)	Beechcraft B100	

SEASONAL USE

Some level of seasonal fluctuation in aircraft operations may be expected at any airport. This fluctuation is most apparent in regions with severe winter weather patterns, at nontowered general aviation airfields. The fluctuation is less pronounced at major airports, with a high percentage of commercial and scheduled airline activity, and also at those facilities with a milder winter climate and/or a high percentage of training activity.

The probable future seasonal use at Superior's airport was modeled by applying the forecast total annual operations to the average seasonal use trend derived from the 1979-84 FAA records of aircraft operations handled by towered and non-towered facilities nationally (from the FAA Statistical Handbook of Aviation), as follows. A seasonal use curve for nontowered airports located in areas with severe winter weather is included for comparison.

Typical Seasonal Use Trend Curves

MONTH	Nontowered Airports w/Severe Winter Weather	FAA Towered Airports
January	3.5%	7.2%
February	4.0%	8.2%
March	4.8%	8.6%
April	7.5%	9.0%
May	11.3%	9.1%
June	13.5%	9.4%
July	14.8%	9.1%
August	13.0%	8.7%
September	10.0%	8.7%
October	8.0%	7.8%
November	5.8%	7.1%
December	3.8%	7.1%

PEAK DEMAND CALCULATIONS

In order to arrive at a reasonable estimate of the actual peak demand upon the airport facilities, it was necessary to develop a method to calculate the estimated Maximum Peak Hourly Demand which might be expected to occur during the hours of peak usage of the airport. The Seasonal Use Trend Curve, as presented above, was used as a tool to determine this usage.

Using the Seasonal Use information, a formula was derived which will calculate the average daily operations in a given month, based on the percentage of the total annual operations for that month, as determined by the curve.

The formula is as follows:

Where	T	=	Monthly percent of use (from curve).
	M	=	Average monthly operations.
	A	=	Total annual operations.
	D	=	Average Daily Operations in a given month.
	M	=	A (T / 100)
	D	=	M / (365 / 12)

Experience has shown that approximately 90% of total daily operations will occur between the hours of 7:00 AM and 7:00 PM (12 hours) at a typical General Aviation airport, and that the maximum peak hourly occurrence may be 50% greater than the average of the hourly operations calculated for this time period.

Therefore, the *Estimated Peak Hourly Demand* (P) in a given month was determined by compressing 90% of the Average Daily Operations (D) in a given month into the 12 hour peak use period, reducing that number to an hourly average for the peak use period, and increasing the result by 50%, as follows:

Where	D	=	Average Daily Operations in a given month.
	P	=	Peak Hourly Demand in a given month.
	P	=	1.5 (0.90D / 12)

The monthly, daily, and hourly demand was computed for both forecast models, for their respective beginning and horizon planning years.

The results are included in the tables on the following pages.

Estimated Hourly Demand / Month
Superior Airport
MODEL 1: Estimated Potential Activity - 2002

Planning Year:	2002			
Operations:	9,900			
Month	% USE	Monthly	Daily	Hourly
January	7.20	713	23	3
February	8.20	812	27	3
March	8.60	851	28	3
April	9.00	891	29	3
May	9.10	901	30	3
June	9.40	931	31	3
July	9.10	901	30	3
August	8.70	861	28	3
September	8.70	861	28	3
October	7.80	772	25	3
November	7.10	703	23	3
December	7.10	703	23	3

Estimated Hourly Demand / Month
Superior Airport
MODEL 1: Estimated Potential Activity - 2022

Planning Year:	2022			
Operations:	19,549			
Month	% USE	Monthly	Daily	Hourly
January	7.20	1,408	46	5
February	8.20	1,603	53	6
March	8.60	1,681	55	6
April	9.00	1,759	58	7
May	9.10	1,779	58	7
June	9.40	1,838	60	7
July	9.10	1,779	58	7
August	8.70	1,701	56	6
September	8.70	1,701	56	6
October	7.80	1,525	50	6
November	7.10	1,388	46	5
December	7.10	1,388	46	5

Estimated Hourly Demand / Month
Superior Airport
MODEL 2: Estimated Potential Activity - 2005

Planning Year:	2005			
Operations:	27,034			
Month	% USE	Monthly	Daily	Hourly
January	7.20	1,946	64	7
February	8.20	2,217	73	8
March	8.60	2,325	76	9
April	9.00	2,433	80	9
May	9.10	2,460	81	9
June	9.40	2,541	84	9
July	9.10	2,460	81	9
August	8.70	2,352	77	9
September	8.70	2,352	77	9
October	7.80	2,109	69	8
November	7.10	1,919	63	7
December	7.10	1,919	63	7

Estimated Hourly Demand / Month
Superior Airport
MODEL 2: Estimated Potential Activity - 2025

Planning Year:	2025			
Operations:	35,615			
Month	% USE	Monthly	Daily	Hourly
January	7.20	2,564	84	9
February	8.20	2,920	96	11
March	8.60	3,063	101	11
April	9.00	3,205	105	12
May	9.10	3,241	107	12
June	9.40	3,348	110	12
July	9.10	3,241	107	12
August	8.70	3,099	102	11
September	8.70	3,099	102	11
October	7.80	2,778	91	10
November	7.10	2,529	83	9
December	7.10	2,529	83	9

AIRPORT DEMAND VERSUS CAPACITY

The methodology for computing the relationship between an airport's configuration and its theoretical capacity is contained in FAA Advisory Circular AC 150/5060-5, Airport Capacity and Delay. The FAA's Airport Design version 4.2A computer program includes a routine for estimating capacity of small airports that is based on this methodology.

The Annual Service Volume, or ASV, is a calculated reasonable estimate of an airport's total annual capacity, taking into account differences in runway utilization, weather conditions and aircraft mix that might be encountered in a year's time. When compared to the existing or forecast operations of an airport, the ASV will give an indication of the adequacy of the facility in relationship to its activity level.

The ASV for Superior Airport, assuming it remains in a single runway configuration, is 230,000 annual operations. The forecasts developed in this study indicate that total maximum annual activity for any of the forecast scenarios will be about 35,600 operations in the year 2025, or only about 15.5% of the airport's ASV.

Superior Airport's capacity in terms of operations per hour is estimated as 98 operations per hour in Visual Flight Rules (VFR) conditions, and 59 operations per hour in Instrument Flight Rules (IFR) conditions. The hourly demand estimates developed in this study indicate that hourly activity will not exceed 12 operations during the twenty year planning period.

There are no capacity constraints apparent for the Superior Airport.

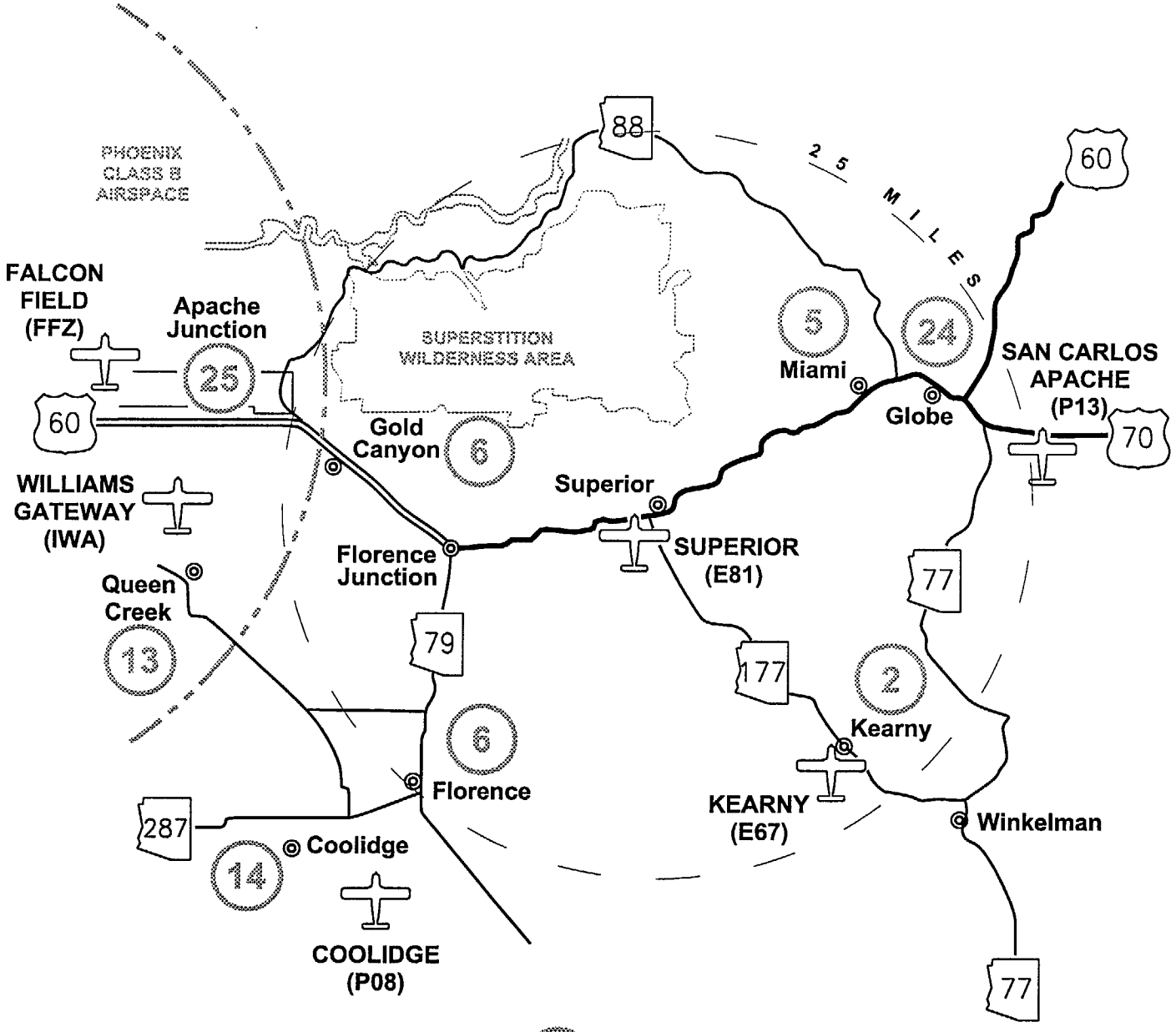


FIGURE 2-1

SUPERIOR AIRPORT
Aircraft Distribution Map

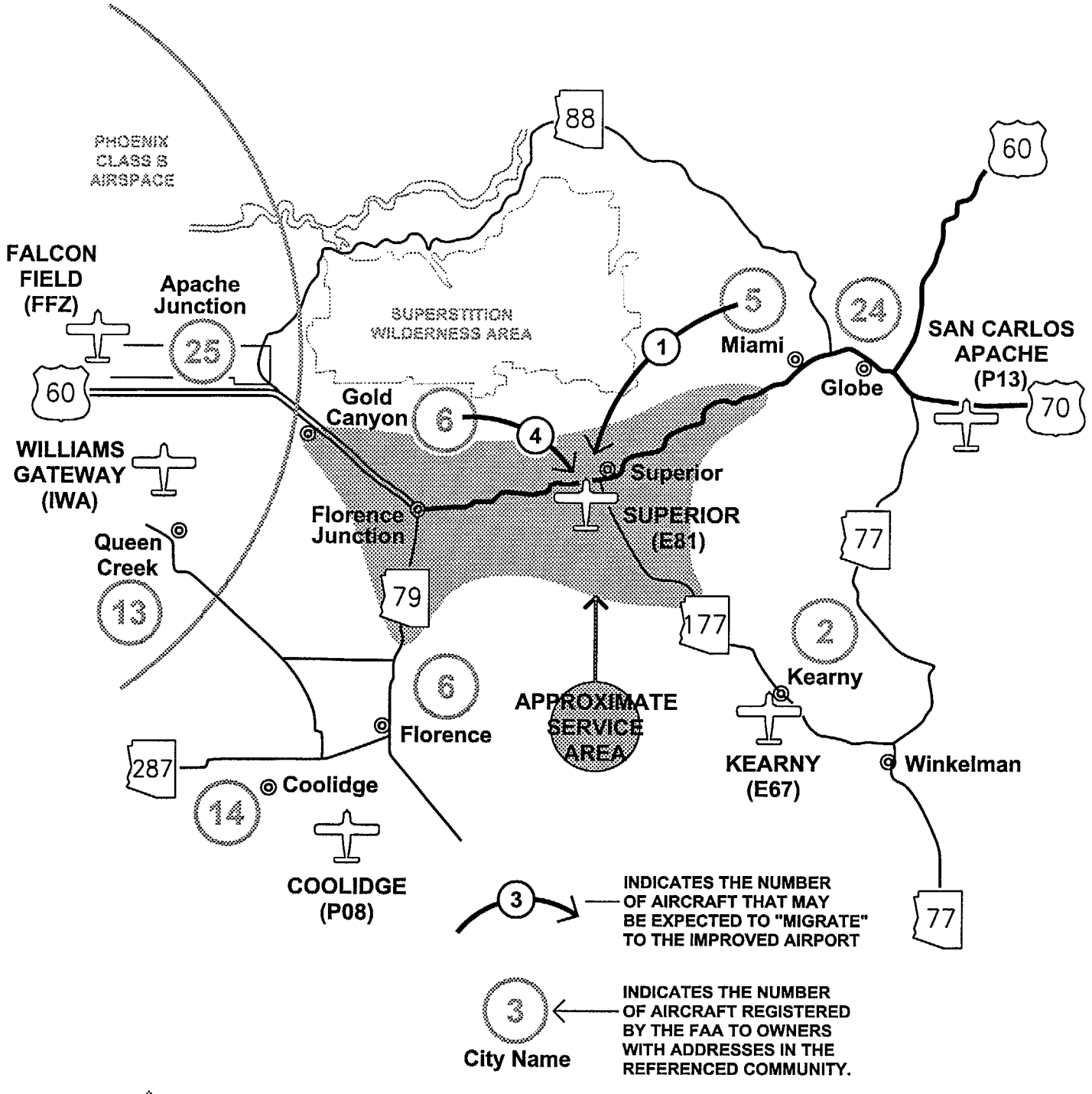


FIGURE 2-2

SUPERIOR AIRPORT

Based Aircraft Migration

AIRPORT AT PRESENT SUPERIOR SITE

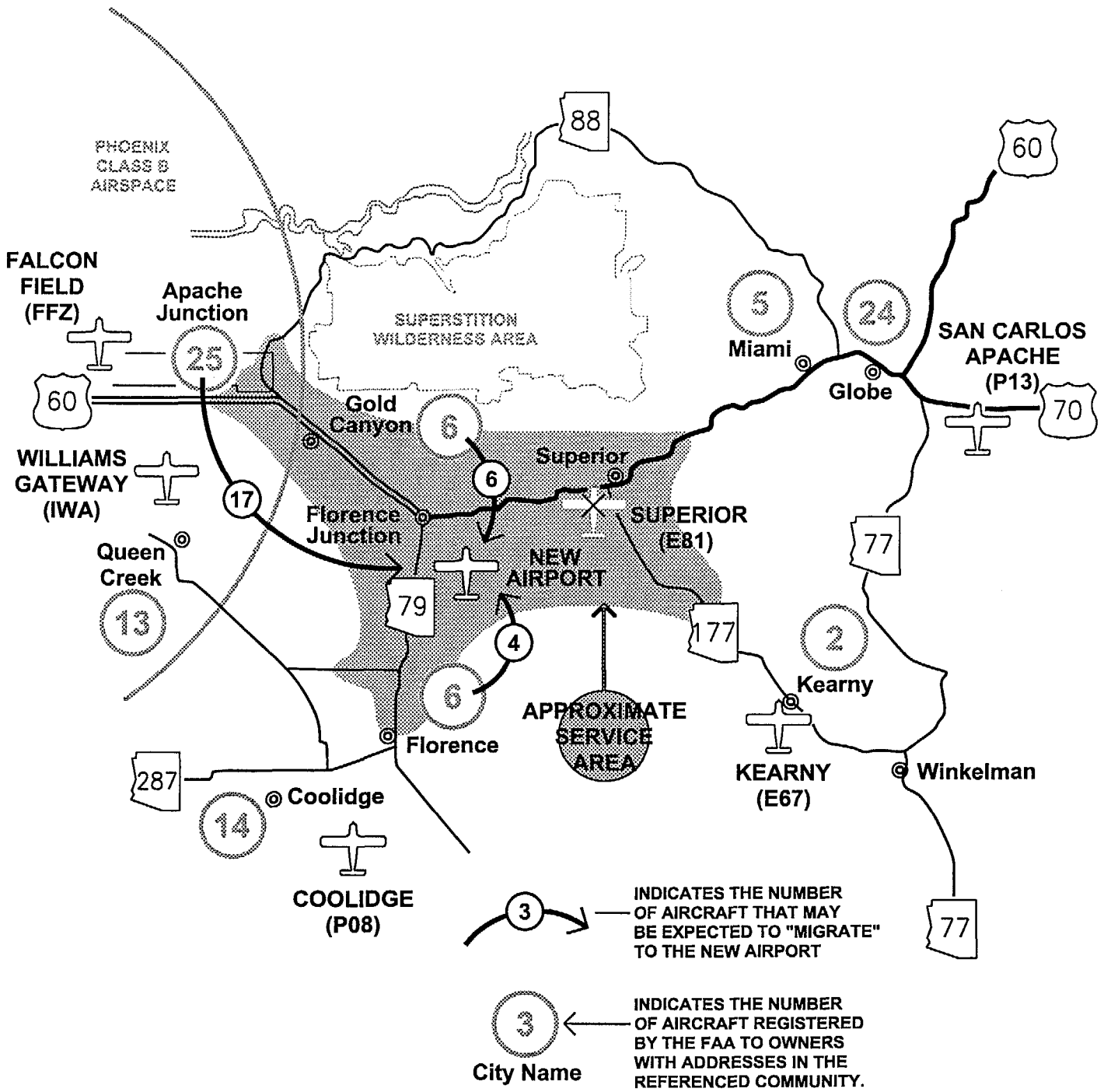
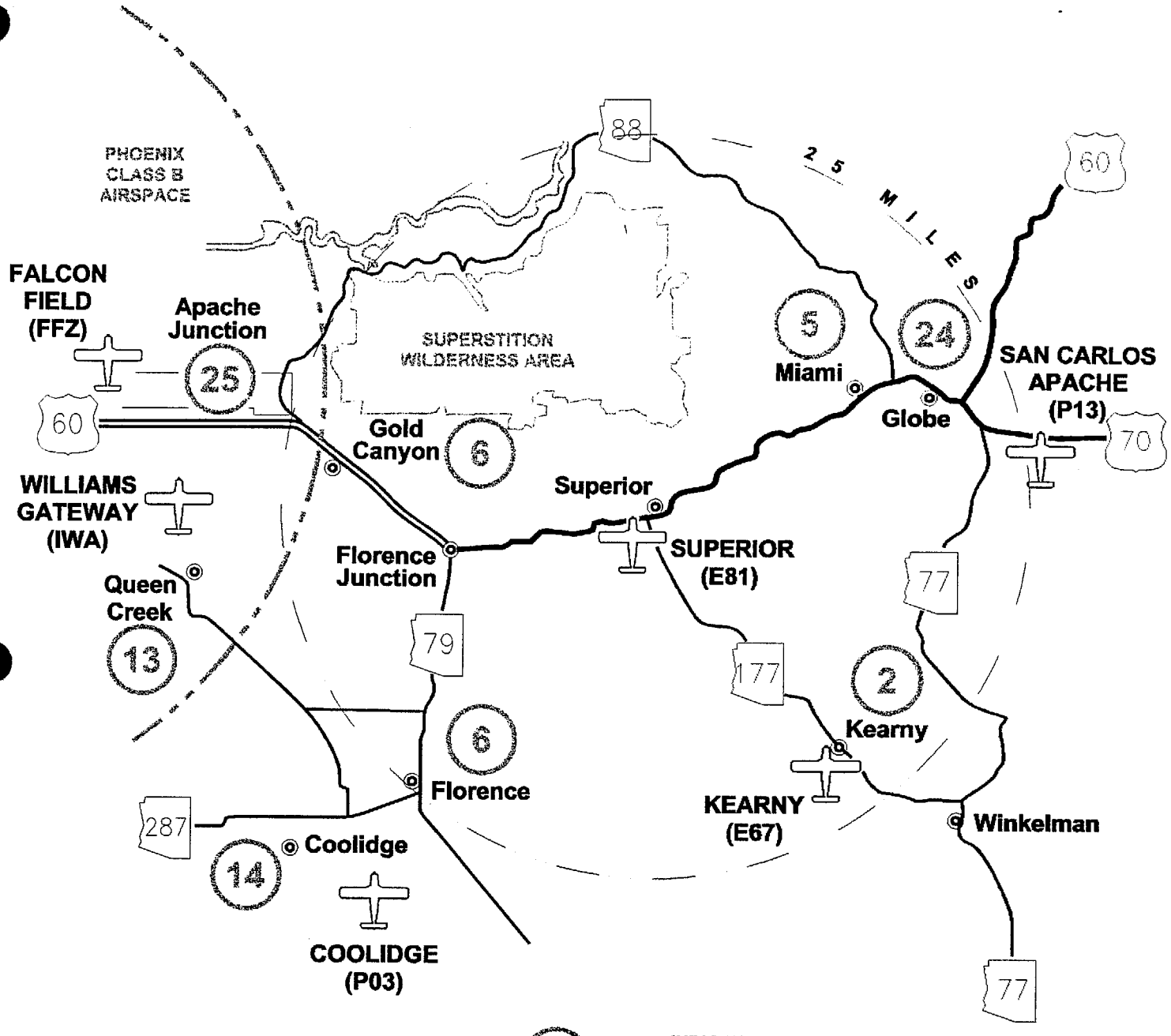


FIGURE 2-3

SUPERIOR AIRPORT
Based Aircraft Migration
AIRPORT NEAR FLORENCE JUNCTION



SUPERIOR AIRPORT
Aircraft Distribution Map

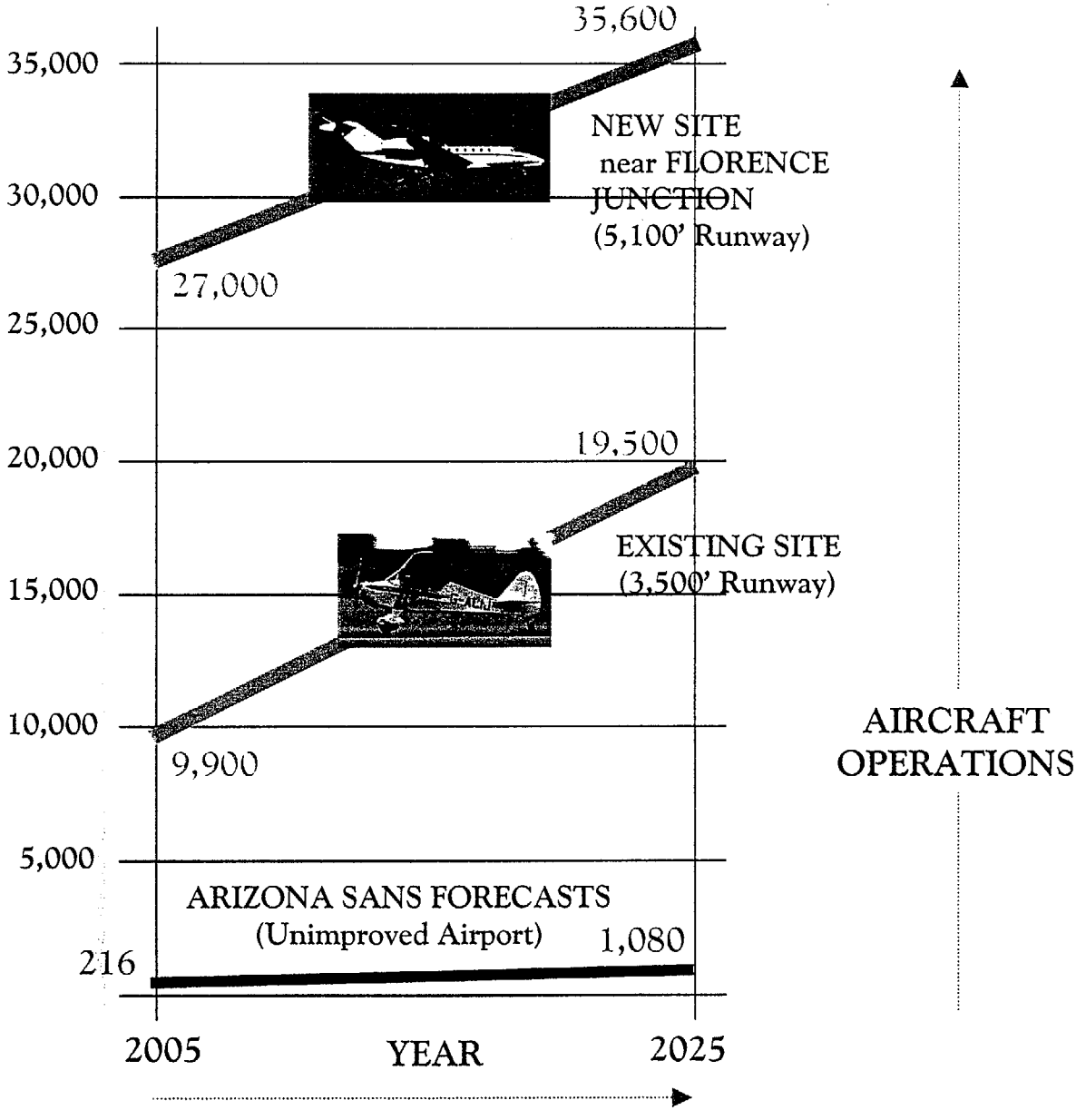


FIGURE 2-4
SUPERIOR AIRPORT
Forecasts of Aviation Activity
COMPARISON OF FORECASTS