Financial Needs: Aviation

In scenarios B and C total financial needs identified in the long-range are considerably lower than those over the first ten years due to the difficulty of projecting the need and extent of future projects with as much detail as in the early stages of the planning program. The SANS, therefore concentrates more on the short and intermediate planning periods.

Figure 12:
Total 10-Year Financial Need for
Two Performance Scenarios B&C
2000-2010

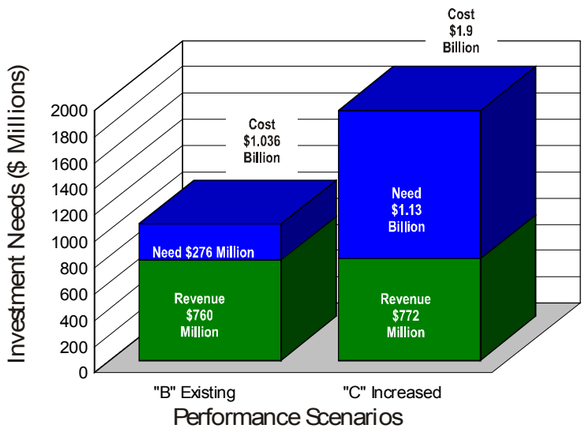
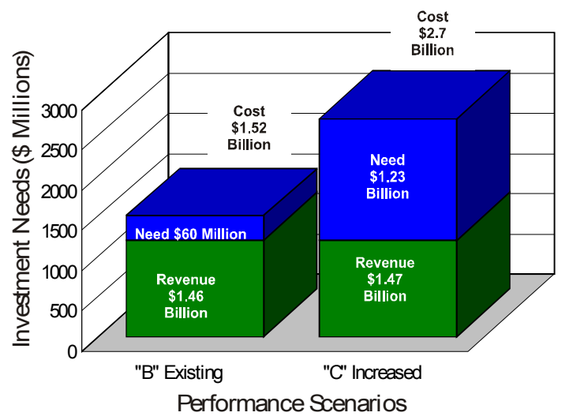


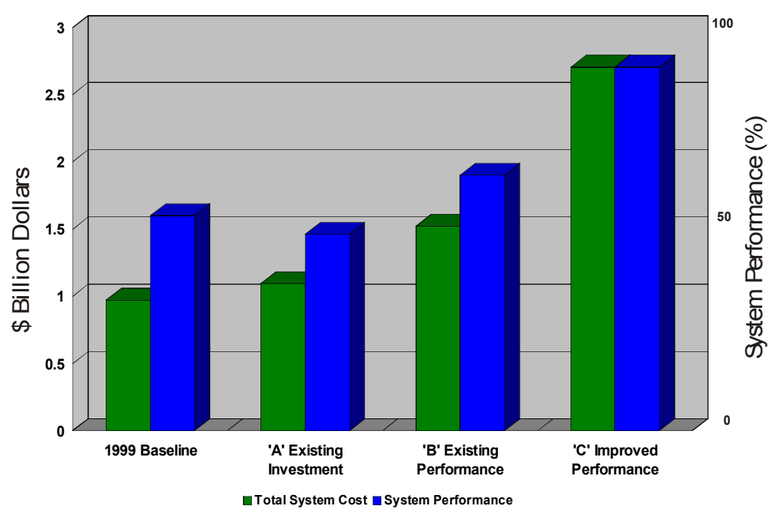
Figure 13:
Total 20-Year Financial Need for
Two Performance Scenarios B&C
2000-2020



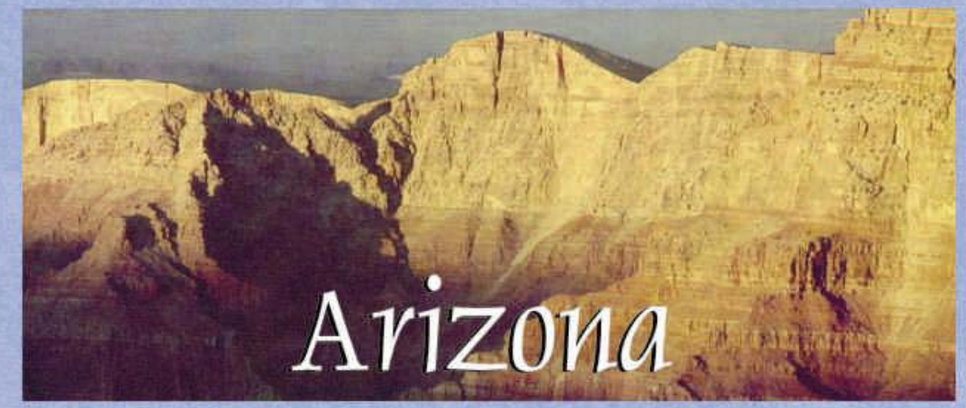
Investment and Performance

The concept selected for assessing the Needs for the SANS 2000 is one based on the application of objective performance measures for evaluating alternative system funding scenarios. The value of this methodology is that the results from various levels of investment in the system can be clearly determined and identified relative to the goals, objectives and performance measures utilized. A key assumption of the methodology is that the overall system performance should take precedence over the individual airports. Figure 14, which follows, graphically shows the relationship between the recent investments which have been made to the Arizona system of airports since 1995 and the effects on system-wide facility performance. Since 1995 the level of investment to the airport system has resulted in an overall deterioration in system performance. A continuation of the existing funding level will result in a continued decline in services and could affect aviation safety across the state. While significant improvements have been made at several larger airports across the state, the aviation system as a whole and many of the smaller facilities continue to have significant needs.

Figure 14:
Investment and Performance
Performance Scenarios - Year 2020



Executive Summary



State Aviation Needs Study (SANS) 2000

Prepared for the

Arizona Department of Transportation
Aeronautics Division

Volume I, II, III

Introduction

The Arizona Department of Transportation, Aeronautics Division, through its State System Planning Process and special studies, has developed an extensive and highly effective statewide aviation system. Consisting of nearly 85 public use facilities, the system moves over 20 million passengers per year and provides an estimated 28.1 billion dollars in direct, indirect, and induced economic impact annually for the State in 1998. The aviation system supports the tourist industry and other business opportunities, enhances the quality of life in the state through the delivery of health care and social services to rural areas, and facilitates the provision of emergency medevac flights throughout the state.

From a systemwide perspective, the condition of the existing system relative to the basic airport infrastructure, runway capacity, and the level of service provided to the citizens of the state is generally good. Overall, most airports in the state have better than average airside and landside facilities, adequate runway capacity, and well maintained pavements. The system also performs well in fulfilling its fundamental mission of the movement of people and goods. When compared to national standards, the system has very few gaps in the provision of convenient access to both commercial passenger airline service and general aviation services.

However, continued growth in both commercial service and general aviation activity will put a strain on the system. Significant increases in delay will occur at the state's busiest airports and system-wide performance will decline without continued investment in the system. Increased delays for both air carrier and general aviation airports would substantially reduce the significant positive economic impact of aviation to the state.

SANS Assessment Process

Aviation needs are estimated using a performance based needs model originally developed for the 1990 State Aviation Needs Study. The methodology, which is illustrated in Figure 1, evaluates the performance of all airports in the state aviation system and determines needs relative to the state aviation system's goals and objectives. Three aviation needs scenarios were developed corresponding to the capital investment levels required to maintain and to improve system performance over the next twenty years.

The first Scenario (A) was designed to explore a scenario in which the existing funding level (in current dollars) would remain unchanged over the next twenty year period. The goal was to examine the types of improvements that could be done in circumstances in which funding for maintenance and construction does not keep up with increasing demand.

The second Scenario (B) determines the financial investment required to maintain the present performance level of Arizona's airport system into the future. Investment is sufficient only to keep pace with projected demand.

The third Scenario (C) assesses the financial investment needed to improve all State Aviation System facilities sufficiently to meet the Federal Aviation Administration and ADOT's minimum planning and design guidelines for airports. In this scenario, existing airports are expanded to meet forecast demand, and new airports are constructed to meet access or capacity deficiencies.

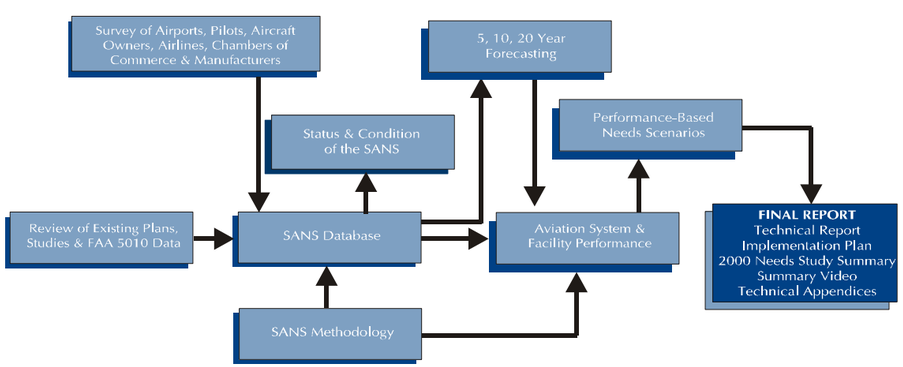


Figure 1: SANS Methodology Flow Chart

Aviation Cost Estimates

For this summary, we have primarily concentrated on only two of the investment scenarios -- maintaining existing performance and increased performance of the system. Because the existing investment scenario (A) results in a dramatic decrease in overall system performance, it was determined that this would be an undesirable course of action for the future. Figure 9 shows the estimated cost to **maintain** the existing level of performance of the aviation system. In this scenario, the total cost for the next five years is $539 million and for the next ten years is $1.04 billion. Nearly one-third of all expenditures are required by commercial service airports, with about sixty percent invested in other state primary airports.

Figure 9:
Cost Estimates to Maintain Existing Level
of Aviation System Performance 2000-2010
Ten-Year Total Cost = $1.04 Billion

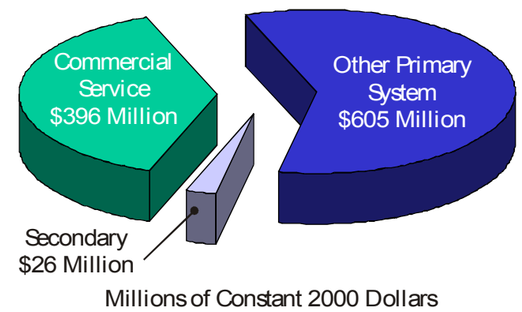
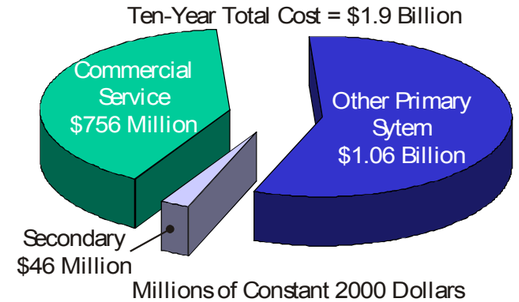


Figure 10 shows the estimated cost to bring all system airports up to the minimum Federal Aviation Administration and ADOT guidelines for airport planning and design. For the next five years, costs are estimated at $1.123 billion and for the next ten years, estimated expenditures are $1.9 billion. Again, the majority of expenditures would be used to upgrade commercial service and other primary system airports.

Figure 10:
Cost Estimates to Bring All Airports
to Minimum Guidelines 2000-2010
Ten-Year Total Cost = $1.9 Billion



Aviation Revenue

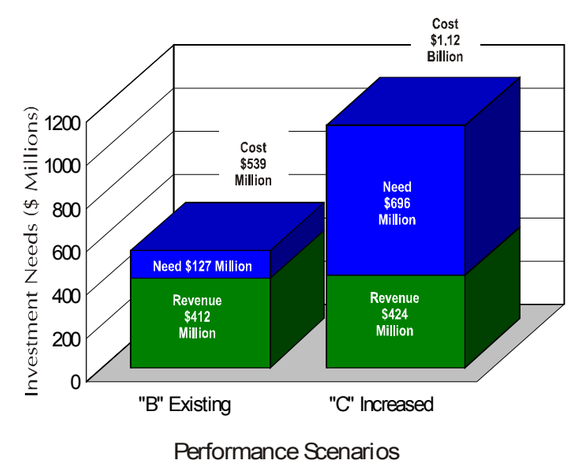
From the year 2000 forward, aviation revenue is forecast to average about $72 million per year based on current revenue sources. If averaged over the next five years, total revenue is forecast to total about $360 million. For the ten-year period, total aviation revenue would reach about $760 million. Of that ten-year total, $592 million is estimated from the federal government, $129 million from the state, and nearly $39 million from local governments and private sources. Private contributions for private airports vary with each scenario.

Financial Needs: Aviation

Financial needs are defined as the difference between costs and revenues. Figures 11-13 show the estimated financial needs for each Scenario. For example, over the next five years, to maintain the existing level of performance, an additional $127 million is needed to meet expenditures. Over the next ten years that figure rises to more than $276 million, and about $604 million in additional funding is needed over the next two decades.

To bring all the system airports to minimum guidelines, an additional $696 million, $1.12 billion, and $1.5 billion is needed over the five-, ten- and twenty- years, respectively.

Figure 11:
Total 5-Year Financial Need for
Two Performance Scenarios B&C
2000-2005



System Performance

The performance-based needs scenarios are the focus of this study. Needs scenarios were developed to evaluate the various alternative future aviation system development strategies. They were matched against performance measures that reflected the desired level of service that the state aviation system should provide. As indicated, three alternative development strategies were considered. By comparing each system development scenario to the performance measures, State decision makers can determine the level of performance that each scenario will provide, as well as the associated costs of that scenario.

To adequately assess the system, three general categories of performance measures were developed: Facility, Service Level, and Economic Measures.

- Facility Performance - Primary measures are physical condition and airfield capacity.
- Service Level Performance - Measures of the adequacy of the system in fulfulling the fundamental mission of the movement of people and goods.
- Economic Performance - Primary measures are costs of delay, economic impacts, and return on investment.

In total, 17 performance measures were selected for the SANS 2000. Figure 7 shows the existing performance level of 12 of the measures, those addressing only facility and service level performance. Figure 8 provides a comparison of the State aviation system performance since the previous SANS prepared in 1995. As can be seen, some areas of performance have improved over the past five years including the resulting total economic impact of the system which has increased from $4.1 billion to $6.3 billion annually. At the same time, while many of the larger, more active airports in the system have kept up with demand, the system, as a whole, due to lack of available funding, has experienced a decline in overall performance.

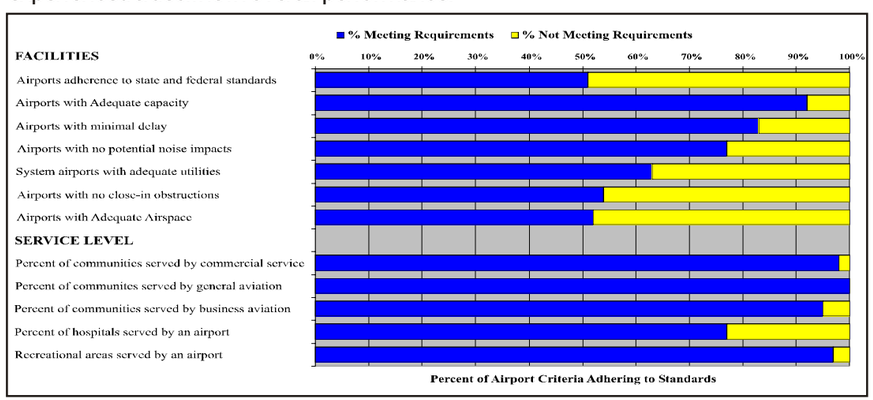


Figure 7:
Facility and Services Level Performance for the Existing System

PEFORMANCE MEASURE		1995 SANS	2000 SANS	% - CHANGE
Facilities				
1	Airports meeting Planning Standards	57%	51%	-6%
2	Airports with adequate capacity	92%	92%	No Change
3	Airports with minimal aircraft delay	2639 hrs	2253 hrs	7%
4	Airports with no/minimal Noise Impacts	84%	77%	-8%
5	Airports with adequate Utilities	65%	64%	-1%
6	Airports with no close-in Obstructions	38%	73%	35%
7	Airports with no significant/restricted shared airspace	N/A	54%	N/A
Service Level				
8	Percent of communities with commercial air service	98%	94%	-4%
9	Percent of communities served by general aviation	100%	100%	No Change
10	Percent of communities served by business aircraft	95%	90%	-5%
11	Percent of hospitals served by an airport	80%	82%	2%
12	Recreational areas served by an airport	97%	97%	No Change
Economic				
13	Cost of Average Aircraft Annual Delay	$28.5 Million	$39.1 Million	25%
14	Aviation Economic Impact	$4.1 Billion	$6.3 Billion	35%
15A	Cost ratio of enplaned passengers	5:1	4:1	Decreased
15B	Cost of ratio of annual aircraft operations	17:1	15:1	Decreased
16	Cost of Aircraft delays	N/A	$8.2 Million	N/A
Total System Cost		$45.0 Million	$60.0 Million *	25%

Figure 8:
Performance Measure Comparison of the State Aviation System 1995 to 2000

Advisory Committee

In order to get input from users of the system, groups representing both aviation and non-aviation interests were invited to participate in the SANS as a Planning Advisory Committee (PAC). The following is a listing of organizations that took part:

- Arizona State Legislature (Representative)
- 56th Fighter Wing (Luke Air Force Base)
- Arizona State University
- Arizona Air National Guard
- Vision 21 Task Force
- Embry-Riddle Aeronautics University
- Maricopa Association of Governments (MAC)
- Office of the Governor
- Federal Aviation Administration (FAA)
- Aircraft Owners and Pilots Association (AOPA)
- Honeywell Computer
- Kingman Airport
- Arizona Flyways
- Glendale Municipal Airport
- American West Airlines
- Tucson Airport Authority
- Arizona Pilots Association
- MD Helicopters
- Pima Association of Governments (PAG)
- Arizona Airports Association
- Yuma International Airport
- Southwest Airlines
- Navajo Nation
- Phoenix Sky-Harbor Airport
- Arizona DOT, Aeronautics Division

Goals and Objectives

The primary goal of the SANS 2000 was to determine the existing status, condition and performance of Arizona's aviation system and to evaluate the improvement needs of the system on a five-, ten- and twenty-year basis. The study provides guidance for the structured development of aviation facilities necessary to meet the State's needs through the year 2020. The SANS 2000 incorporates the requirements of the ADOT, Aeronautics Division and the Federal Aviation Administration (FAA) into the analysis and planning program.

Goals and objectives are the essential bridge between technical evaluation of alternative plans and the needs of the state, regions within the state, individual communities, and special interest groups. The evaluation process combines quantitative standards or relatively precise criteria with qualitative judgements. Setting goals and objectives in the planning process directs the quantitative ranking judgements towards conformity with overall statewide and community values.

Ultimately, the success of this study effort largely depends on identifying the long-term policies of the state and developing an overall strategy that will guide the planning effort in the desired direction. In support of overall state social, economic and environmental policies, the following goals were identified as relating to the future development of Arizona's state air transportation system.

- Provide for the timely development of aviation facilities adequate to meet the air transportation needs and economic goals of the State of Arizona.
- Maintain a system of public use airports and heliports that assures a high degree of safety to the users while at the same time providing better than adequate levels of service, in terms of reliability and efficiency.
- Maximize the economic benefits and return on investment from development of Arizona's air transportation system.
- Develop an air transportation system that is consistent with Arizona's long range comprehensive planning policies and plans, particularly with respect to surface transportation and land use.

Status and Condition

Arizona's aviation facilities range from small rural unpaved airstrips to large long-haul commercial service airports. Three hundred and nine Arizona airports are registered with the Federal Aviation Administration (FAA), of which 92 are open to the public and included in the State Aviation System. Fifty-nine facilities are recognized by the FAA as nationally significant by inclusion in FAA's National Plan of Integrated Airport Systems (NPIAS). These airports are eligible for federal funding for airport planning and capital improvements. Included in this group are eight primary commercial service airports, five non-primary commercial airports, 33 general aviation airports and nine reliever airports. Figure 2 shows the State Aviation System facilities (public use) by type. Figures 3 and 4 identify the State's Primary and Secondary System Airports.

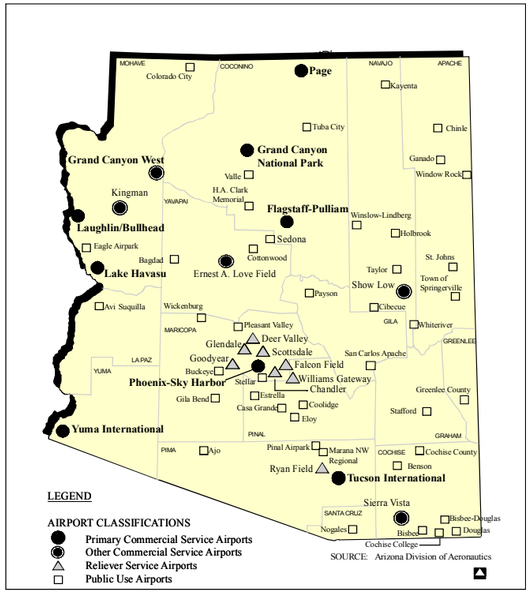


Figure 3:
Arizona State Primary Airport System

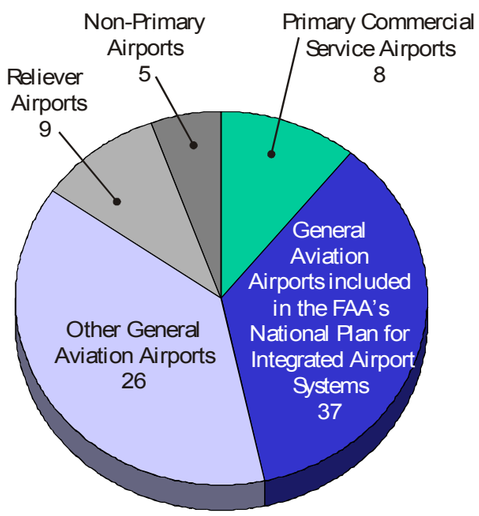


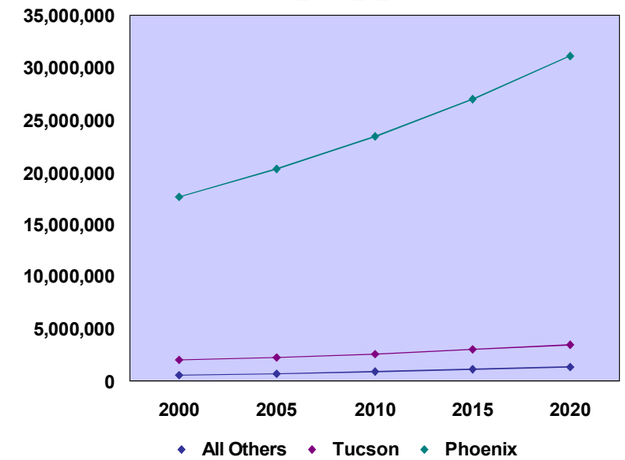
Figure 2:
Classification of Aviation Facilities
Total State System Airports: 85

Figure 4:
Arizona State Secondary Airport System

Aviation Activity: Commercial Air Passengers

Arizona's aviation industry is a catalyst for economic expansion and continues to grow rapidly. The state has witnessed tremendous growth over the past twenty years and the next twenty promise to be filled with equal potential as the state epitomizes "sun belt" attractiveness. The forecast for commercial passenger enplanements is shown on Figure 5. Between 2000 and 2020, total passenger enplanements are expected to increase by 79 percent, to nearly 36 million annually. Phoenix and Tucson carry worldwide recognition and will account for the majority of this activity. In addition, however, the Grand Canyon and Colorado River communities remain top draws for tourism, old West towns perpetuate Arizona's appeal, and the state's diversified climate and scenery create an unmatched variety of travel experiences.

Figure 5:
Forecast Commercial Passenger Enplanements
2000-2020



General Aviation Activity

General aviation includes every type of civil flying other than the certificated air carriers and, often the system is characterized by a relatively low profile. Most of the general public enjoys the benefits of the system while many remain unaware of its existence or misunderstand its use and importance. Nationally, general aviation accounts for 96 percent of all hours flown and provides access to more than 12,000 communities, while commercial air carriers provide service to about 350 airports. In Arizona, while the commercial air carriers provide service to only 20 communities within the state, general aviation public use airports provide quick, efficient access to nearly 100 communities statewide. Over the past five years, total general aviation based aircraft within Arizona has increased by 9.7 percent. As illustrated in Figure 6, this sustained growth in general aviation usage is expected to continue in the state with an estimated increase of more than 40 percent in total-based aircraft over the next 20 years. In terms of aircraft operations, or landings and takeoffs, activity is expected to increase by nearly 64 percent over this same period which will result in even greater demand and need for improvement to airfield facilities.

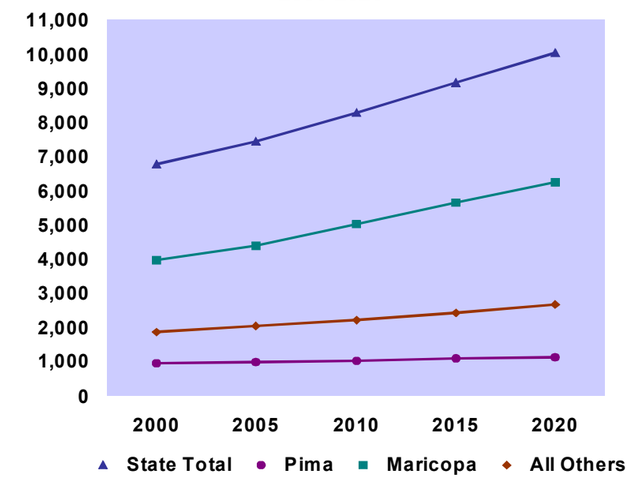



Figure 6:
Forecast General Aviation Based Aircraft
2000-2020