Arizona State Airports System Plan

2008

TABLE OF CONTENTS

CHAPTER ONE: AIR TRANSPORTATION SYSTEM VISION, GOALS, AND PERFORMANCE MEASURES

CHAPTER TWO: INVENTORY OF CURRENT POLICY

CHAPTER THREE: IDENTIFICATION OF AVIATION/AIRPORT ASSETS

CHAPTER FOUR: FORECASTS OF AVIATION ACTIVITY

CHAPTER FIVE: ESTABLISH EXISTING AIRPORT ROLES

CHAPTER SIX: CURRENT AIR TRANSPORTATION SYSTEM PERFORMANCE

CHAPTER SEVEN: FUTURE AIR TRANSPORTATION SYSTEM PERFORMANCE

CHAPTER EIGHT: SYSTEM DEVELOPMENT COSTS

CHAPTER NINE: RECOMMENDED PLAN & POLICIES

LIST OF FIGURES

CHAPTER ONE: AIR TRANSPORTATION SYSTEM VISION, GOALS, AND PERFORMANCE MEASURES

CHAPTER TWO: INVENTORY OF CURRENT POLICY

CHAPTER THREE: IDENTIFICATION OF AVIATION/AIRPORT ASSETS

CHAPTER FOUR: FORECASTS OF AVIATION ACTIVITY

CHAPTER FIVE: ESTABLISH EXISTING AIRPORT ROLES

CHAPTER SIX: CURRENT AIR TRANSPORTATION SYSTEM PERFORMANCE

CHAPTER SEVEN: FUTURE AIR TRANSPORTATION SYSTEM PERFORMANCE

CHAPTER EIGHT: SYSTEM DEVELOPMENT COSTS

CHAPTER NINE: RECOMMENDED PLAN & POLICIES

APPENDIX B: CURRENT FACILITY AND SERVICE OBJECTIVE COMPLIANCE

APPENDIX C: NPIAS CANDIDATE

APPENDIX D: RELIEVER AIRPORT ANALYSIS

CHAPTER ONE: AIR TRANSPORTATION SYSTEM VISION, GOALS, AND PERFORMANCE MEASURES

INTRODUCTION

This chapter represents the first in a series of technical chapters that document the Arizona State Airports System Plan (SASP). This chapter provides an overview of the study; background information on previous state and regional studies, state duties, and the existing state airport system; identifies aviation issues impacting the state and its airports; and establishes the study vision, goals, and performance measures.

STUDY OVERVIEW

The Arizona Department of Transportation- Aeronautics Division (ADOT or Aeronautics) has long recognized the importance of planning as a proactive approach to ensuring aviation continues its role in the statewide transportation system. The State Airports System Plan for Arizona was developed in 1978. Aeronautics has been diligent in updating various components of the system plan over the last 30 years, conducting various elements of a Continuous Airport System Planning Process (CASPP). These components include State Aviation Needs Study (SANS), Economic Impact studies, Rural Air Service studies, Navigational Aids and Services studies, Recreational Airport studies, and other special studies.

The 2008 Arizona State Airports System Plan is a comprehensive update to the 1978 study. This study provides direction for state aviation system planning for years to come. The purpose of this plan is to provide a framework for the integrated planning, operation, and development of Arizona's aviation assets.

This plan updates the 2000 Arizona State Aviation Needs Study (SANS 2000), which looked at the current and future performance of the state airport system. The state airport system will again be analyzed to determine the impact of historic, current, and pending changes in the aviation industry. This plan provides Aeronautics with an important planning tool that enables them to remain current with industry trends and to determine how Arizona's airports should be positioned to respond to future needs and challenges.

In addition to a SANS update, the 2008 Arizona State Airports System Plan also analyzes several other nontraditional system planning items. These items include:

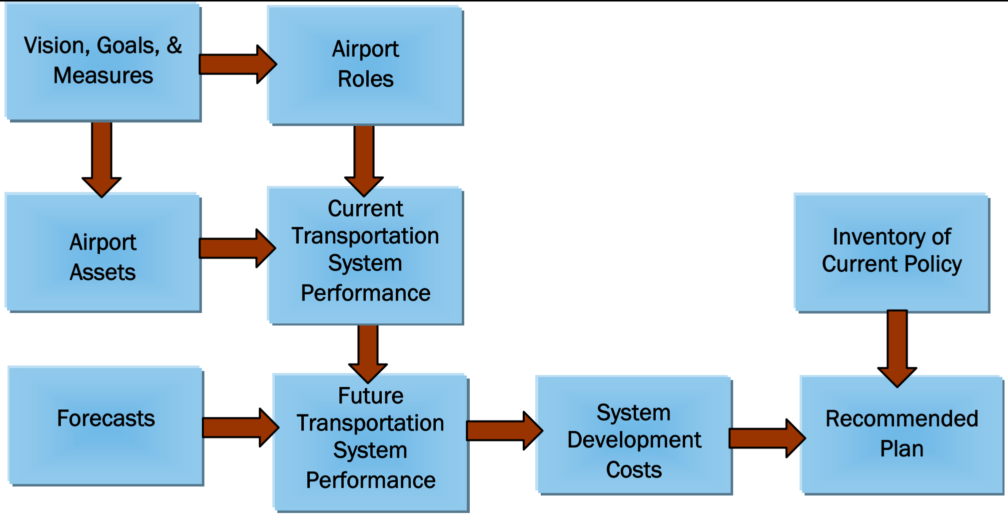
- A review of the effectiveness of current state policies and statutes and suggestions on possible modifications to these policies and statutes or the development of new policies based on findings from the plan.
- An evaluation of Aeronautics' Priority Rating System regarding which airport development projects take precedence over other projects and the development of a priority list for implementing recommended projects.
- A DVD promoting the importance of aviation in the state.

There are nine tasks included in the 2008 Arizona State Airports System Plan. Each of these tasks is described below.

Study Process

The nine tasks being undertaken to develop the Arizona State Airports System Plan are graphically depicted in **Figure 1-1.**

Figure 1-1: Arizona Airports System Plan Study Process



A brief description of each of the plan's tasks is as follows:

1. **Air Transportation System Vision, Goals, and Performance Measures:** The first task outlines the purpose of and sets the stage for the entire SASP. This element provides a backdrop of historic information and current conditions that have the ability to impact the findings of the study. The task also establishes of a system vision, goals, and performance measures. In order to analyze the airport system's needs, a system vision and system goals are translated into goal categories. Performance measures specific to each goal category will provide the foundation for a "report card" that will be used to determine how well the Arizona airport system is performing.
2. **Inventory of Current Policy:** The task reviews policies and statutes that currently govern Aeronautics and impact aviation in the state, including Arizona Revised Statutes, Arizona State Transportation Board Policies, and Five-Year Airport Capital Improvement Program guidelines. Suggestions for changes to these items are developed in Task Nine in order to best support the future needs of the airport system.
3. **Aviation/Airport Assets (Inventory):** One of the first steps in developing Arizona's plan for its airport system is the collection of current facility and activity data for all system airports. A business survey and pilot survey are also conducted to collect important information from users of the airports around the state.
4. **Forecasts:** It is important to have a general understanding of which airports in the airport system are likely to experience the most notable growth for the 5, 10, and 20-year forecast milestones. This task provides projections through 2030 of key commercial and general aviation demand indicators.
5. **Airport Roles:** As part of the 2008 SASP, an extensive analysis is undertaken to assign all system airports to functional roles. These roles are valuable in determining the level of recommended development needed since not all airports in the state should be treated the same.

6. Current Air Transportation System Performance: Goal categories and measures developed in Task One form the framework for an updated report card for the Arizona system of airports. This report card identifies adequacies and deficiencies in the system, as well as possible duplications. This task is the cornerstone of the system plan. Results from this analysis are the primary input for developing recommendations for the airport system.
7. Future Air Transportation System Performance: As part of this task, targets for future system performance are set. Actions needed to raise the bar for the overall performance of the Arizona airport system are the primary output of this task. This task considers if there is a need for additional airports to supplement the existing system and provides information on how Arizona's airport system can be protected.
8. System Development Costs: Cost estimates for improving the system to meet established targets are identified in this task. This task also recommends appropriate ADOT funding levels and takes the best return on investment into consideration.
9. Recommended Plan: The final task of the Plan provides actions needed to implement study recommendations and policy or legislative changes suggested to enhance the system.

Project Advisory Committee

A Project Advisory Committee (PAC) was assembled by Aeronautics to provide input and direction for the study. The PAC is comprised of volunteer members with a broad base of airport/aviation and statewide knowledge and responsibilities. The PAC includes representatives from the following:

- Federal Aviation Administration (FAA)
- Arizona Department of Transportation (ADOT)
- Arizona Department of Commerce
- Regional Associations of Governments
- League of Arizona Cities and Towns
- Arizona Airports Association (AzAA)
- Aircraft Owners and Pilots Association (AOPA)
- Arizona Pilots Association
- Arizona Business Aviation Association
- U.S. Military
- Boeing
- Several Arizona airport directors

This committee provides Aeronautics with outside input into the system planning process and provides the Consultant Team with first-hand knowledge of the key factors impacting aviation demand and needs throughout the state. Six PAC meetings were held at key junctures of the study to help guide the development of the system plan.

REVIEW OF PREVIOUS STUDIES

The Arizona State Airports System Plan is only the latest aviation study in Arizona. The Aeronautics Division of ADOT, regional planning agencies, municipalities, and airport sponsors have also conducted numerous studies related to airports and aviation. These studies provide valuable information on current and historical conditions within the Arizona aviation environment. The following sections summarize recent planning efforts that have the potential to influence the information and recommendations developed in the SASP.

Not all data found in existing plans is applicable to the SASP. The information may no longer be current, or may be too specific to be applicable. However, local plans provide a level of detail and insight that would not be cost-effective to duplicate. As a result, information presented in previous studies is used, except in cases where more current or more relevant data is available.

National Plan of Integrated Airport Systems (NPIAS)

The FAA updates its National Plan of Integrated Airport Systems (NPIAS) every other year. State system plans, such as this, are used to develop NPIAS recommendations. The FAA draws money for eligible airport development projects from the Airport Improvement Program (AIP). AIP funding is derived from the Aviation Trust Fund; the source for this trust fund is a dedicated stream that is derived from taxes on the aviation fuel and commercial airline tickets. Airports must be included in the NPIAS for their projects to be eligible for AIP funding. While there are a variety of criteria that are considered for an airport to be included in the NPIAS, generally speaking, to be in the NPIAS, an airport must:

- Be more than 30 miles from the closest NPIAS airport
- Have at least 10 based aircraft
- Have a willing public sponsor

Recommendations from this SASP will be coordinated with both the NPIAS as well as individual airport master plans.

The FAA assigns each airport a ‘service level’, depending on the level of activity accommodated and services provided. Each service level has a congressionally established funding category associated with it. The service levels are:

- Primary Service (PR) – Primary service airports are public use airports receiving scheduled airline passenger service which enplane 10,000 or more passengers per year.
- Commercial Service (CM) – Commercial service airports are public use airports receiving scheduled airline passenger service which enplane 2,500 or more passengers per year.
- General Aviation (GA) – General aviation airports are either publicly or privately owned public use airports that serve general aviation users.
- Reliever (RL) – Reliever airports are general aviation airports that are capable of providing relief to Primary Service airports in the event that the airport becomes unavailable due to congestion or other causes. They also provide general aviation and minor commercial operators alternative access to communities already served by Commercial Service airports. Reliever airports often receive higher priority for funding assistance than other general aviation airports.

State Planning – SASP, CASPP, and SANS

The first State Airports System Plan (SASP) was completed in 1973, and updated in 1978. In 1988, it was replaced by the Continuous Aviation System Planning Process (CASPP). In 1995, the first State Aviation Needs Study (SANS) was conducted. The SANS was updated in 2000.

The 2000 SANS set four developmental goals: adequate facilities, system maintenance, economic development, and consistency with surface transportation and land-use plans. These goals are developed into a set of nine specific objectives that are as follows:

1. Facilitate commercial air service in both urban and rural areas throughout Arizona.
2. Ensure conformance with physical development standards established by federal, state, and local agencies.
3. Provide a system of aviation facilities within reasonable access to all system users.
4. Promote the use of aviation facilities for the delivery of emergency and rural health care services.
5. Encourage economic development opportunities through the utilization of an effective aviation system.
6. Maintain compatibility with local land use patterns and plans.
7. Raise the efficiency of the aviation system.
8. Maximize the return on investment for aviation dollars.
9. Foster input from potentially impacted parties through a variety of means including public forums and questionnaires.

The methodology of the SANS 2000 was to:

1. Identify quantifiable measures to define system performance.
2. Determine the status, condition, and performance of the existing system.
3. Forecast future system demands and future funding.
4. Develop multiple scenarios of aviation development.
5. Analyze all scenarios on a performance basis and choose one accordingly.

Three scenarios were developed: 'A'- Existing Funding; 'B'- Existing Performance; and 'C'- Increased. The 'A' scenario resulted in dramatic decreases in system performance. The 'B' scenario maintained the existing performance of the system at 10-year cost of $1.04 billion. Scenario 'C' increased the performance of the system at a 10-year cost of $1.9 billion. In both scenarios 'B' and 'C' approximately 40 percent of funds were allocated to commercial service airports.

The 10-year total for expected revenue was $760 million: $592 million federal, $129 million state, and $39 million local/private. An additional $276 million in 10-year revenue was determined to be necessary to maintain the current system and $1.12 billion to improve all airports to meet SANS 2000 recommendations. Investment since the 1995 SANS has allowed larger, more active airports to keep up with demand, resulting in an increase in the total economic impact from $4.1 billion to $6.3 billion.

However, the report also identified a decline in performance in some aspects of the system. Between the development of the 1995 SANS and the 2000 SANS, more airports experienced community noise concerns and fewer communities were served by business aircraft. Fewer airports complied with the recommended planning measures. The decline in airports meeting planning standards may be a result of changes in the standards or changes in which standards are applied to specific airports.

The number of communities with scheduled commercial aviation also decreased. The loss of commercial air service was the result of several factors, including the emergence of Phoenix Sky Harbor as a major hub for discount carriers Southwest and America West. This caused airfares at Phoenix Sky Harbor to decline, and made flying from Phoenix even more cost-efficient.

The cost of average annual aircraft delay also increased substantially. The increase in delay is a result of aviation activity growing faster then capacity and the concentration of activity at a few airports. The majority of aircraft delay is experienced at high growth airports in the Phoenix metropolitan area.

Special Studies

In addition to performing statewide system planning, ADOT has also produced a number of special studies dedicated to specific topics. The following studies were developed by ADOT previous to the 2000 SANS:

- Feasibility Study and Environmental Review for a Regional Rescue and Firefighter Training Facility (ARFF) – 1995
- The Economic Impact of Aviation in Arizona – 1998
- Navigational Aids and Aviation Services Special Study – 1998

The following studies were developed by ADOT subsequent to the 2000 SANS:

- Airport Small Community Economic Development & Transportation Program (ASCET)– 1999
- Rural Air Service Study – 1999 and 2006
- Arizona Airport Pavement Management System – 2003
- The Economic Impact of Aviation in Arizona – 2004
- Automatic Weather Observation System (AWOS) Network Study – 2007
- Governor's Advisory Council on Aviation Final Report – 2007

Airport Small Community Economic Development & Transportation Program (ASCET)

The ASCET sought to provide economic development through aviation improvements. Noting that the lack of sufficient airport facilities is often enough to preclude greater economic development in rural Arizona communities, the program surveyed all Arizona communities, and focused on those with populations of more then 10,000 that were more then 50 miles from a major metropolitan location. These communities were classified according to the primary use of aviation in the community. It identified seven communities as focused on tourism (three 'national' and four 'regional') and 10 on business/corporate (two 'major', four 'intermediate', and four 'emerging'). The ASCET suggested a series of improvements applicable to each group and noted the importance of 'soft' efforts such as marketing in economic development efforts.

The opportunities for, and challenges to, further industrial and business development at each location were reviewed, and an exhaustive review of potential funding sources and their limitations performed. This showed that funding was not available for all projects. A process for prioritizing and sequencing projects was devised which emphasized economic development benefits, stated level of need, the availability of matching funds, and the degree of local support. On a whole, the ASCET emphasis was on using specific market or local industry attractions to attract and retain jobs in rural Arizona communities.

Rural Air Service Study – 1999 and 2006

This study reported that airline deregulation caused a general decline in scheduled commercial service to rural areas, which had strong negative economic impacts due to the dependence of rural communities on income from tourism. Rural airports were also impacted by the commercial shift to jet aircraft and larger aircraft. This forced smaller airports to compete more often with airports offering more nonstop flights that were located within a one to two hour drive. The number of commercial enplanements at rural airports was also declining, as passengers chose to drive to larger airports to begin their flights. Another complication was many airports were beyond the effective stage length of the turboprop aircraft, which was in predominant use at the time of the study. It was noted that assuring commercial service might require municipalities (or groups of municipalities working together) to follow Show Low's example in acquiring their own aircraft to ensure service.

In 2003, ADOT initiated an update of the 1999 Rural Air Service Study. Air service conditions in Arizona and nationwide had changed drastically, with even further erosion of service and passengers in the small markets. The study was directed at the small communities, with individual reports prepared for each community as opposed to a statewide-only report which was prepared in 1999. The focus of the study was to provide action items, not just an analysis of needs and demand in each of the communities. Community-specific public meetings were conducted on three separate occasions to get the local buy-in needed for air service enhancements to be realized, recognizing that the state can only serve as the facilitator of change that must be activated at the local level.

In addition to the study, ADOT participated in development of Small Community Air Service Development Pilot Program (SCASDPP) grants on behalf of the airports. A $1.5 million grant from the USDOT was received for the Arizona Rural Consortium of Airports (ARCA) that included Kingman, Page, Prescott, Show Low, and Sierra Vista. ADOT served as the sponsor for this grant and worked closely with the airports and USDOT to implement the program.

Arizona Airport Pavement Management System

Grant assurances for projects funded under the FAA Airport Improvement Program (AIP), require a pavement maintenance system be utilized. To meet this requirement and ensure that the limited pavement maintenance funds are spent in the most cost effective manner, ADOT developed the Airport Pavement Management System (APMS). The APMS is a database of pavement condition at 51 Arizona airports, comprising a total of 16,294,345 square yards of pavement. The APMS identified the area-weighted average age of the pavement was 13 years, with an area-weighted Pavement Condition Index (PCI) of 79. The system prioritizes 'preventative maintenance' projects that have historically proven to have the greatest benefit for pavement dollar expended. The system also identifies all pavement sections whose PCI has fallen below the level where they are unable to be maintained, and instead require rehabilitation. The annual pavement maintenance costs identified by the pavement management system are presented in Figure 1-2.

Figure 1-2: 2004–2012 APMS Projected Pavement Maintenance Costs

Year	*Projected Annual Cost*
2004	$5,549,517
2005	$5,681,098
2006	$1,436,081
2007	$1,814,326
2008	$2,200,600
2009	$2,331,967
2010	$1,940,303
2011	$2,962,384
2012	$1,606,559

Source: Arizona Airport Pavement Management System, 2003

The Economic Impact of Aviation in Arizona

Aviation plays a key role in Arizona's economic performance. Because of this, ADOT commissioned *The Economic Impact of Aviation in Arizona* study, and several updates, to quantify the impacts aviation has on the state's economy. The 2002 study indicated the state's dry climate and wide open spaces help create an environment for aviation-related activity and development to thrive. Aviation activities supporting the state's economy include pilot training, aerospace engineering and manufacturing, airpark development, and aerial sightseeing tours. In 2002 aviation activity in Arizona generated $38.5 billion in primary and induced economic activity. This is an increase from the 1998 study which noted $28.2 billion in total economic activity. Total jobs increased from 420,000 in 1998 to over 470,700 in the 2002 study.

Automatic Weather Observation System (AWOS) Network Study

The purpose of the AWOS Network Study was to explore methods to link with federal data networks in an effort to provide near real-time aviation weather data to Arizona airports and their users. It identified 26 Arizona airports that would benefit from the presence of an AWOS. The study estimated an AWOS system could be established for $2.3 million with an additional $0.3 million in annual maintenance costs. The study was an update of the 1998 "Navigational Aids and Aviation Services Special Study."

Governor's Advisory Council on Aviation Final Report

Governor Janet Napolitano established the Governor's Advisory Council on Aviation (ACA) through Executive Order 2004-22 on September 21, 2004. The ACA was tasked to study and issue consensus findings and recommendations that specifically addressed the following issues:

- Airspace utilization and airport capacity
- Land use compatibility
- Federal funding for aviation in Arizona
- Criteria for evaluating aviation facility and system needs
- Future aviation needs assessments and funding strategies

These five issues were combined into three categories for further study; Land Use, Capacity and Funding Needs. The ACA met 19 times in various capacities beginning January 31, 2005 through January 31, 2007 in locations throughout the state (Phoenix, Tucson, Flagstaff, and

Yuma). In those meetings the ACA consulted with, or took testimony from, as many aviation interests as possible. Those interests consisted of stakeholders in commercial, military, and general aviation, including representatives from the Federal Aviation Administration, Arizona Department of Transportation – Aeronautics Division, Maricopa Association of Governments, Pima County Association of Governments, Arizona State Land Department, Arizona Department of Real Estate, Southern Arizona Leadership Council, airport operators, Governor's Office on the Governor's Growth Initiative, ADOT's Multi-modal Transportation Study and Arizona Airports Association (AzAA), Arizona Pilots Association, Aircraft Owners and Pilots Association (AOPA), and the Aviation Safety Advisory Group of Arizona.

The meetings, consultations, and testimonies contributed to ensure all necessary information could be gathered, the issues identified and thoroughly studied, and meaningful and achievable recommendations developed. Further discussion of the ACA and its findings and recommendations is provided later in this chapter.

Regional Airport System Plans (RASP)

In addition to system plans developed by ADOT, regional system plans have been completed by county-level organizations. Cochise County developed a RASP in 1982 and 1994. The Pima Association of Governments (PAG) completed its initial RASP in 1985, with subsequent updates in 1995 and 2002. The Maricopa Association of Governments (MAG) completed its initial RASP in 1993, followed by an update in 2005. Results of the RASPs completed since 2000 are summarized below.

Pima Association of Governments (PAG)

The 2002 RASP included the following elements:

- System Performance Criteria
- Inventory
- Intermodal System Trends and Issues
- Aviation Industry Trends
- Forecasts of Demand
- System Airport Roles and Facility & Service Objectives
- System Evaluation
- System Recommendations
- Implementation Plans

The following airports were included in the 2002 PAG RASP: Ajo Municipal, Benson Municipal, Davis-Monthan Air Force Base, La Cholla Airpark, Marana Northwest Regional, Pinal Airpark, Ryan Airfield, Sells Airport, and Tucson International Airport. Benson Municipal Airport was added since the previous RASP.

Downtown Tucson remains the primary intermodal link, despite the decentralization of public transportation within the county and growing inter-county linkages. A future passenger rail system offered potential for an intermodal link between downtown Tucson and the airport. The study suggested that the limited airport freight activity is partially due to the lack of rail connections to the airport. Puerto Nuevo was identified as the location of a potential regional and national transportation hub, but lacked access to other regional transportation infrastructure.

The study noted the dependency of business on air travel to increase productivity, as well as the lack of any practical alternative to air travel. The RASP also identified the increase in fractional ownership programs for general aviation business class aircraft which has lowered the cost of utilizing this form of air travel. As a result, businesses in the region increased usage of general aviation aircraft.

The percent of the aviation fleet comprised of single-engine aircraft was expected to decline. The proportion of jet aircraft in the 2002 study area was higher than the national average and was projected to continue increasing. The study suggested that capacity based analysis of airports is no longer sufficient.

Metrics included in PAG's development of roles included the size of the access roads, the area of the airport, the population within a 30-minute drive time, ownership, facilities, and services. The airports were then classified as Level I or Level II. Level I airports were to support all commercial aviation activities and the Level II were dedicated to single-engine aircraft, with limited jet usage.

Based on system plan calculations, Tucson International Airport and potentially Ryan Field were expected to exceed operational capacity during the 20 year forecast period. It should be noted that Tucson International has planned for improved operational capacity during this forecast period. Scheduled commercial service at Tucson International had improved, despite the then-recent events of September 11, 2001. System wide, there was a need for more auto parking and more hangar space. For security purposes, it was suggested that auto parking no longer be co-located with airplanes.

Airports within the PAG region had no serious obstruction or airspace issues, but still needed to take action relevant to height-based zoning. The majority of airports had taken steps to make themselves compliant with ADOT guidelines for preparing an AIA and Disclosure map. However, not all airports had implemented Part 77 zoning or developed current noise contours.

While a large portion of employers were located near existing airports, the population was much more decentralized, with only eight percent within a 30-minute drive of an airport with a 5,000-foot long runway. While the suggested improvements are too extensive to be detailed here, the PAG recommended the highest dollar amounts of improvements occur at Marana Northwest Regional, followed by Tucson International.

Maricopa Association of Governments (MAG)

In 2000, the Maricopa Association of Governments initiated an update of its RASP. The purpose of the Plan was to analyze the long-range air transportation needs of Maricopa County and the immediate environs, and to meet these needs in a safe and efficient manner. This plan concluded in 2005 with an acceptance of the analysis by the MAG Policy Committee.

In addition to study goals and objectives, specific assumptions were noted upon which the study should be based. These study assumptions provided an understanding of the approach to the MAG RASP Update and were used to provide direction to the consultant for the project. Principal assumptions included:

- The study area for the RASP was defined as Maricopa County along with a portion of Pinal County and Yavapai County to reflect the growth of cities within Maricopa County into neighboring counties.

- The study time frame extended to 2025, with 1999 serving as the base year.
- Luke Air Force Bases (AFB) was assumed to remain open during the planning period. The RASP recognized and respected the right of Luke to carry out its military mission; and did not make recommendations that impaired the ability of the base to carry out its mission.
- It was assumed that the existing public use airport facilities in the region would remain open. Future development options recognized the functions of existing airports and made every effort to avoid infringement on their ability to exist.
- The Intergovernmental Agreement between Phoenix and Tempe and the east bound jet departure procedure known as 4 DME was assumed to continue throughout the planning period.
- The MAG RASP Update will seek to accommodate projected demand.

Based on these assumptions and the goals and objectives stated for the study, technical analysis was prepared to evaluate the MAG regional airport system through six working papers. The RASP provided an overview of the existing system, projected demand for aviation, determined future needs, evaluated alternatives to meet future needs, and developed a selected alternative. This selected alternative identifies those projects that have the potential to help the system meet its goals, but will require more detailed airspace review and analysis, including the potential impact to Luke Air Force Base's mission, in order to determine its implementation feasibility.

The selected alternative is actually a hybrid of several of the alternatives. While the Status Quo alternative was not included as a whole, this and the other alternatives including the Improved Technology, Maximized Airport Development, and New Airport Development alternatives, each had projects that were included in the selected alternative. After analysis of each alternative for each of 10 evaluation criteria, the following projects were noted to have the most potential for development as part of the Maximized Airport Development alternative and are included in the selected alternative:

- Buckeye Municipal – runway extension
- Chandler Municipal – runway extension, precision approach
- Glendale Municipal – taxiway extension
- Memorial – airport facility restoration
- Mesa Falcon Field – precision approach
- Phoenix-Deer Valley – parallel runway and precision approach from the east
- Phoenix-Goodyear – parallel runway and precision approach from the east
- Phoenix-Sky Harbor International – 4th runway, runway extension, precision approaches (4th runway and 25R), additional terminal building space
- Scottsdale – precision approach, additional terminal building space
- Williams Gateway – additional terminal building space[1]

These projects would enhance the region's ability to meet long-term air transportation needs by improving the capacity of the airport system and providing additional facilities and approaches. While improving the capacity of the system, even with these enhancements, further capacity increases could be needed to meet the projected level of demand for 2025.

Development of a new general aviation airport was recommended for further analysis as the cursory review revealed two potential areas where the impacts are considered moderate. The

[1] The development of curved instrument approaches at Williams Gateway is also included in the selected alternative.

New East Valley and New South Valley sites present opportunities where the region's capacity could be increased through development of new runway facilities at either site. This would help to fulfill the study's goal of meeting the long-term air transportation needs, however the extent of the impact to congestion, the environment, and airspace are not sufficiently detailed. The analysis also showed that, both in the Maximized Airport Development alternative and the New Airport Development alternative that a supplemental Williams Gateway commercial airport has significant potential to address several of this study's goals. This New Airport Development alternative for commercial activity appears to have the highest potential for implementation.

The following are policy considerations that have been identified in the evaluation of recommendations for the MAG RASP:

- Airspace analysis: The RASP included development of additional runways and improved instrument approach capabilities that will enhance the ability of the system to accommodate future demand in the selected alternative. All of these changes will dictate analysis of airspace requirements, including how to integrate these improvements into the existing airspace structure. Significant analysis of potential impacts to Luke AFB's existing airspace needs and Phoenix-Sky Harbor International was conducted, however, a systemwide analysis of how implementing all of these projects would impact the airspace was not prepared. In addition, it is assumed that as technology improvements are made, airspace impacts may be reduced, although the extent is not known at this time. While a single project can be accommodated within the existing airspace environs based on current technology, when combined, the total impact of the recommendations will require more detailed analysis, including computer-aided airspace modeling wherein these improvements are analyzed together as a "single improvement" versus individual projects. Airspace modeling may also afford the opportunity to examine how the new technological advances related to approach procedures may impact the airspace requirements. It was the recommendation of the MAG RASP Technical Advisory Committee to the MAG RASP Policy Committee that a detailed airspace analysis be conducted, possibly by the FAA for whom airspace is a responsibility.

- Environmental impacts: The RASP primarily evaluated noise impacts as a result of the alternatives. The noise impact analysis was based on existing available noise contours, supplementing these contours with development of estimated noise impact areas where identified. Prior to implementation of projects, additional environmental review would be required, including noise and other environmental categories such as air quality.

- Land use: As part of the noise evaluation in the alternatives analysis, the impacts to incompatible land uses near airports were identified. This cursory analysis also reviewed the state's policies regarding airport land use compatibility. Arizona has several statutes in place that were developed to reflect the importance of addressing airport noise including Airport Influence Area, Military Airport Registry, Military Airport Disclosure, and Public Airport Disclosure. Many of the airports have implemented Public Airport Disclosure and Luke has complied with Military Airport Registry and Disclosure, but none of the MAG airports have implemented Airport Influence Area which serves as a notification that properties located in the vicinity of an airport may be impacted by noise levels of aircraft overflights. Consideration of this statute and its ability to impact future airport development should be part of follow-on planning efforts for the MAG airports. In addition to noise issues, the location of other incompatible uses, such as the gas storage facility that was planned near Luke Air Force Base, should also be considered for the long-term preservation of the region's airport system. The land uses and zoning around airports should consider the need for potential airport expansion to accommodate growth projected for airports in the region. As part of a feasibility study for a new airport, land uses would be a significant evaluation factor in determining the viability of constructing a new general aviation airport in the region.

ADOT AERONAUTICS DIVISION DUTIES

The following section identifies the duties and role the Aeronautics Division plays in maintaining and developing Arizona's airport system. The duties discussed are those that are pertinent to the development of the state's airport system, and have been defined by the Arizona Revised Statutes (ARS) Title 28, Chapter 25, Article 2 28-8242 *Powers and duties*, and the NASAO State Aviation Funding and Organizational Data Report FY 2007. Additionally, the duties of aeronautical organizations within other states are compared with those of ADOT Aeronautics.

The following duties relate directly to the development of the state's airport system and are identified in the ARS:

- Cooperate with local, state, and federal organizations to encourage and advance the safe and orderly development of aviation in this state.
- Assemble and distribute to the public information relating to aviation, landing fields, navigational aids and other matters pertaining to aviation.
- Accept, in the name of this state, federal monies made available for the advancement of aviation.
- Represent the state on issues of routing structures and rate schedules concerning commercial airline traffic (developed prior to Airline Deregulation Act of 1978).
- Accept and receive federal and other public or private monies for the acquisition, construction, enlargement, improvement, maintenance, equipment, or operation of airports and other air navigation facilities and sites for air navigation facilities or for any other purpose authorized by this section.
- Contract for the operation of state owned airports.
- In conjunction with local authorities, plan, build, and develop airports, airport terminals and other related navigational facilities.
- Operate and maintain the Grand Canyon National Park Airport.

The NASAO State Aviation Funding and Organizational Data Report notes the following generalized duties of the ADOT Aeronautics Division:

- Aircraft registration
- Airfield pavement management program
- Air service assistance program
- State funding (state-only grants)
- Aviation education
- State aeronautical chart
- State funding (FAA matching only)
- State loans (to airports from Aviation Fund)
- Operate state-owned airports
- Airfield maintenance project funding
- NAVAID project funding
- Hangar construction funding (loans only)

Figure 1-3 compares these duties with those performed by other state aeronautical organization in the western United States.

Figure 1-3: Comparison of ADOT Aeronautics Division Duties/Programs with Other Western U.S. States (where available)

State Duty	*AZ*	*CA*	*CO*	*NV*	*NM*	*UT*	*WA*	*WY*
Block grant state								
Channeling state						X		X
Aviation education	X	X		X	X		X	
Pilot registration								
Aircraft registration	X				X	X	X	
License airports		X				X		
Airfield pavement management program	X	X	X	X	X	X	X	X
Air service assistance program	X			X	X		X	X
Airport preservation program		X	X				X	
Search and rescue program						X	X	
Own and operate state aircraft		X		X		X	X	X
State funding (FAA matching only)	X	X	X	X	X	X	X	X
State funding (state-only grants)	X	X	X		X	X	X	X
State-only loans	X	X	X					X
Operate state-owned airports	X				X	X	X	
Hangar construction funding	X	X			X			X
NAVAID project funding	X	X	X		X	X	X	X
Airfield maintenance project funding	X	X	X		X	X	X	X
Airport directory			X	X	X		X	X
Aeronautical chart	X	X	X	X	X	X		X

Source: *NASAO State Aviation Funding and Organizational Data Report FY 2007*

EXISTING AIRPORT SYSTEM ORGANIZATION

Airport classifications or roles are defined differently from national, state, and local perspectives. Historically, Arizona has used a classification system developed by the ADOT Aeronautics Division to define each airport's role in the system. Airports in Arizona have been grouped into two main categories: Primary and Secondary Airports. Arizona system airports were categorized into one of these two groups based on the size and level of activity occurring at each airport. All airports in the Primary category are public-use and meet one or more of the following criteria:

- Ten or more based aircraft
- 2,000 or more annual operations
- Scheduled commercial air carrier service
- Projected to meet any of the above criteria within 10 years

Airports in the Secondary category are generally located in rural areas and are designed to accommodate single-engine and light twin-engine aircraft. Secondary airports do not provide facilities or services necessary to serve larger business class or commercial aircraft. Secondary airports are generally defined as airports that have been recognized by the FAA through inclusion in their 5010 database and are open for public-use.

Arizona's airport system was defined by ADOT Planning Division and contained a total of 91 airports. Sixty-six of the airports were classified as Primary and 25 were classified as Secondary. In addition to the Primary and Secondary classifications, each system airport was also grouped into one of several sub-classifications based primarily on airport ownership and activity. Four of the categories: Primary Service, Commercial Service, Reliever, and General

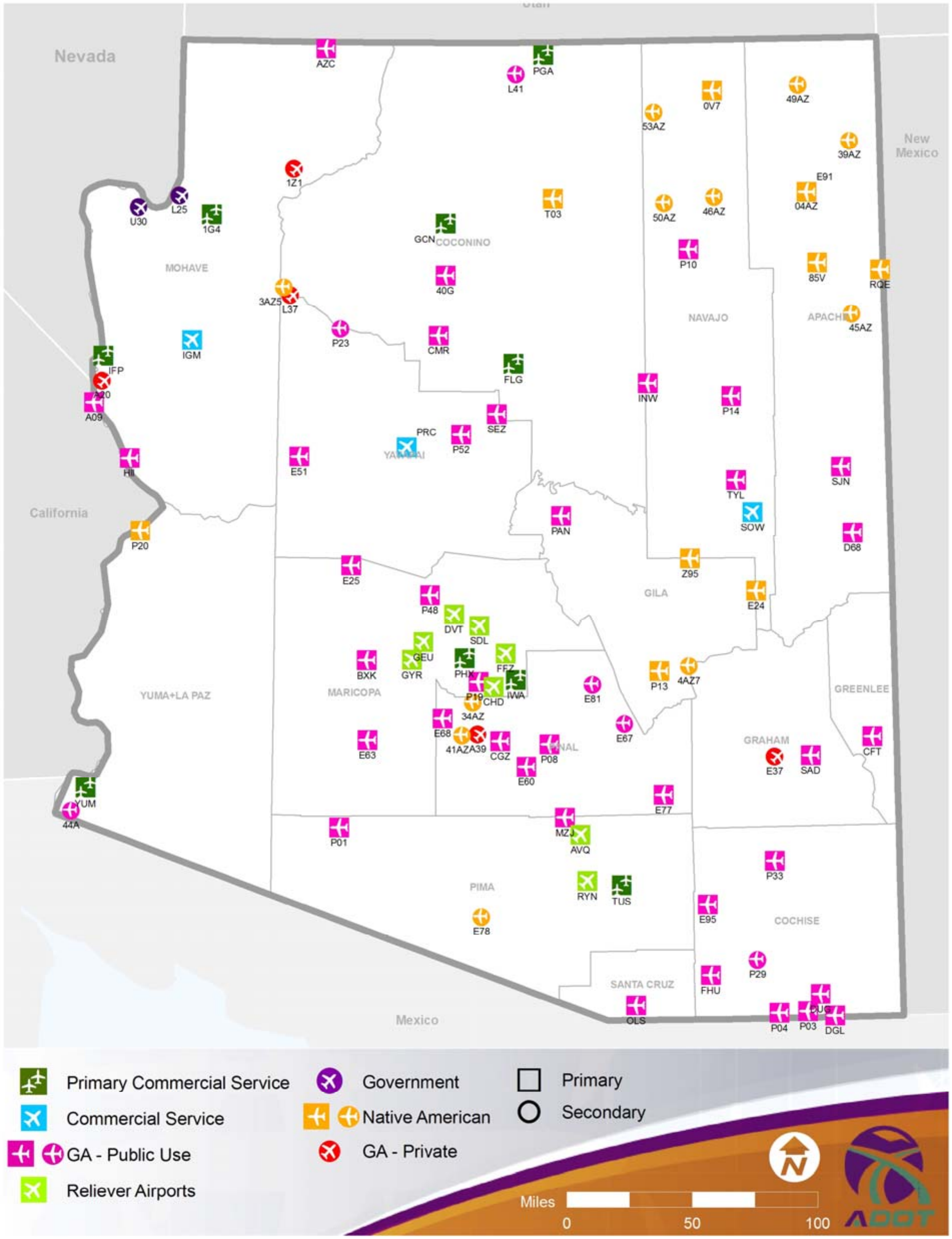
Aviation, are identical to the NPIAS designations defined earlier in the chapter, while the remaining designations are based on the ownership of the airport. Figure 1-4 identifies the number of airports included in each category. Figure 1-5 graphically depicts the airports included in Arizona's Primary and Secondary airport system. A reference table containing the airport codes, airport name, and associated city name can be found in Appendix A.

Figure 1-4: Primary and Secondary Airport System

Classification		*Number of Airports*
Primary	Primary Service	9
	Commercial Service	3
	Reliever	8
	General Aviation - Public Use	37
	Native American	9
Secondary	General Aviation - Public Use	6
	Native American	12
	Government	2
	General Aviation - Private Use	5
Total		91

Source: ADOT Planning Division Primary and Secondary Airport System Maps

Figure 1-5: Primary and Secondary Arizona Airport System



Source: ADOT Planning Division Primary and Secondary Airport System Maps, 2008

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

IDENTIFICATION OF AVIATION ISSUES

Issues that affect the aviation system range from national in scope to local issues, with the impacts affecting airports in different ways. To address specific issues facing Arizona's airports, Governor Janet Napolitano established the Governor's Advisory Council on Aviation (ACA) in 2004.

ACA

The ACA was tasked to study and report its consensus findings and recommendations regarding the following issues:

- Land use compatibility
- Airspace utilization and airport capacity
- Federal funding for aviation in Arizona
- Criteria for evaluating aviation facilities and system needs
- Future aviation needs assessments and funding strategies

These five key issues were combined by the ACA into the following three categories for analysis during the two-year Advisory Committee process:

- Land use
- Capacity
- Funding needs

A brief summary of these issues and the findings of the ACA are presented below.

Land Use

The land use analysis conducted by the ACA identified "formidable challenges" that are facing the development of Arizona's airport system. Coordination between airport planning and general planning, cross-jurisdictional concerns, and the lack of a state or federal policy to protect airports were identified as the most significant barriers that exist in the promulgation of compatible land use for airports.

Capacity

Capacity was identified as an issue facing Arizona's airports in terms of airfield capacity, terminal/hangar capacity, airspace capacity, and ground access capacity. While there are many airports in Arizona's system, only a third were identified as planning for future capacity improvements. The ACA also included Grand Canyon National Park Airport and its funding situation as a capacity impact. Additional capacity issues included military airspace, mobile aircraft rescue fire fighting training unit, outlying system plan development, additional funding for airport pavement maintenance management program, need for an adopt-an-airport program, and creation of a statewide AWOS inspection and maintenance program.

Funding Needs

Funding for airport projects comes from a variety of sources depending upon the airport. Some airports are eligible for federal Airport Improvement Program (AIP) funding, state airport funding, and local monies. The federal AIP is a critical element of Arizona's airport funding. The current reauthorization of the legislation to fund the AIP expired in 2007 and significant changes are proposed for the funding mechanism and distribution to airports. In addition, the state's aviation funding which is intended to supplement federal allocations and provide opportunities for "smaller non-commercial publicly owned and operated airports" has been insufficient to meet the growing demand for infrastructure development. The state's Aviation Fund is also subject to the appropriations process and has experienced a diversion of the funds. Protection of the state's Aviation Fund is recommended by the ACA.

In addition to these significant issues identified as impacting Arizona's aviation system, other issues that are more national and regional in scope also have the potential to impact the future development of airports. These issues are discussed below.

National Issues

On the national level, some of the same Arizona-specific issues are being faced by other states and agencies. These include land use compatibility, funding for airport projects, and airport capacity. The impact of these issues on the national aviation environment is similar to what has been described in Arizona.

Other issues that are raised at the national level by the FAA, national interest groups such as the Airport Owners and Pilots Association (AOPA) and National Business Aviation Association (NBAA), and airport groups such as American Association of Airport Executives (AAAE) and Airports Council International (ACI) include fuel prices, loss of airports, fees, new technology, and maintaining airport pavements. A brief description of these issues and their potential impact on Arizona is provided below.

Fuel Prices

The price of aviation fuel impacts both commercial airlines and the general aviation community. Commercial service airlines are taking drastic measures to cut expenses in other areas to account for increased fuel prices, changing their business models, and increasing prices. The decline in the level of service provided by the commercial airlines has caused some businesses to utilize general aviation to a higher degree. Within the general aviation community, higher fuel prices have resulted in less activity especially by discretionary flyers that are flying for personal and not business reasons.

Airline Bankruptcies, Mergers, and Acquisitions

Airline bankruptcies, mergers, and acquisitions have altered the landscape of the U.S. commercial airline industry. Commercial service airports in Arizona have not been able to avoid the air service changes that have accompanied airline restructuring. Airline bankruptcies were prevalent following the events of September 11, 2001. Several of the largest U.S. airlines, including Trans World, US Airways, United, Delta, and Northwest, declared bankruptcy. While United, Delta, and Northwest did emerge, American purchased Trans World in 2001 and America West acquired US Airways in 2005.

Fueled largely by exorbitant fuel prices and an excess of capacity, a new wave of bankruptcies and mergers is emerging and once again has the potential to impact future air service in Arizona, The impact of Frontier's recent entry in bankruptcy, the Delta-Northwest merger, and additional airline restructurings will be monitored during this study.

Loss of Airports

Additional development occurring near airports has encroached upon airports' ability to expand and operate efficiently. In some areas, the rising value of land in some areas has resulted in the development of non-aviation uses on and around airports. The loss of airports is most critical in major metropolitan areas but is also occurring throughout the country where sponsors cannot afford to maintain airports due to cost.

Fees

Funding for the FAA's Airport Improvement Program has been generated primarily from a tax imposed on passengers flying on commercial airlines. With the lapsing of the current funding source in 2008, a new system of user fees was proposed by federal legislators to fund the future development of US airports. A component of the proposed funding system is a user fee for general aviation aircraft. Presently, general aviation pays fees via a fuel tax but pays no distinct or separate fee for the use of air traffic control services. As of April 2008, a final decision has not been made regarding future funding mechanisms for the aviation system. The existing funding mechanisms have been extended by a series of congressional continuing resolutions.

New Technology

New technologies including the very light jet (VLJ) and satellite-based navigation have created substantial change within the aviation community. VLJ technology utilizes new fuel efficient engines and lower cost manufacturing processes to lower the operating and acquisition costs of these aircraft. These lower-cost jet aircraft provide an opportunity for more individuals and corporations, that have otherwise relied on commercial service aircraft or typical business jets, to purchase or utilize general aviation aircraft. The increased utilization of VLJ aircraft creates an opportunity for growth at general aviation airports. These aircraft can operate at smaller airports throughout the US, requiring runway lengths as low as 2,500 feet. In the future as utilization of these aircraft increases, smaller airports may need to provide additional services and instrument approaches.

The implementation of global positioning systems (GPS) in the late 1990s and development of wide area augmentation system and local area augmentation system (WAAS and LAAS) technology will allow for precision approach capabilities, with near instrument landing system (ILS) descent and visibility minimums. These new instrument approaches are referred to as Approach Procedures with Vertical Guidance (APV) and are derived from the WAAS technology. Lateral Precision with Vertical Guidance (LPV) approaches rely on space-based satellite signals rather than land-based facilities, precluding terrain interference. APV/LPV approaches currently provide approach descent minimums to 250 feet above the runway elevation, with lower descent minimums expected to be published in the near future. GPS satellite data in concert with a ground-based transmitter can provide the three-dimensional guidance for a GPS near-precision approach.

Maintaining Airport Pavements

Significant investment has been made by the FAA, states, and individual airport sponsors in airport pavements, one of the most critical elements of any airport. While pavements can be developed for long-term use, their maintenance must be provided to maximize the investment. Similar to other airport needs, airport pavements require monitoring and evaluation to ensure the safety of the airport users. While many sponsors monitor and evaluate their pavements, the cost of even routine maintenance must be justified in the sponsor's budget, whether it is a city-owned, county-owned, or privately owned facility. Because of this and the increasing cost of pavement projects, many airport pavements are falling further into disrepair and beyond the curve of "preventative maintenance." At a certain point, the pavement requires rehabilitation, a costly project for any airport sponsor.

Sustainability

The concept of sustainability has historically been used in reference to environmental concerns but has, more recently, taken on a larger definition in relation to airport development and maintenance. Sustainability in terms of airports has been defined by the concept of what is in place that is sustainable and worth sustaining and how we can better develop airports that are sustainable long-term and more cost-effective and balanced in terms of actual cost and environmental impact. This is challenging in an environment of cost-cutting by airlines and increased costs for airport improvements, as the process of sustainability typically requires spending more up-front on projects to create longer sustaining infrastructure. While many can justify the long-term cost savings that may be realized, the higher up-front costs mean that fewer projects will be funded, leading to more delay in airport development.

All of these issues contribute to the current environment in which the aviation system operates and the issues expected to affect Arizona's airports in the future.

State Airport Issues

As previously noted, the Governor's Advisory Council on Aviation was created to address aviation issues specific to Arizona. The three issues evaluated through the ACA process included:

- Land use
- Capacity
- Funding needs

Somewhat unique to Arizona is the ownership of one of the state's primary airports by the state, Grand Canyon National Park Airport. While other states own and sometimes operate airports, these airports are typically small in nature and do not receive the high level of activity that exists at Grand Canyon. Other state issues raised during the ACA process are similar to those experienced at the national level including capacity, land use, and military airspace interactions.

Regional Airport Issues

There are two major metropolitan areas within Arizona, Phoenix and Tucson. While each of these metropolitan areas operate independently, the aviation issues faced by both regions are very similar. Regional aviation system plans have been prepared in each of these regions in the past five years. Both of the plans addressed the following issues:

- Capacity
- Military activity
- Expanding population base

These issues mirror those identified at the national level, with the exception of the expanding population base. Unlike other metropolitan areas, Phoenix and Tucson continue to experience growth beyond the average, with many new residents and businesses locating in the state to take advantage of the area's many positive aspects. The growth experienced in population has caused expansion of the development limits in many directions. The growth in development limits has meant new aviation demand in areas that previously had limited or no demand. Airports such as Buckeye near Phoenix and Marana near Tucson have experienced significant growth associated with new population and business development. These airports are examining ways to accommodate the projected continued increase in demand.

ESTABLISMENT OF SYSTEM VISION, GOALS & PERFORMANCE MEASURES

The Arizona SASP is being conducted in a series of separate, but related, technical steps. The first step in the analysis of the airport system's needs is to establish a system vision and system goals, then translate them into goal categories. System goal categories are subsequently used to evaluate the adequacy of Arizona's airport system. To facilitate the evaluation process, performance measures specific to each goal category are employed to provide the foundation for a "report card" that will ultimately be used in the SASP to determine how well the Arizona airport system is performing.

The remainder of this chapter is devoted to describing the plan vision, goal categories, and performance measures for the Arizona SASP.

System Plan Vision

The vision for the 2008 Arizona State Airports System Plan is to:

> *Provide an airport system that accommodates demand, supports economic and transportation needs, and maximizes funding resources*

This vision requires that the process used to develop the SASP include input from a variety of sources. The process brings together representatives of airports and other public agencies to work with ADOT and the consultant team to ensure that a comprehensive evaluation of the airport system is conducted. States, as well as individual communities within those states, continue to recognize the importance of an airport system to their statewide and local economic and transportation infrastructures, and to that end, development of a SASP that can be supported on all levels is the primary vision.

System Plan Goals & Goal Categories

Establishment of this overall vision for the plan led to the development of the following goals, which were established for the airport system that serves Arizona:

- Arizona should provide an airport system that is adequately maintained to meet current and projected demand and is easily accessible from both the ground and the air.
- Arizona should advance a system of airports that is supportive of Arizona's economy, ensuring that the airport system is matched to Arizona's socioeconomic and demographic characteristics.
- Arizona should provide for a safe airport system, as measured by compliance with applicable safety and security standards, as well as supports health, welfare and safety-related services and activities.
- Arizona should promote a system of airports that is considerate of the environment and supports aviation programs and outreach opportunities in Arizona.

These four goals for the system are translated into the following goal categories:

- Development
- Economic Support
- Safety and Standards
- Environmental Sensitivity and Stewardship

When developing the goal categories, Title 28, Chapter 2, Article 7 of the Arizona Revised Statutes (ARS) was reviewed to determine its applicability to the Arizona SASP. The ARS provides guidelines for performance-based transportation planning in the state. Much of the terminology and items noted in the ARS were directly related to planning for highways. ARS did outline performance measures and factors that can be broadly applied to aviation. These items were considered in the development of the goal categories for this plan.

The SANS 2000 outlined three categories similar to the goal categories developed for this system plan. These categories were Economic, Facility, and Service Levels. Each of these categories was evaluated using several performance measures. The categories from the SANS 2000 have not been used in this system plan. However, most of the performance measures analyzed in the SANS 2000 will also be performance measures in the 2008 Arizona SASP. This will allow the plan to measure how the system has changed since the SANS 2000. The performance measures included in the SANS 2000 and the 2008 plan are noted below.

System Plan Performance Measures

In developing a "report card" for Arizona's airport performance, the Arizona airport system will be evaluated or graded on the four goal categories. Performance measures for each of the goal categories are the "tests" that are applied to determine how well the system is currently performing.

Figure 1-6 provides a summary of the goal categories and their associated performance measures that will be used in this update to the Arizona SASP. Some performance measures were chosen based on inclusion in the SANS 2000. Other measures were selected by ADOT Aeronautics for their relevance and importance to the Arizona airport system. Some of the performance measures used to evaluate the Arizona aviation system are action-oriented, while others are more informational in nature. Many of the measures are performance based and have the ability to be tracked in the future. The performance measures included from the SANS 2000 are noted in parentheses. The information presented in Figure 1-6 is integral to the remainder of this study.

Figure 1-6: Goal Categories and Performance Measures for the 2008 Arizona State Airports System Plan

GOAL CATEGORY: DEVELOPMENT
• Percent of communities in the state with a population greater than 5,000 within 60 minutes driving time of a commercial service airport (SANS 2000)
• Percent of communities in the state with a population greater than 1,000 within 30 minutes driving time of a general aviation airport(SANS 2000)
• Population within 60 minutes of commercial service airports served by one airline
• Percent of population within 30 minutes of a public use airport
• Percent of population within 30 minutes of a NPIAS Airport
• Percent of population within a 30 minutes of each airport, by role category
• Percent of population within 30 minutes of an airport and the number of airports with an instrument approach
• Percent of licensed pilots within 30 minutes of an airport
• Percent of airports capable of supporting physician/medical transport aircraft
• Percent of communities in the state with a population greater than 15,000 within 30 minutes driving time of a general aviation airport that can accommodate large general aviation aircraft (ARC B-II) and has Instrument Meteorological Conditions (IMC) capability (SANS 2000)
• Percent of airports within 30 minutes of an alternate airport with an ILS or LPV (300’, 1 mile)
• Percent of population within 30 minutes of an all weather runway (paved, instrument approach, AWOS)
• Percent of population within 30 minutes of an airport with on-site weather reporting
• Percent of airports with 24/7 fuel
• Percent of airports with jet fuel
• The number of airports with an annual demand less than 60 percent of runway annual service volume (SANS 2000)
• Percent of airports currently operating below FAA target demand/capacity ratio
• Percent of airports projected to be operating below FAA target demand/capacity ratio in 2028
• Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion (SANS 2000)
• Percent of population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2020
• Airports with a current (past 5 years) master plan
• Percent of airports that are compliant with FAR Part 77 (height zoning)
• Percent of airports with surrounding municipalities that have adopted controls/ zoning to make land use in the airport environs compatible with airport operations and development
• Percent of airports with surrounding municipalities that have adopted “disclosure areas”
• Percent of airports that are recognized in local comprehensive plan
• Percent of airports included in regional transportation plans

Figure 1-6: Goal Categories and Performance Measures for the 2008 Arizona State Airports System Plan (continued)

GOAL CATEGORY: ECONOMIC SUPPORT
• Dollars of direct and indirect economic impact on the state from aviation (SANS 2000) • Number of major recreational areas in the state within 30 minutes driving time of a general aviation airport (SANS 2000) • Percent of total employment that is within 30 minutes of an airport • Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport • Percent of population within 30 minutes of a system airport meeting business user needs • Number of airports without adequate utilities (electricity, telephone, water, sewer, and gas) (SANS 2000) • Percent of airports with a PCI of 70 or greater • Percent of airports meeting minimum facility and service objectives
GOAL CATEGORY: SAFETY AND STANDARDS
• Percent of airports with clear approaches to primary runway ends • Percent of airports with adopted Wildlife Management Plans • Percent of airports with adopted Security Plans • Airports controlling all runway end RPZs • Percent of airports that have active programs (including vegetation management plans) to clear obstructions from their approaches • Percent of airports that meet runway/taxiway separation criteria for their current ARC • Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC • Percent of airports that have a written emergency response plan • Percent of airports that have procedures in place to conduct self-inspections on a regular basis • Percent of hospitals in the state within 30 minutes driving time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability (SANS 2000) • Percent of airports that support search and rescue operations • Percent of airports that support aerial fire fighting operations
GOAL CATEGORY: ENVIRONMENTAL SENSITIVITY AND STEWARDHIP
• Number of airports that have Storm Water Pollution Prevention Plan (SWPPP) • Percent of system airports supporting flight training • Percent of the population that are within 30 minutes of a system airport with a full-time flight school/flight instructor. • Percent of system airports supporting A&P programs • Percent of system airports that have aviation maintenance and repair. • Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools.

SUMMARY

The groundwork established in this phase of the study is used to guide the remainder of the system plan. This chapter of the Arizona State Airports System Plan provides a foundation for subsequent analysis. Information presented in this chapter is used to:

- Guide the collection of data and information at system airports during the inventory phase of the study.
- Determine how well Arizona's system of public use airports is currently performing.
- Identify where Arizona's airport system is currently adequate, as well as where it is presently deficient, or where overlaps may be present.
- Identify the need for change in the airport system and Aeronautics' policies to meet Arizona's future aviation needs.

CHAPTER TWO: INVENTORY OF CURRENT POLICY

INTRODUCTION

Arizona has a legacy of policies that have been created based on historical conditions. Many of these policies have not been evaluated for their effectiveness and appropriateness based on current and projected conditions in Arizona and in the aviation industry. The purpose of this chapter is to review and summarize existing policies pertaining to airports including the Arizona Revised Statutes, Arizona State Transportation Board (STB) Aviation Policies, and Five-Year Airport Capital Improvement Program guidelines.

This chapter reviews the existing policies to set the stage for evaluating the effectiveness and appropriateness of the policies in Chapter Nine. The existing policies are subsequently evaluated to determine the need for clarification, definition, or modification to increase the effectiveness of each policy.

REVIEW OF CURRENT POLICIES

Each of the following policies are reviewed and analyzed to determine how the policies affect the state's aviation system and how the policy is serving or not serving its purpose:

- Arizona Revised Statutes Title 28 – Chapter 25 Aviation
- State Transportation Board Aviation Policies
- Five-Year Airport Capital Improvement Program (ACIP) Guidelines

Arizona Revised Statutes Title 28 – Chapter 25 Aviation

The current Arizona Revised Statutes (ARS) have been updated with the 48th Legislature, 1st Regular Session information and contain the version of the statutes effective January 1, 2008. The ARS are the laws established by Arizona; the current ARS has more than 49 titles including Title 28 which addresses transportation. Among other requirements, the statutes under Chapter 25 establish the guidance and requirements for the Aeronautics Division and the Director of Aviation to follow in order to encourage and advance the safe and orderly development of aviation in the state. The Director uses the statutes along with the STB policies to develop programs and procedures to fulfill the mandates and directs staff to implement and maintain the programs. Figure 2-1 presents Chapter 25 and the articles it covers.

As shown, there are eight articles included in Chapter 25. These eight articles deal with issues ranging from the operation of the Aeronautics Division to aircraft operation, aircraft registration and taxation, aircraft dealers, airports, airport zoning and regulation, and joint powers airport authorities.

Figure 2-1: Arizona Revised Statutes, Title 28 - Chapter 25, Aviation

Article 1	**General Provisions**
28-8201	Definitions
28-8202	State aviation fund; report
28-8204	State owned airports; fees
28-8205	Construction of new airports; definitions
28-8206	Sovereignty
28-8207	Ownership
28-8208	Crimes, torts and other wrongs; governing law
28-8209	Legal relationships while in flight
Article 2	**Aeronautics Division**
28-8241	Aeronautics division; assistant director
28-8242	Powers and duties
28-8243	Abandoned aircraft; definition
28-8244	Hearing; appeal
Article 3	**Aircraft Operation**
28-8271	Federal license; violation
28-8272	Federal regulation; licensing and registration; violation
28-8273	Damage responsibility
28-8274	Aircraft collisions; liability
28-8275	Insurance coverage disclosure; civil penalty
28-8276	Violations; classification
28-8277	Low altitude flying prohibited
28-8278	Landing prohibition; liability
28-8279	Trick or acrobatic flying; low level flying; dropping objects
28-8280	Careless or reckless aircraft operation; classification
28-8281	Killing birds or animals; classification
28-8282	Prohibited operation; under the influence; incapacitation
28-8283	Implied consent; immunity
28-8284	Violation; classification
28-8285	Alcohol abuse screening session
28-8286	Alternative sentencing
28-8287	Second offense
28-8288	Third or subsequent offense
28-8289	Political subdivision; immunity
28-8290	Employment permitted
28-8291	Prior convictions allowed
28-8292	Waiver of fine, surcharge or assessment
Article 4	**Aircraft Registration and Taxation**
28-8321	Definition of resident
28-8322	Registration; exceptions
28-8323	Government and dealer aircraft registration; fees
28-8324	Registration; license tax; proration; fee
28-8325	Registration fee; certificate; decal; duplicate
28-8326	Aircraft dealers; registration application; penalty
28-8327	Exemption claim
28-8328	Failure to register; assessment procedure
28-8329	Late registration; penalty; abatement
28-8330	Lien
28-8331	Seized aircraft sale
28-8332	Registration; transfer or assignment

Figure 2-1: Arizona Revised Statutes, Title 28 - Chapter 25, Aviation (Continued)

Article 4 (con't)	Aircraft Registration and Taxation
28-8334	Aircraft loss or destruction
28-8335	License tax; tax rate
28-8336	Nonresident; license tax rate
28-8337	Stored or repaired aircraft; license tax rate
28-8338	Salvage aircraft; license tax rate; definition
28-8339	Special aircraft; license tax rate; definitions
28-8340	Manufacturer's aircraft; definition
28-8341	Maintenance aircraft; license tax rate; definition
28-8342	Fair market value determination
28-8343	Aircraft total loss; violation; classification
28-8344	Aviation fuel tax; rate; definition
28-8345	Registration fees; penalties; taxes; distribution
28-8346	Filing by mail; date of filing
28-8347	Civil penalties
Article 5	**Aircraft Dealers**
28-8381	Definition of aircraft dealer
28-8382	License requirement; application; renewal; license tax; liability
28-8383	Aircraft dealer duties
28-8384	Bond or cash deposit
28-8385	Records
28-8386	Violation; classification
Article 6	**Airports in General**
28-8411	Authority of cities, towns and counties; limitation
28-8412	Airports; public purpose
28-8413	Acceptance by state, cities, towns or counties of federal or other aid
28-8414	City and town airport disposal
28-8415	Real property interests; airport purposes
28-8416	Private property acquisition; airport purposes
28-8417	Payment for real property; bonds
28-8418	Airport construction and operation; charge
28-8419	Airport rules, fees and charges; limitation
28-8420	Agreements; joint airport operations
28-8421	Joint exercise of powers
28-8422	Adjoining state monies for airports
28-8423	Airport land lease; nonprofit corporation
28-8424	Nonprofit corporation lessees; status; authority; exemptions
28-8425	Lease authority; airport or air terminal purposes
28-8426	Airport police; powers; qualifications
28-8427	Police aides
28-8428	Liability; airport police and aides
Article 7	**Airport Zoning and Regulation**
28-8461	Definitions
28-8462	Airport hazard; public nuisance; prevention and elimination
28-8463	Acquisition of facilities or nonconforming property; exception
28-8464	Political subdivisions; airport zoning regulations
28-8465	Joint airport zoning board
28-8466	Zoning regulations; relationships
28-8467	Airport zoning regulations; procedure; airport zoning commission
28-8468	Airport zoning regulations; criteria; limitations

Figure 2-1: Arizona Revised Statutes, Title 28 - Chapter 25, Aviation (Continued)

Article 7 (con't)	Airport Zoning and Regulation
28-8469	Airport zoning regulations; administrative agency; duties
28-8470	Permit
28-8471	Variance
28-8472	Permit; variance; condition; hazard indicators
28-8473	Airport zoning regulations; board of adjustment; powers;proceedings
28-8474	Board of adjustment; appeals
28-8475	Appeals; superior court
28-8476	Violation; classification
28-8477	Remedies
28-8478	Resolutions; ordinances; vehicle operations in airports
28-8479	Regulation; limitation
28-8480	Military airport continuation; land acquisition
28-8481	Planning and zoning; military airport and ancillary military facility's operation compatibility; compliance review; penalty; definitions
28-8482	Incorporation of sound attenuation standards in building codes
28-8483	Registry of military airport flight operations; public inspection
28-8484	Military airport disclosure; residential property
28-8485	Airport influence areas; notice
28-8486	Public airport disclosure; definitions
Article 8	**Joint Powers Airport Authority**
28-8521	Joint powers airport authority; agreement; board of directors
28-8522	Joint powers airport authority classification
28-8523	Annual operating budget
28-8524	Allocation of monies; sources; public hearing; reuse, development and capital improvement plans
28-8525	Joint powers airport authority; withdrawal
28-8526	Joint powers airport authority; admission
28-8527	Joint powers airport authority; powers
28-8529	Financing authority
28-8530	Revenue bonds; fees and charges
28-8531	Refunding bonds
28-8532	Bond terms
28-8533	Bond validity
28-8534	Bonds; legal investments
28-8535	Federal income tax considerations
28-8536	Bond proceeds; application

Source: Arizona State Legislature

As stated in ARS 28-8242 *Powers and Duties,* the Aeronautics Division "shall cooperate with all state, local, and federal organizations to encourage and advance the safe and orderly development of aviation in this state." This parallels the Arizona State Transportation Board Aviation Policies and the Five-Year Airport Capital Improvement Program Guidelines. In addition, it recommends the division "accept, in the name of this state, federal monies made available for the advancement of aviation" and deposit these monies in the state aviation fund, which is supported by the ACIP and the associated FAA grants. It also permits the department to loan monies from the state aviation fund to the operating entity for a public airport.

ARS 28-8242 also says the Director will "adopt rules to promote public safety and the best interests of aviation in this state." The Director is also supposed to work with local authorities to plan, build, and develop airports, airport terminals, and other related navigational facilities. Finally, the Director is directed to operate and maintain the Grand Canyon National Park Airport.

Other articles and statutes within Title 28, Chapter 25 Aviation are applicable to aircraft and airport operators, and several focus specifically on Grand Canyon National Park Airport. As noted in the previous task, the Division of Aeronautics performs many functions that contribute to the public safety and best interests of aviation and the statutes support these functions.

A review of the effectiveness and appropriateness of this policy will be conducted in a Chapter Nine. An example of this evaluation analysis may be the provision in Title 28, Chapter 25 Aviation directing the Division of Aeronautics to operate and maintain the Grand Canyon National Park Airport. Does this directive "promote public safety" and is it in the "best interests of aviation in this state"? Could another entity operate and maintain the airport to established state standards more efficiently and cost-effectively. Aspects of these policies will be evaluated and determined if the need for clarification, definition, or modification would increase the effectiveness of each policy.

Arizona State Transportation Board Aviation Policies

While the ARS establish the laws that govern the state, Arizona's State Transportation Board is responsible for developing rules to administer the ARS and create statewide transportation policies. There are six STB policies applicable to the State Airports System, which were adopted as current policy on October 18, 2002 (Fiscal Year 2003). The purpose of the policies is to maximize funding resources and advance the safe and orderly development of the airport system. The intended purpose is to update STB policies on a regular basis to address specific issues facing ADOT and aviation that are within the statutory authority of the division.

Prior to describing the specific policies, the Fiscal Year 2003 STB Aviation Policies presents a definition of the State Aviation System. This definition is important as it describes the division of airports into two systems for planning and administrative purposes. It also describes airport categories within the two systems. As the 2008 SASP progresses, any changes to the airport system and airport category definitions will require changes to the STB Aviation Policies.

The six current policies are described below:

1. Loan Program: A program created by the State Transportation Board using available cash balance funds in the State Aviation Fund. Dollars are loaned to eligible system airports for revenue generating and airport economic development projects that are ineligible under state and federal grant programs. In addition, the loan program provides eligible airports with a means to borrow matching funds for federal grants.

   For an airport to be considered eligible, four basic conditions must be met: it is an eligible agency with an eligible project; has statewide interest; has financial need; and the project is considered feasible. An eligible agency is a town, city, county, airport authority, or other political subdivision of the state, which owns, operates, or controls an airport, open to the public on a nondiscriminatory basis. Eligible projects are ones that are not eligible for funding under other programs and are designed to improve airport self-sufficiency. The project has statewide interest if it contains factors such as protecting airport facilities from damage, enhancing air safety, protecting natural resources from loss or waste, improving air service, maintaining the state-wide system, etc. Financial need is determined if an agency applying for an airport assistance loan demonstrates that it has attempted to obtain funds on reasonable terms from other sources. Finally, the agency must demonstrate that the proposed project meets certain conditions of engineering feasibility, economic justification, and financial feasibility. A project feasibility report must accompany the application for a loan and must contain sufficient information to justify the project.

   This loan program appears to serve its purpose of maximizing federal funding by providing eligible airport sponsors with loans for the local matching share and also supporting revenue generating projects to provide airport sponsors additional opportunities to be more financially self sufficient and have the ability to pay the local share of grants that would otherwise not be available. This policy supports ADOT’s mission to “encourage and advance the safe…development of aviation” in Arizona. It will be evaluated in a subsequent chapter and determined if clarification or a modification would increase its effectiveness.

2. Airport Pavement Management Program (APMP): Public Law 103-305 requires that airports requesting Federal Airport Improvement Program (AIP) funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. The Aeronautics Division has completed and is maintaining an Airport Pavement Management System (APMS) which, coupled with monthly pavement evaluations by the airport sponsors, fulfills this requirement. The APMS consists of visual inspections of all airport pavements and uses the Army Corps of Engineers' “Micropaver” program as a basis for generating a Five-Year Airport Pavement Preservation Program (APPP). The program generates a pavement condition index (PCI) of all eligible system airports. Airports that are eligible include all public-use airports in Arizona. The APMP also recommends projects, in priority order, for pavement preservation work.

   The APMP is a program that helps preserve airport infrastructure, protects the initial investment used to fund critical aircraft pavement projects and extends to the maximum amount the useful life of the airport system's pavement. This policy supports ADOT’s mission to “encourage and advance the safe…development of aviation” in Arizona. In addition, this policy satisfies ARS 28-504 Transportation System Performance Measures; Data Collection and Reporting; Methodologies by supporting the need for “system preservation and maintenance." This program will be evaluated to determine if additional clarification or a modification to the policy would increase its effectiveness of achieving the state's goals.

3. Planning Guidelines: Guidelines were established by the State Transportation Board in order for the Aeronautics Division to accurately assess the limitations and deficiencies of airports in the state's Primary and Secondary Airport systems. These guidelines apply to airports in the Primary and Secondary system and are evaluated periodically to determine the estimated statewide capital improvement costs required to bring the airports into compliance with the planning guidelines.

   The planning guidelines provide the Aeronautics Division with definitive criteria to steer airports toward developing capital improvement programs that achieve these minimum standards/safety improvement goals. This policy clearly encourages and advances the safe and orderly development of airports in the state. In addition, this policy satisfies ARS 28-503 Performance Based Planning and Programming by supporting the need "to monitor and evaluate the performance outcomes of transportation planning and programming decisions."

   This program will be evaluated to determine if additional clarification or a modification to the policy would increase its effectiveness of encouraging and advancing "the safe and orderly development of aviation in this state."

4. Priority Rating System: A rating system utilized to numerically score individual airport development projects requested by system eligible airports. This numerical rating system is designed to assist the Aeronautics Division in recommending the allocation of funds to the highest priority airport development projects within the statewide airport system.

   The purpose of the Priority Rating System is to objectively evaluate projects based upon the airport's activity level and the type of project being proposed. This system provides the Aeronautics Division with objective measurements of various factors, including the importance of the proposed project to the airport, the importance of the airport to the people of Arizona, and the considerations specified in ARS 28-6951. The priority rating formula is intended to provide systematic information to guide decision-making for the limited funding resources available annually.

   Criteria for rating projects in the Five-Year Airport Development Program are based on whether the airport is classified as a Primary or a Secondary Airport. The Primary Airport System includes all public use airports in Arizona categorized as:

   - Commercial Service, Reliever, and/or General Aviation Airports
   - Airports that have 10 or more based aircraft
   - Airports with 2,000 or more annual aircraft operations
   - Airports projected to meet any of the above criteria within 10 years

   The airports in the Secondary Airport System are the state's public use airports/heliports that do not qualify for inclusion in the Primary Airport System.

   Proposed changes and projects must be included in the approved airport layout plan prior to consideration for possible funding.

This policy supports the Division's mission statement to encourage and advance the safe and orderly development of airports in the state and ARS 28-505 Transportation System Performance Factors; weights by demonstrating how the "system is moving people, goods and services in relation to the cost." This policy will be evaluated in a subsequent chapter and determined if a clarification or modification would increase its effectiveness and benefit state aviation better.

5. Resource Allocation: Guidelines established by the State Transportation Board to allocate State Aviation Fund dollars in an equitable, efficient, and effective manner and utilized by the Aeronautics Division in the development of the annual five-year Airport Development Program.

   The construction and development of airports in Arizona are accomplished through a variety of funding efforts involving federal, state, and local governments. The state program is a separately established program that derives funds from taxes on aviation goods and services. Flight property taxes, aircraft lieu tax, registration fees and aviation fuel tax are the primary sources of revenue for the State Aviation Fund, All public use airports/heliports sponsored by a political subdivision of the state are eligible to participate in the Airport Development Grant Program.

   The allocation formulas are designed to provide the largest dollars to the airports with the largest amount of aviation activity (passenger enplanements, based aircraft and operations) while ensuring that all eligible airports will have an opportunity to participate in the annual allocation of state aviation funds. The allocation percentages are based upon the percentage of based aircraft and annual operations at the commercial service and reliever airports compared with based aircraft and annual operations levels at other airports. These funding resources are allocated in the following approximate percentages:

   - Commercial Service and Reliever Airports - 80%
   - Other Primary Airports - 18%
   - Secondary Airports – 2%

   This policy supports aeronautics' mission statement to encourage and advance the development of airports in the state and ARS 28-504 Transportation System Performance Measures; data collection and reporting; methodologies through "identify the appropriate units of measurement and the processes for determining and reporting the performance measures." This program will be evaluated to determine if additional clarification or a modification to the policy would increase its effectiveness of encouraging and advancing "the safe and orderly development of aviation in this state."

6. Small Community Air Service Pilot Program: This pilot program is funded through a grant-in-aid from the STB to supplement a related federal grant from the USDOT. It is designed to help smaller communities enhance their air service through public-private partnership projects. Funding to support this program is obtained from the Arizona Department of Transportation funds collected pursuant to ARS 35-146 and 147 and placed in a special account to be established by the Department of Transportation. The Aviation Investment and Reform Act for the 21st Century (AIR-21) gives priority to those communities where: (1) average air fares are higher than the air fares for all communities; (2) a portion of the cost of the project is provided from local, non-airport revenue sources; (3) a public-

private partnership has or will be established to facilitate air carrier service to the public; (4) improved service will bring material benefits to a broad section of the traveling public.

This policy encourages state, local, and federal organizations to cooperate and advance the development of aviation and air service in the state. However, the effectiveness and appropriateness of this policy and its elements will be reviewed in part by comparing what other states are doing and identifying the benefits and any unintended consequences.

Five-Year Airport Capital Improvement Program Guidelines

With the STB Aviation Policies in place, the ADOT Aeronautics Five-Year Airport Capital Improvement Program (ACIP) Guidelines are developed to ensure the policies are implemented through project planning. The purpose of the ADOT Aeronautics Five-Year ACIP is to maximize the effective use of state dollars for airport development, while maximizing FAA funding for Arizona airports. ADOT Aeronautics develops the five-year ACIP program and it is reviewed and approved annually by the State Transportation Board in conjunction with the STB Aviation Policies.

The ACIP allocates funds for eligible projects from the State Aviation Fund and distributes these funds across three major funding categories: the Airport Development Grants Program; Airport Loan Program; and the Airport Preventative Maintenance Services.

Currently, the Airport Development Grants Program requires the local sponsor to provide a matching share of five percent on most federal/state/local projects. Most local sponsors can request a matching grant from the state and both the sponsor and the state will provide 2.5 percent share of the total grant. Exceptions to this include Phoenix Sky Harbor International and Tucson International. The local share of federal projects for Phoenix Sky Harbor is 25 percent and the local share for Tucson International is nine percent, making the state share 12.5 and 4.47 percent, respectively. On state/local projects, the Primary Airport sponsors must provide 10 percent of the funds and a five percent match is needed for Secondary Airports.

Even with a matching share of only 2.5 to 10 percent, many smaller communities find it difficult to meet this requirement, given the size and extent of the projects necessary to adequately address the needs of their local airport. Thus the Airport Loan Program was developed to help airports become more financially self-sufficient and generate revenue to help pay the local share. The Airport Loan Program provides low-interest loans for projects that are not eligible for grant assistance.

The Aeronautics Division has developed an Airport Pavement Management System that includes all paved airports in the Primary and Secondary airport systems. A set-aside for the Pavement Maintenance Program is calculated annually based upon the system project costs needed to fund identified projects, approximately $3 million annually.

The Five-Year Airport Capital Improvement Program serves its stated purpose of maximizing the effective use of funding based on the three successful, stable funding programs ADOT Aeronautics administers. Nearly 1,000 airport improvement projects are submitted annually to ADOT, however, only a small number actual receive funding. These projects have helped advance the safe and orderly development of the airport system in Arizona.

IMPACT OF POLICIES

The current ARS, STB, and Five-Year ACIP policies and guidelines have been in place over many years. Each of these policies has had varying levels of impact on the development of Arizona's aviation system. Specific impacts of the three groups of policies are discussed below.

ARS – Title 28, Chapter 25

The Title 28, Chapter 25 of the ARS sets forth specific statutes or laws regarding all matters related to aviation. Many of these do not impact the operation or activities of the Aeronautics Division or the airports specifically, but instead focus on issues such as general provisions, aircraft operation, and aircraft dealers. These articles within the chapter will continue to be modified as necessary to meet safety and regulatory needs. A few of the statutes that have the most significant impact on Arizona's aviation system, as relevant to this study, are as follows:

Article 1, 28-8202, State aviation fund; report

This statute provides for the establishment and administration of the State Aviation Fund. The creation of this statute was critical to the funding now in place to assist with the development of Arizona's airports. The fund is comprised of money from aviation fuel taxes or motor vehicle fuel taxes, monies from the sale of abandoned or seized aircraft, flight property tax revenue, registration fees, license taxes, and penalties, monies from the operation of airports (Grand Canyon National Park), and monies earned from investment of the fund. This statute allows for administering monies that are appropriated from the legislature out of the fund, as approved by the STB. The STB is directed to distribute the monies according to the needs of publicly owned and operated airports. The statute indicates that no more than 10 percent of the average fund revenue for the past three years may be awarded to any one airport in any fiscal year.

The State Aviation Fund has enjoyed significant growth as Arizona's aviation environment has expanded. With additional airlines generating flight property tax revenue, pilots purchasing additional fuel due to growth in population, and increased registration fees from higher numbers of registered aircraft, the State Aviation Fund had nearly $30 million dollars at the start of Fiscal Year 2007. This growth in the fund provides an opportunity for more investment in Arizona's aviation system, even though the cost of projects has increased substantially with the economic environment of 2008.

The limitation of an annual award of no more than 10 percent of the average fund revenue for the past three years has meant that more airports have been provided with grants, as opposed to large grants being awarded to single airports. For some airports seeking projects that exceed this amount, they must obtain funding from other sources to ensure completion of these projects.

The deposit of funding from the operation of the Grand Canyon National Park Airport has meant that the money generated by the airport is not necessarily available for its use for maintenance and development. This airport is the only one in the state operated by ADOT and funded strictly through the State Aviation Fund. *Article 28-8204, State owned airports; fees* sets the framework for the types of fess that can be charged at the airport. While not noted, because of the inclusion of this airport's funding in the State Aviation Fund, it is also subject to the appropriations and other regulatory processes associated with state government.

Article 1, 28-8205, Construction of new airports; definitions

This statute identifies limitations associated with developing new airports. It notes that "new airports within the boundaries of an urbanized area or within 24 statute miles of the exterior boundary of an urbanized area" shall not be constructed without approval of the STB. This statute would impact the development of new airports in the state, but would not prevent such development.

There are currently no policing mechanisms in place to locate and identify new airports being developed within 24 statute miles of the exterior boundary of an urbanized area. Also, there are no penalties imposed on the developer of such an airport if that airport was not approved by the STB.

Article 6, 28-8413, Acceptance by state, cities, towns or counties of federal or other aid

This statute allows the state or a county, city, or town to accept federal and other monies for airport improvement. It also allows that ADOT can be designated as the agent to accept and receive federal monies. This statute would allow ADOT to consider participation in the Federal Aviation Administration's (FAA's) Block Grant or Channeling programs if so desired or warranted.

Article 7, 28-8485, Airport influence areas; notice

This statute provides for the option of the state or the governing body of a political subdivision to establish an airport influence area. The statute identifies property in the vicinity of the airport "that is currently exposed to aircraft noise and overflight and that either has a day-night average sound level of 65 decibels or higher or is within such geographical distance from an existing runway that exposes the area to aircraft noise and overflights as determined by the airport owner or operator" as potentially included in the airport influence area. After notification and conducting a hearing, the political entity that has established an airport influence area must file a record of the area in the office of the county recorder in each county that contains property in the airport influence area. As part of the record, owners or potential purchasers of property in the airport influence area will receive notification that property in the area is currently subject to aircraft noise and aircraft overflights.

This statute provides a means for airports to educate those in their environs of the potential noise and overflight issues associated with airports. There are separate statutes that address military airports and their disclosure and these have been widely implemented. While many airports may have airport influence areas, less than 30 have taken the next step in implementing public disclosure through the Arizona Department of Real Estate (ADRE). *Article 7, 28-8486. Public airport disclosure; definitions* denotes that the ADRE "shall have and make available to the public on request a map showing the exterior boundaries of each territory in the vicinity of a public airport." The ADRE is to work with each public airport and affected local government "as necessary to develop a map that is visually useful in determining whether property is located in or outside of a territory in the vicinity of a public airport."

While these two statutes provide for some airport zoning and regulation, there are no requirements and no penalties for not implementing airport influence areas or public airport disclosure. Because of this, encroachment is worsening around airports, limiting expansion potential and creating additional impacted areas.

Arizona STB Aviation Policies

The STB Aviation Policies are updated regularly to reflect current aviation needs and changes in the aviation environment. Through the SASP, an update of the STB Aviation Policies will be suggested to reflect changes recommended as part of the plan. While changes to all policies may not be proposed, the impact of the policies on the state aviation system and its future will be considered throughout the study's process.

As the 2008 SASP progresses, any changes to the airport system and airport category definitions will require changes to the STB Aviation Policies. Other potential impacts for the six current policies are outlined below:

1. Loan Program: The current Loan Program is limited to certain airports and projects designed to generate revenue, improve economic development, and provide a match for grants. The eligibility of airports and projects will be considered in subsequent elements of the study once the analysis has determined where Arizona's airports are in need of improvement.

2. Airport Pavement Management Program: While not part of the SASP, the APMP serves to preserve airport infrastructure investment by extending the useful life of pavements. Through review of the PCI for Arizona's airports and how the PCI has changed with the implementation of a long-standing APMP, the SASP will provide information that can be used to determine if changes to the APMP would enhance the state aviation system.

3. Planning Guidelines: The current STB policies contain guidelines related to the development of airports within the Primary and Secondary Airport system. If the SASP determines that different airport categories will be established, these planning guidelines may require modification to be consistent with the SASP's recommendations. As part of the SASP, updated estimates of statewide capital improvement costs required to bring the airports into compliance with the new planning guidelines will be prepared.

4. Priority Rating System: Use of the current rating system has impacted Arizona's development of the state aviation system through the priorities established in the system. The factors used in the rating system as well as the high priority placed on certain types of projects have resulted in some projects being funded and others still remaining on the list of needs. Based on the analysis of the state's future aviation needs as determined during the SASP, it is possible that changes to the rating system will be proposed. It is important that any proposed changes to the rating system continue to provide ADOT with an objective and sustainable process for selecting projects that improve the state aviation system's performance.

5. Resource Allocation: The allocation formulas currently in place have resulted in the most significant development focused on commercial service and reliever airports (who are allocated 80 percent of the funding), while other Primary and Secondary Airports receive approximately 20 percent of the funding. These allocation guidelines allow for participation by all eligible airports but more funding at larger airports. The eligibility of

airports, allocation formulas, and factors used to allocate will be considered as part of the SASP.

6. Small Community Air Service Pilot Program: This STB policy was created to address air service throughout Arizona and to maximize funding that may be provided through the USDOT. Based on grants that were provided by the USDOT to several of Arizona's smaller commercial service airports, this policy allowed for matching funds to be dedicated to air service improvement. The continued importance and need for this policy will be evaluated as the other policies are considered.

Five-Year ACIP Guidelines

The Five-Year ACIP allocates funds for eligible projects from the State Aviation Fund and distributes these funds across three major funding categories: the Airport Development Grants Program; Airport Loan Program; and the APMS. The guidelines used to distribute the funds in each of these categories have resulted in Arizona's current aviation system development. Once the system has been analyzed, a review of how the Five-Year ACIP Guidelines can be modified to address the performance of the system will be performed. Modifications will be proposed that promote improvement in the areas of the system most in need to promote a balanced, integrated system of airports to serve Arizona's aviation needs.

SUMMARY

This chapter has identified the existing policies impacting Arizona's aviation environment. These existing policies have been implemented over time, and will continue to see changes. A subsequent task analyzes the effectiveness of these policies based on the evaluation of the system's performance. Changes to the existing policies will be considered after the evaluation of the system.

CHAPTER THREE: IDENTIFICATION OF AVIATION/AIRPORT ASSETS

INTRODUCTION

The purpose of this chapter is to depict existing conditions at Arizona's airports using tables, charts, and graphics. An accurate and thorough inventory of existing airport and aviation assets is necessary to ensure the results of the State Airports System Plan (SASP) are factual and implementable. The inventory portion of the SASP serves as the primary source of data for analysis throughout the study. Business and pilot surveys were also used to gather information from the users of the airport system. The data presented in this chapter is organized as follows:

- Data Collection Methods
- Existing Airside Facilities
- Existing Landside Facilities
- Airport Planning Documents
- Airport Activity
- Airspace
- Navigational Aids and Approach Types
- Airport Development Constraints
- Business Survey Results
- Pilot Survey Results

DATA COLLECTION METHODS

The ADOT Aeronautics Division maintains a database of aviation facilities in Arizona. The data is based on information provided by airport managers, as provided to ADOT through various means. This database was used as the initial resource for the collection of airport inventory data in this analysis. This data was confirmed or revised using other sources.

Data for this study was also obtained through an inventory survey and on-site visits to each study airport. Prior to visiting each of the study airports, a partially completed inventory survey was sent to each airport manager/sponsor. Data included in the survey was compiled from ADOT's database. During the on-site visit, a member of the consulting team reviewed each of the inventory surveys with the airport representative, typically the airport manager and/or sponsor, reviewing each question for accuracy and completing any unanswered questions.

In addition to the inventory survey and on-site visits, other sources including Federal Aviation Administration FAA databases, and previous Aeronautics Division and individual airport studies, provided additional information regarding Arizona's airport system. The following specific sources of information were used, where necessary, to supplement data gathered during the inventory process:

- FAA Terminal Area Forecasts (TAF)
- FAA 5010 forms for individual airports
- Airport Master Plans
- Airport Layout Plans (ALP)
- FAA's Air Traffic Activity Data System (ATADS)

The following data was collected where applicable from the airports through the inventory survey, on-site visits, and follow-up:

- Airport information (sponsor name, contact, phone number, hours attended)
- Aeronautical activity (based aircraft, operational mix, design\critical aircraft, recreational aircraft)
- Aeronautical services
- Scheduled airline activity
- Air cargo activity
- Activities (business, training, sport and recreational)
- Airside facilities
- Landside facilities and ground access
- Landing aids
- Weather/communications
- Approach minima and protection standards
- Ordinances (enacted locally)
- Land use/regulatory
- Airspace/obstructions (constraints and design standards)
- Ownership/management
- Capital improvements
- Operations/maintenance
- Emergency services
- Special aviation uses (such as military, pilot training, firefighting support, skydiving operations, glider operations, etc.)
- Major airport users
- Security measures

Based on discussions with ADOT, 93 airports were included in the inventory effort and were visited in order to gather additional information for the system plan. Data collection efforts also included a limited number of privately owned-private use airports. The airports inventoried as part of this study are presented in **Figure 3-1.** The airports are summarized by FAA NPIAS category. These categories were defined in Chapter One.

Figure 3-1: Airports Visited During Inventory Effort

NPIAS Category	*Number of Airports Visited*
Primary Commercial Service	9
Commercial Service	3
Reliever	8
General Aviation	39
Non-NPIAS General Aviation	34
Total	**93**

Source: Wilbur Smith Associates

The airports visited as part of the inventory effort, all Native American airports, and military airports are depicted in **Figure 3-2.** A reference table containing the airport codes, airport name, and associated city name can also be found in **Appendix A.**

Figure 3-2: Arizona Airports Considered in the SASP Inventory Effort

PUBLIC USE AIRPORTS		
FAA ID	Associated City	Airport
20AZ	Picacho	EDS Field
41AZ	Maricopa	Ak-Chin
44A	San Luis	Rolle Airfield
44E	Wickenburg	Forepaugh
4AZ7	San Carlos	San Carlos
A20	Bullhead City	Sun Valley
A39	Phoenix	Phoenix Regional
AVQ	Marana	Marana Regional
AZC	Colorado City	Colorado City Municipal
BXK	Buckeye	Buckeye Municipal
CFT	Clifton/Morenci	Greenlee County
CGZ	Casa Grande	Casa Grande Municipal
CHD	Chandler	Chandler Municipal
CMR	Williams	H.A. Clark Memorial Field
D68	Springerville	Springerville Municipal
DGL	Douglas	Douglas Municipal
DUG	Douglas Bisbee	Bisbee Douglas International
DVT	Phoenix	Phoenix Deer Valley
E25	Wickenburg	Wickenburg Municipal
E51	Bagdad	Bagdad
E60	Eloy	Eloy Municipal
E63	Gila Bend	Gila Bend Municipal
E67	Kearny	Kearny
E77	San Manuel	San Manuel
E81	Superior	Superior Municipal
E91	Chinle	Chinle Municipal
E95	Benson	Benson Municipal
FFZ	Mesa	Falcon Field
FLG	Flagstaff	Flagstaff Pulliam
GCN	Grand Canyon	Grand Canyon National Park
GEU	Glendale	Glendale Municipal
GYR	Goodyear	Phoenix Goodyear
HII	Lake Havasu City	Lake Havasu City
IFP	Bullhead City	Laughlin/Bullhead International
IGM	Kingman	Kingman
INW	Winslow	Winslow-Lindbergh Regional
IWA	Mesa	Phoenix-Mesa Gateway
L25	Meadview	Pearce Ferry
L41	Marble Canyon	Marble Canyon
MZJ	Marana	Pinal Airpark
P01	Ajo	Eric Marcus Municipal
P03	Douglas	Cochise College
P04	Bisbee	Bisbee Municipal
P08	Coolidge	Coolidge Municipal
P14	Holbrook	Holbrook Municipal
P23	Seligman	Seligman
P29	Tombstone	Tombstone Municipal
P33	Willcox	Cochise County
P52	Cottonwood	Cottonwood
PAN	Payson	Payson
PGA	Page	Page Municipal
PHX	Phoenix	Phoenix Sky Harbor International
PRC	Prescott	Ernest A. Love Field
RYN	Tucson	Ryan Field
SAD	Safford	Safford Regional
SDL	Scottsdale	Scottsdale
SEZ	Sedona	Sedona
SJN	St Johns	St Johns Industrial
SOW	Show Low	Show Low Regional
TUS	Tucson	Tucson Intl
TYL	Taylor	Taylor
U30	Temple Bar	Temple Bar

PRIVATE USE AIRPORTS		
FAA ID	Associated City	Airport
18AZ	Carefree	Sky Ranch At Carefree
OLS	Nogales	Nogales Intl
57AZ	Tucson	La Cholla Airpark
1AZ0	Mobile	Mobile
E68	Maricopa	Estrella Sailport
5AZ3	Queen Creek	Pegasus Airpark
P19	Chandler	Stellar Airpark
51AZ	Roosevelt	Grapevine
P48	Peoria	Pleasant Valley
27AZ	Aguila	Eagle Roost Airpark
A09	Bullhead City	Eagle Airpark
L37	Peach Springs	Grand Canyon Caverns
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip
L50	Tuweep	Tuweep
40G	Grand Canyon	Valle
00AZ	Cordes	Cordes
48AZ	Rimrock	Rim Rock

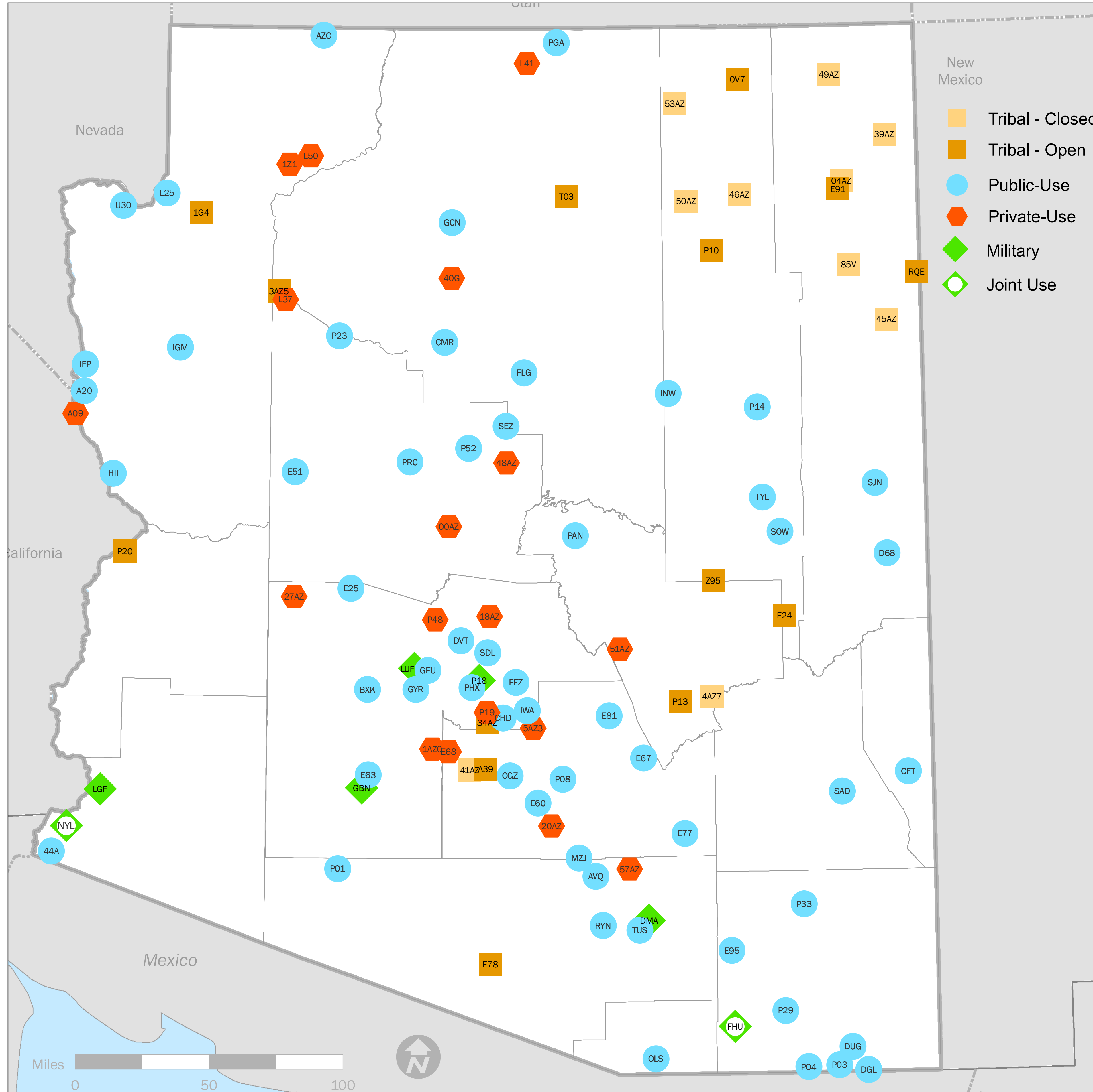
MILITARY		
FAA ID	Associated City	Airport
DMA	Tucson	Davis-Monthan AFB
LGF	Yuma	Laguna AAF
LUF	Litchfield Park	Luke AFB
GBN	Gila Bend	Gila Bend-AF Aux.
P18	Scottsdale	Papago AAF

MILITARY - JOINT USE		
FAA ID	Associated City	Airport
NYL	Yuma	Yuma International
FHU	Sierra Vista	Sierra Vista Municipal

TRIBAL AIRPORTS - OPEN		
FAA ID	Associated City	Airport
P20	Parker	Avi Suquilla
Z95	Cibecue	Cibecue
1G4	Peach Springs	Grand Canyon West
3AZ5	Hualapai	Hualapai
0V7	Kayenta	Kayenta
34AZ	Chandler	Gila River Memorial Airport
P10	Polacca	Polacca
P13	Globe	San Carlos Apache
E78	Sells	Sells
T03	Tuba City	Tuba City
E24	Whiteriver	Whiteriver
RQE	Window Rock	Window Rock

NATIVE AMERICAN - CLOSED		
FAA ID	Associated City	Airport
04AZ	Chinle	Chinle
39AZ	Lukachukai	Lukachukai
45AZ	Pine Springs	Pine Springs
46AZ	Pinon	Pinon
49AZ	Rock Point	Rock Point
4AZ7	San Carlos	San Carlos
50AZ	Rocky Ridge	Rocky Ridge
53AZ	Shonto	Shonto
85V	Ganado	Ganado

Source:
Wilbur Smith Associates



Native American Airport Review

As part of the SASP, a detailed review of airports located on Native American tribal lands was conducted. Arizona is home to 21 federally-recognized Native American Tribes. Tribal property and reservations occupy over 25 percent of Arizona's land. A review of FAA 5010 data indicates there are 24 airfields on tribal land. These airports are denoted in Figure 3-2. This list of airports was compared to available information from the FAA and ADOT. Through this process, over nine different tribes were identified along with several private owners. Through further research, it was determined that only 14 of those airports were open and available for public use, and would be included in future SASP analysis. These airports are:

- Avi Suquilla
- Chinle Municipal
- Cibecue
- Grand Canyon West
- Hualapai
- Kayenta
- Memorial Airfield
- Phoenix Regional
- Polacca
- San Carlos Apache
- Sells
- Tuba City
- Whiteriver
- Window Rock

Through conversations with representatives of the tribal communities, confirmation of closed airports was made, including Ganado which has been included in the NPIAS. Review of the current condition of the Native American airports was conducted to determine how these airports contribute and relate to other airports in the statewide system. The needs of these airports will be evaluated as part of this study. While these airports are not currently eligible for state funding, they are part of the overall system and their analysis is a necessary part of the SASP.

Inventoried Airports Removed from Further SASP Analysis

After conducting the extensive inventory effort, which included contact with and visits to 93 airports, it was determined that 10 of the airports should be removed from further analysis in the SASP. **Figure 3-3** lists the airports removed from further analysis in the SASP. Among the 10 airports removed, six are currently closed and are unlikely to reopen in the foreseeable future. The remaining four are privately owned, are operated for private use only, and were not interested in participating in the study. These airports still play an important role in the system and accommodate key aviation users. Future inclusion of these airports in the airport system may be considered if the analysis in this plan unveils a hole or gap in the system that may be filled by one of these airports.

Figure 3-3: Airports Removed from Further SASP Analysis

Code	*Associated City*	*Airport Name*	*Status*	*Reason for Removal*
A09	Bullhead City	Eagle Airpark	Manager not interested in participating in state study since ineligible for funding	Private Use Only
00AZ	Cordes	Cordes	Permanently closed and no interest in selling or using land as future airport site	Closed Indefinitely
85V	Ganado	Ganado	Land owned by Navajo Tribe; closed	Closed Indefinitely
41AZ	Maricopa	AK Chin Community Airfield	Owned by Ak Chin Farms for agricultural spraying; not interested in becoming public use facility	Private Use Only
1AZ0	Mobile	Mobile	Used for commercial airline training; not interested in operating as public use facility	Private Use Only
20AZ	Picacho	EDS Field	Located on BLM land and previously used for crop dusting; BLM has no intention of re-opening	Closed Indefinitely
5AZ3	Queen Creek	Pegasus Airpark	Privately used by residents of airpark only; not interesting in participating in SASP	Private Use Only
51AZ	Roosevelt	Grapevine	Located on U.S. Forest Service land; closed for several years; no plans to reopen or rehabilitate this site	Closed Indefinitely
L50	Tuweep	Tuweep	Located on State Trust Land and closed since 2004; runway in poor condition; limited road access	Closed Indefinitely
44E	Wickenburg	Forepaugh	Owned and controlled by Bureau of Land Management; does not have reason or resources to open, operate, or maintain airport	Closed Indefinitely

Source: Wilbur Smith Associates

SASP Airports

Figure 3-4 presents all airports included in the Arizona SASP. The airports are grouped by their current NPIAS service level. Within each category the airports are listed in alphabetical order by their associated city. The Arizona SASP contains nine Primary Commercial Service airports, three Commercial Service airports, eight Reliever airports, thirty-eight General Aviation airports, and twenty-four non-NPIAS airports. The usage of each airport, either public or private, is also presented in this figure.

Figure 3-4: Airports Included in AZ SASP

NPIAS - PRIMARY COMMERCIAL SERVICE		
FAA ID	Associated City	Airport
1G4	Peach Springs	Grand Canyon West
FLG	Flagstaff	Flagstaff Pulliam
GCN	Grand Canyon	Grand Canyon National Park
IFP	Bullhead City	Laughlin/Bullhead International
IWA	Mesa	Phoenix-Mesa Gateway
NYL	Yuma	Yuma International
PGA	Page	Page Municipal
PHX	Phoenix	Phoenix Sky Harbor International
TUS	Tucson	Tucson International

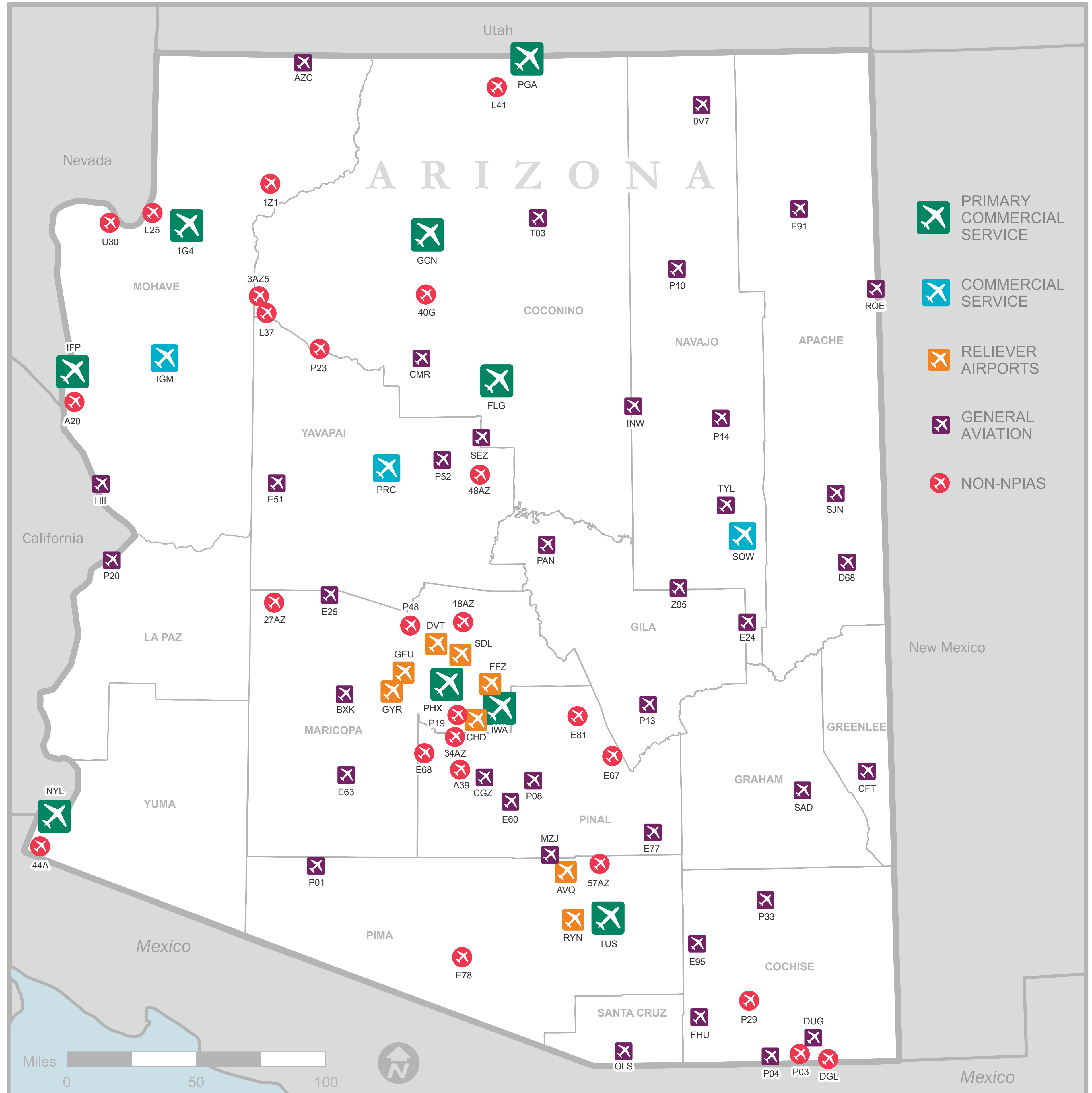
NPIAS - GENERAL AVIATION		
FAA ID	Associated City	Airport
0V7	Kayenta	Kayenta
AZC	Colorado City	Colorado City Municipal
BXK	Buckeye	Buckeye Municipal
CFT	Clifton/Morenci	Greenlee County
CGZ	Casa Grande	Casa Grande Municipal
CMR	Williams	H.A. Clark Memorial Field
D68	Springerville	Springerville Municipal
DUG	Douglas Bisbee	Bisbee Douglas International
E24	Whiteriver	Whiteriver
E25	Wickenburg	Wickenburg Municipal
E51	Bagdad	Bagdad
E60	Eloy	Eloy Municipal
E63	Gila Bend	Gila Bend Municipal
E77	San Manuel	San Manuel/Ray/Blair
E91	Chinle	Chinle Municipal
E95	Benson	Benson Municipal
FHU	Sierra Vista	Sierra Vista Municipal
HII	Lake Havasu	Lake Havasu City
INW	Winslow	Winslow-Lindbergh Regional
MZJ	Marana	Pinal Airpark
OLS	Nogales	Nogales International
P01	Ajo	Eric Marcus Municipal
P04	Bisbee	Bisbee Municipal
P08	Coolidge	Coolidge Municipal
P10	Polacca	Polacca
P13	Globe	San Carlos Apache
P14	Holbrook	Holbrook Municipal
P20	Parker	Avi Suquilla
P33	Willcox	Cochise County
P52	Cottonwood	Cottonwood
PAN	Payson	Payson
RQE	Window Rock	Window Rock
SAD	Safford	Safford Regional
SEZ	Sedona	Sedona
SJN	St Johns	St Johns Industrial Air Park
T03	Tuba City	Tuba City
TYL	Taylor	Taylor
Z95	Cibecue	Cibecue

NPIAS - COMMERCIAL SERVICE		
FAA ID	Associated City	Airport
IGM	Kingman	Kingman
PRC	Prescott	Ernest A. Love Field
SOW	Show Low	Show Low Regional

NPIAS - RELIEVER		
FAA ID	Associated City	Airport
AVQ	Marana	Marana Regional
CHD	Chandler	Chandler Municipal
DVT	Phoenix	Phoenix Deer Valley
FFZ	Mesa	Falcon Field
GEU	Glendale	Glendale Municipal
GYR	Goodyear	Phoenix Goodyear
RYN	Tucson	Ryan Field
SDL	Scottsdale	Scottsdale

NON-NPIAS GENERAL AVIATION		
FAA ID	Associated City	Airport
18AZ	Carefree	Sky Ranch at Carefree
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip
27AZ	Aguila	Eagle Roost
34AZ	Chandler	Memorial Airfield
3AZ5	Hualapai	Hualapai
40G	Grand Canyon	Grand Canyon Valle
44A	San Luis	Rolle Airfield
48AZ	Rimrock	Rimrock
57AZ	Tucson	La Cholla Airpark
A20	Bullhead City	Sun Valley
A39	Phoenix	Phoenix Regional
DGL	Douglas	Douglas Municipal
E67	Kearny	Kearny
E68	Maricopa	Estrella Sailport
E78	Sells	Sells
E81	Superior	Superior Municipal
L25	Meadview	Pearce Ferry
L37	Peach Springs	Grand Canyon Caverns
L41	Marble Canyon	Marble Canyon
P03	Douglas	Cochise College
P19	Chandler	Stellar Airpark
P23	Seligman	Seligman
P29	Tombstone	Tombstone Municipal
P48	Peoria	Pleasant Valley
U30	Temple Bar	Temple Bar

Source: Wilbur Smith Associates



EXISTING AIRSIDE FACILITIES

The SASP inventory effort included the identification of airside facilities at system airports. Airside facilities include runways, taxiways, lighting, and visual approach aids.

Runway Summary

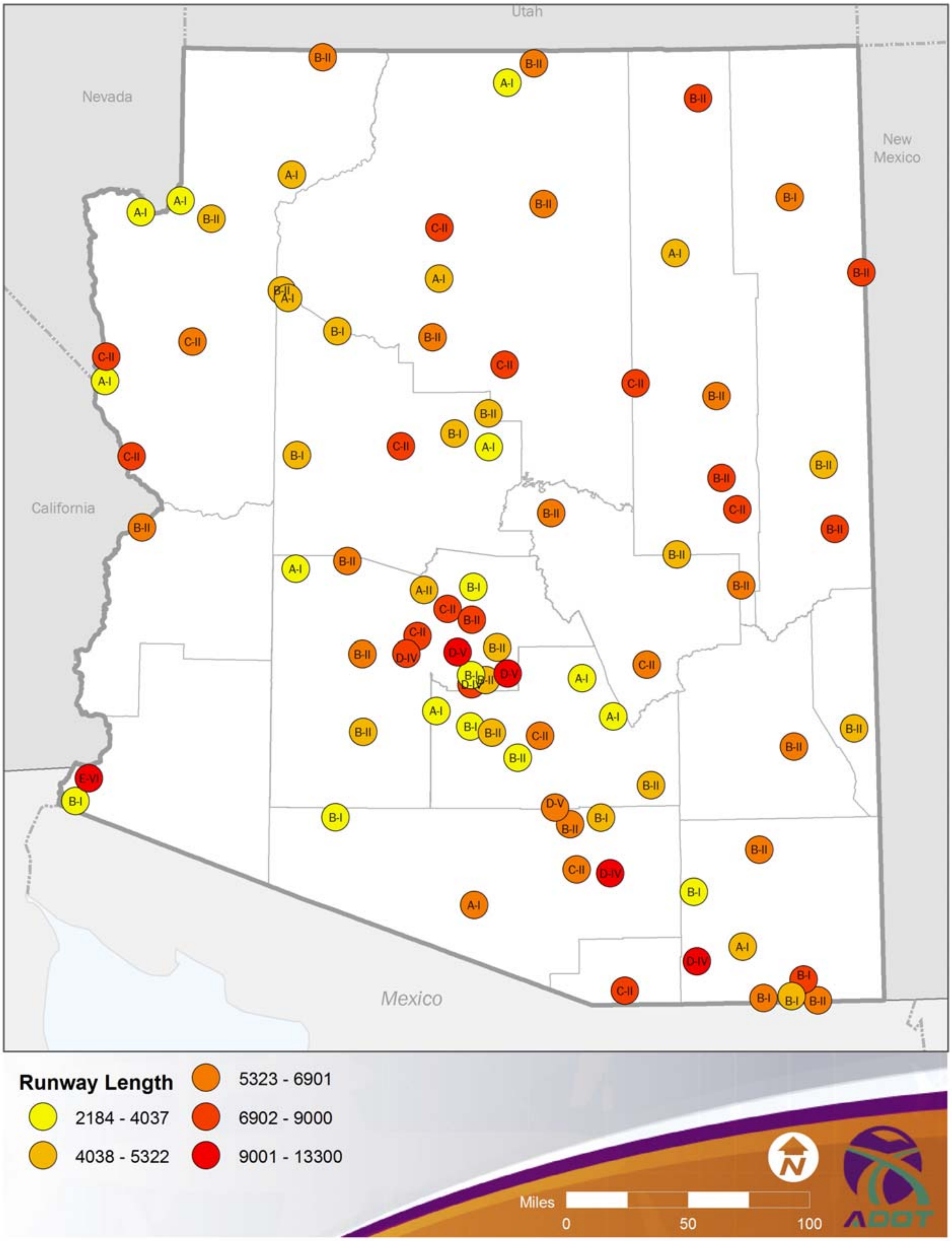
Of the airports included in the SASP, there are five airports with runways over 10,000' long. They are: Phoenix-Mesa Gateway, Phoenix Sky Harbor, Tucson International, Sierra Vista Municipal, and Yuma International. There are 55 runways over 5,000' long, one of which is gravel, and the rest asphalt or concrete. Yuma has the longest runway, at 13,300'. Rimrock has the shortest paved runway at 2,184'. Estrella has the shortest of all runways, a 1,000' dirt runway. Among the inventoried airports, there are 29 with more than one runway. However, 24 of the second runways are paved.

FAA standards recognize three standard types of runway lighting: High, Medium, and Low Intensity Runway Lights; these are referred to as HIRL, MIRL, and LIRL.

Airport Reference Code Summary

The Airport Reference Code (ARC) is a coding system that relates airport design criteria to the operational and physical characteristics of the airplanes that are intended to operate at an airport. An ARC is a composite designation based on the Aircraft Category and Airplane Design Group of the critical aircraft. The Aircraft Categories, designated by a letter (A through E), refer to the aircraft's approach speed. Airplane Design Groups are designated by a Roman numeral (I through VI), and refer to the wingspan of the aircraft. Even though a runway may be designated as a certain ARC, it does not prohibit larger aircraft from operating at the airport. Figure 3-5 graphically depicts the system airports by primary runway length category and primary runway ARC.

Figure 3-5: Arizona System Airports by Primary Runway Length and ARC Category

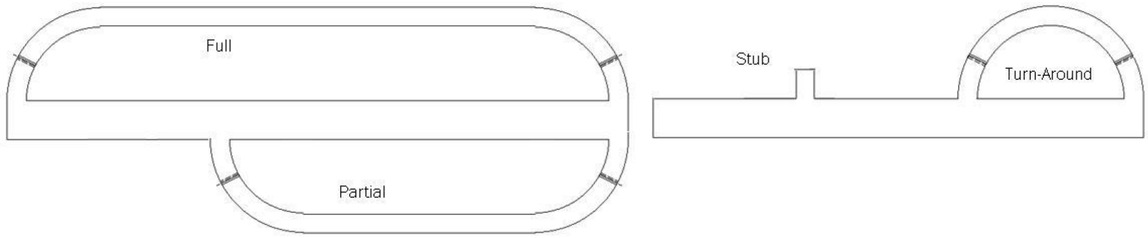


Sources: *Airport Inventory & Data Survey* 2008, Wilbur Smith Associates

Taxiway Summary

The FAA recognizes four different types of taxiways: stub, turn-around, partial parallel, and full parallel. These four types are depicted in **Figure 3-6**. Of the airports included in the SASP, sixty-nine had some type of taxiway. Forty-eight had full parallel taxiways and another ten had partial parallel taxiways. The remaining eleven airports had either a turn-around or stub.

Figure 3-6: FAA-Recognized Taxiway Types



Source: Federal Aviation Administration, Wilbur Smith Associates

Similar to runway lighting, FAA standards recognize three standard types of taxiway lighting: High (HITL), Medium (MITL), and Low Intensity Taxiway Lights (LITL).

Visual Aids Summary

A Visual Glide Slope Indicator (VGSI) is a system of lights on the side of the runway threshold near the touchdown zone. VGSIs help to ensure that any obstructions in the approach area are cleared by indicating if the aircraft is higher than or lower than the appropriate glide slope angle. The two most common types of VGSI systems found at Arizona system airports are: PAPI and VASI. Each is further divided into additional categories depending on the lighting configurations and location.

- Precision Approach Path Indicators (PAPIs)
  - P2L – Two Light PAPI on Left Side of Runway
  - P2R - Two Light PAPI on Right Side of Runway
  - P4L – Four Light PAPI of Left Side of Runway
  - P4R - Four Light PAPI on Right Side of Runway
- Visual Approach Slope Indicators (VASIs)
  - V2L – Two Box VASI on Left Side of Runway
  - V4L – Four Box VASI on Left Side of Runway

Runway End Identification Lights (REILs) are an airport lighting facility located at the runway threshold that consists of one white high intensity strobe light installed at each corner of a runway end, enabling the pilot to quickly identify the runway threshold.

Figure 3-7 summarizes the runway orientation, runway length and runway width, as well as the FAA Airport Reference Code (ARC) for each system airport. Also presented are the type of runway lighting, VGSI, the presence of REILs, the taxiway type, and taxiway lighting.

Figure 3-7: Existing Airside Facilities and Visual Aids

Associated City	*Airport*	*Runway Orientation*	*Length (feet)*	*Width (feet)*	*ARC*	*Runway Lighting*	*Visual Glide Slope Indicator*	*REIL*	*Taxiway Type*	*Taxiway Lighting*
Primary Commercial Service										
Bullhead City	Laughlin/Bullhead Intl.	16/34	7,520	150	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Flagstaff	Flagstaff Pulliam	03/21	8,800	150	C-III	HIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Grand Canyon	Grand Canyon National Park	03/21	9,000	150	C-III	MIRL	None/VASI	N/Y	Full Parallel	MITL
Mesa	Phoenix-Mesa Gateway	12R/30L	10,401	150	D-V	MIRL	None/None	N/N	Partial Parallel	MITL
		12C/30C	10,201	150		MIRL	PAPI/PAPI	N/N	Stub	MITL
		12L/30R	9,301	150		HIRL	PAPI/PAPI	Y/Y	Stub/Turnaround	MITL
Page	Page	15/33	5,950	150	B-II	MIRL	VASI/VASI	Y/Y	Full Parallel	MITL
		07/25	2,200	75		None	None/None	N/N	None	None
Peach Springs	Grand Canyon West	17/35	5,058	60	B-II	None	None/None	N/N	Stub	None
Phoenix	Phoenix Sky Harbor Intl.	08/26	11,489	150	D-V	HIRL	PAPI/PAPI	N/Y	Full Parallel	MITL
		07L/25R	10,300	150		HIRL	PAPI/PAPI	N/Y	Full Parallel	MITL
		07R/25L	7,800	150		HIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Tucson	Tucson International	11L/29R	10,996	150	D-IV	HIRL	PAPI/PAPI	N/Y	Full Parallel	MITL
		11R/29L	8,408	75		MIRL	PAPI/None	N/Y	Full Parallel	MITL
		03/21	6,000	150		MIRL	None/VASI	N/Y	Full Parallel	MITL
Yuma	Yuma International	03L/21R	13,300	200	E-VI	HIRL	PAPI/PAPI	N/N	Full Parallel	MITL
		03R/21L	9,239	150		HIRL	PAPI/PAPI	N/N	Partial Parallel	MITL
		08/26	6,145	150		HIRL	None/None	N/N	Full Parallel	MITL
		17/35	5,710	150		HIRL	VASI/None	N/Y	Partial Parallel	MITL
Commercial Service										
Kingman	Kingman	03/21	6,831	150	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		17/35	6,725	75		MIRL	PAPI/PAPI	N/N	Partial Parallel	MITL
Prescott	Ernest A. Love Field	03R/21L	7,616	150	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		03L/21R	4,862	60		MIRL	PAPI/PAPI	N/N	Partial Parallel	MITL
		12/30	4,408	75		MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL/Reflectors
Show Low	Show Low Regional	06/24	7,200	100	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		03/21	3,937	60		None	None/None	N/N	Full Parallel	Reflectors
Reliever										
Chandler	Chandler Municipal	04R/22L	4,850	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		04L/22R	4,401	75		MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Glendale	Glendale Municipal	01/19	7,150	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Goodyear	Phoenix Goodyear	03/21	8,500	150	D-IV	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL

Figure 3-7: Existing Airside Facilities and Visual Aids (Continued)

Associated City	*Airport*	*Runway Orientation*	*Length (feet)*	*Width (feet)*	*ARC*	*Runway Lighting*	*Visual Glide Slope Indicator*	*REIL*	*Taxiway Type*	*Taxiway Lighting*
Marana	Marana Regional	12/30	6,901	100	C-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		03/21	3,893	75		MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Mesa	Falcon Field	04R/22L	5,102	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		04L/22R	3,801	75		MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Phoenix	Phoenix Deer Valley	07R/25L	8,208	100	C-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		07L/25R	4,500	75		MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Scottsdale	Scottsdale	03/21	8,249	100	D-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Tucson	Ryan Field	06R/24L	5,500	75	B-II	MIRL	None/VASI	Y/N	Full Parallel	MITL
		06L/24R	4,900	75		None	PAPI/PAPI	N/N	Full Parallel	None
		15/33	4,000	75		None	None/None	N/N	Full Parallel	None
General Aviation										
Ajo	Eric Marcus Municipal	12/30	3,800	60	B-I	LIRL	PAPI/PAPI	N/N	Stub	None
Bagdad	Bagdad	05/23	4,552	60	B-I	None	None/None	N/N	None	None
Benson	Benson Municipal	10/28	4,000	75	B-I	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Bisbee	Bisbee Municipal	17/35	5,929	75	B-I	MIRL	Inoperable	N/N	Full Parallel	MITL
		02/20	2,650	110		None	None/None	N/N	None	None
Buckeye	Buckeye Municipal	17/35	5,500	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Casa Grande	Casa Grande Municipal	05/23	5,200	100	B-II	MIRL	VASI/PAPI	N/N	Full Parallel	MITL
Chinle	Chinle Municipal	18/36	6,149	60	B-I	MIRL	PAPI/PAPI	Y/Y	Turnaround	MITL
Cibecue	Cibecue	07/25	4,200	100	B-II	None	None/None	N/N	None	None
Clifton/Morenci	Greenlee County	07/25	4,970	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel	Reflectors
Colorado City	Colorado City Municipal	11/29	6,300	75	B-II	MIRL	PAPI/PAPI	Y/Y	Partial Parallel	Reflectors
		02/20	5,100	60		MIRL	None/None	N/N	Partial Parallel	Reflectors
Coolidge	Coolidge Municipal	05/23	5,528	150	C-II	MIRL	PAPI/PAPI	N/N	Stub	MITL
		17/35	3,861	75		None	None/None	N/N	Full Parallel	MITL
Cottonwood	Cottonwood	14/32	4,250	75	B-I	MIRL	None/PAPI	N/Y	Full Parallel	None
Douglas Bisbee	Bisbee Douglas International	17/35	7,311	100	C-I	MIRL	VASI/VASI	Y/Y	Partial Parallel	MITL
		08/26	5,000	75		MIRL	None/None	N/N	Stub	MITL
Eloy	Eloy Municipal	02/20	3,900	75	B-II	MIRL	Inoperable	N/N	Full Parallel	None
Gila Bend	Gila Bend Municipal	04/22	5,200	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Globe	San Carlos Apache	09/27	6,500	100	C-II	HIRL	PAPI/PAPI	Y/Y	Full Parallel	None
Holbrook	Holbrook Municipal	03/21	6,698	75	B-I	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
		11/29	3,200	120		None	None/None	N/N	None	None/None

Figure 3-7: Existing Airside Facilities and Visual Aids (Continued)

Associated City	*Airport*	*Runway Orientation*	*Length (feet)*	*Width (feet)*	*ARC*	*Runway Lighting*	*Visual Glide Slope Indicator*	*REIL*	*Taxiway Type*	*Taxiway Lighting*
Kayenta	Kayenta	05/23	7,100	75	B-II	MIRL	None/VASI	N/N	None	None
Lake Havasu	Lake Havasu City	14/32	8,000	100	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Marana	Pinal Airpark	12/30	6,850	150	D-V	MIRL	None/None	N/N	Full Parallel	Reflectors
Nogales	Nogales International	03/21	7,199	90	C-II	MIRL	PAPI/PAPI	N/N	Full Parallel	MITL
Parker	Avi Suquilla	01/19	6,750	100	C-II	MIRL	PAPI/PAPI	Y/Y	Partial Parallel	MITL
Payson	Payson	06/24	5,500	75	B-II	MIRL	N/PAPI	N/N	Full Parallel	Reflectors
Polacca	Polacca	04/22	4,200	50	A-I	LIRL	None/None	N/N	None	None/None
Safford	Safford Regional	12/30	6,015	100	B-II	MIRL	VASI/VASI	N/N	Full Parallel	MITL
		08/26	4,800	75		MIRL	PAPI/PAPI	N/N	Full parallel	MITL
San Manuel	San Manuel/Ray/Blair	11/29	4,200	75	B-I	None	None/None	N/N	Partial Parallel	None
Sedona	Sedona	03/21	5,132	100	B-I	MIRL	PAPI/PAPI	Y/Y	Partial Parallel	MITL
Sierra Vista	Sierra Vista Municipal/Libby Army Airfield	08/26	12,001	150	D-IV	HIRL	PAPI/PAPI	N/N	Full Parallel	MITL
		12/30	5,366	100		MIRL	PAPI/PAPI	N/N	Partial Parallel	MITL
		03/21	4,285	75		MIRL	None/None	N/N	Partial Parallel	Reflectors
Springerville	Springerville Municipal	03/21	8,417	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel	Reflectors
		11/29	4,589	60		MIRL	None/None	N/N	Partial Parallel	None
St Johns	St Johns Industrial Air Park	14/32	5,322	75	B-II	MIRL	PAPI/PAPI	N/Y	Full Parallel	Reflectors
		03/21	3,400	60		None	None/None	N/N	None	None
Taylor	Taylor	03/21	7,200	75	B-II	MIRL	PAPI/PAPI	Y/Y	Partial Parallel	Reflectors
Tuba City	Tuba City	15/33	6,230	75	B-II	MIRL	PAPI/PAPI	Y/Y	None	None
Whiteriver	Whiteriver	01/19	6,350	75	B-II	MIRL	PAPI/None	Y/Y	Partial Parallel	None
Wickenburg	Wickenburg Municipal	05/23	6,100	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Willcox	Cochise County	03/21	6,095	75	B-II	MIRL	None/None	N/N	Full Parallel	Reflectors
Williams	H.A. Clark Memorial Field	18/36	6,000	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel	None
Window Rock	Window Rock	02/20	7,000	75	B-II	MIRL	PAPI/None	Y/N	None	None
Winslow	Winslow-Lindbergh Regional	04/22	7,499	150	C-II	MIRL	None/VASI	N/Y	Full Parallel	None
		11/29	7,100	150		MIRL	VASI/None	Y/N	Full Parallel	None
Non-NPIAS General Aviation										
Aguila	Eagle Roost	17/35	3,400	40	A-I	LIRL	None/None	N/N	Turnaround	None
Bullhead City	Sun Valley	18/36	3,700	42	A-I	LIRL	None/None	N/N	Full Parallel	None
Carefree	Sky Ranch at Carefree	06/24	4,037	50	B-I	LIRL	PLASI/PLASI	Y/Y	Full Parallel	None
Chandler	Memorial Airfield	12/30	8,530	300	D-IV	None	None/None	N/N	Full Parallel	None
		03/21	5,200	200		None	None/None	N/N	None	None

Figure 3-7: Existing Airside Facilities and Visual Aids (Continued)

Associated City	*Airport*	*Runway Orientation*	*Length (feet)*	*Width (feet)*	*ARC*	*Runway Lighting*	*Visual Glide Slope Indicator*	*REIL*	*Taxiway Type*	*Taxiway Lighting*
Chandler	Stellar Airpark	17/35	3,913	60	B-I	MIRL	VASI/None	N/N	Full Parallel	Reflectors
Douglas	Cochise College	05/23	5,303	72	B-I	LIRL	PAPI/PAPI	N/N	Full Parallel	LITL
Douglas	Douglas Municipal	03/21	5,760	75	B-II	MIRL	PAPI/PAPI	N/N	Partial Parallel	MITL
		18/36	4,095	100		None	None/None	N/N	None	None
Grand Canyon	Grand Canyon Valle	01/19	4,199	45	A-I	MIRL	VASI/VASI	Y/Y	Stub	None
Kearny	Kearny	08/26	3,400	60	A-I	None	None/None	N/N	Turnarounds	None
Marble Canyon	Marble Canyon	03/21	3,715	35	A-I	None	None/None	N/N	Stub	None
Maricopa	Estrella Sailport	6R/24L	2,520	30	A-I	None	None/None	N/N	None	None
		07/25	1,000	20		None	None/None	N/N	None	None
		06C/24C	1,995	25		NA	None/None	N/N	NA	None
		06L/24R	1,910	25		NA	None/None	N/N	NA	None
Meadview	Pearce Ferry	01/19	2,810	90	A-I	None	None/None	N/N	None	None
Peach Springs	Grand Canyon Caverns	05/23	5,300	45	A-I	None	None/None	N/N	Partial Parallel	None
Peach Springs	Hualapai	07/25	4,790	30	A-I	None	None/None	N/N	NA	NA
Peoria	Pleasant Valley	05C/23C	4,200	100	A-II	None	None/None	N/N	None	None
		05L/23R	4,200	100		None	None/None	N/N	None	None
		05R/23L	4,200	100		None	None/None	N/N	None	None
		14/32	2,400	100		NA	None/None	N/N	NA	None
Phoenix	Phoenix Regional	03/21	4,000	50	B-I	None	None/None	N/N	Full Parallel	None
Rimrock	Rimrock	05/23	2,184	75	A-I	LIRL	VASI/None	Y/N	None	None
San Luis	Rolle Airfield	17/35	2,800	60	B-I	None	None/None	N/N	Turnaround	None
Seligman	Seligman	04/22	4,800	75	B-I	MIRL	PAPI/PAPI	Y/Y	Full Parallel	MITL
Sells	Sells	04/22	5,830	48	A-I	None	None/None	N/N	Turnaround	None
Superior	Superior Municipal	04/22	3,250	75	B-II	None	None/None	N/N	None	None
Temple Bar	Temple Bar	18/36	3,500	50	A-I	None	None/None	N/N	Turnarounds	None
Tombstone	Tombstone Municipal	06/24	4,610	65	A-I	None	VASI/None	N/N	None	None
Tucson	La Cholla Airpark	01/19	4,500	44	B-I	LIRL	VASI/None	N/N	Full Parallel	Reflectors
Whitmore	Grand Canyon Bar Ten Airstrip	16/34	4,300	33	A-I	None	None/None	N/N	None	None

Source: *Airport Inventory & Data Survey* 2008

EXISTING LANDSIDE FACILITIES

Landside facilities presented in this section include the number of hangars and tie-down spaces available, types of fuel sold, and the presence of a general aviation and or commercial service terminal.

Aircraft Parking/Storage Summary

Data from the SASP airport inventory survey identified a total of 4,342 hangars in the Arizona airport system, of which 3,074 are T-hangars, 1,158 are conventional hangars, and 110 are hangars of other types. Additionally, there are an estimated 5,754 paved and unpaved apron tie-down parking spaces.

Reliever airports tended to have many more hangars than other airports in the system. The Phoenix-Deer Valley Airport had the largest number of hangars within the system with a total of 779 hangars.

Airports in the general aviation category with more than 55 hangars include the Lake Havasu City and Sedona airports. Of the non-NPIAS general aviation airports, private airparks had the largest number of hangars, because of private hangar-home development. Public use non-NPIAS airports within Arizona had very few hangars, with the Pleasant Valley Airport having the most with a total of 14 hangars.

Fuel Summary

With the exception of Grand Canyon West (1G4), which only maintains on-site fuel for specific charter companies, all commercial service airports have both AvGas and Jet-A fuel available to the public. There are 20 NPIAS general aviation airports with both Avgas and jet fuel, and six with only AvGas. There are 12 NPIAS general aviation airports with no fuel available. Of the non-NPIAS general aviation airports, four have both jet fuel and AvGas, and four have AvGas only. Seventeen airports have no fuel available.

Terminal Summary

For the purpose of this plan, an airport was considered to have a commercial service terminal if the terminal is equipped to serve scheduled airline passengers, including security screening. A general aviation terminal was defined as some sort of building open to the flying public that may or may not have restrooms, a pilot lounge, a public phone, or other amenities. A general aviation terminal can be maintained by the airport owner or a fixed base operator (FBO).

Figure 3-8 presents the existing landside facilities of the airports included in the SASP. Grand Canyon West is the only airport in the Primary Commercial Service category without a commercial service terminal, although it does have a general aviation terminal. There are several general aviation airports in Arizona with commercial service terminals, including Sierra Vista Lake Havasu City, and Sedona, all of which previously had commercial service. None of the airports in the Reliever category have commercial service terminals, but all have general aviation terminals.

Figure 3-8: Existing Landside Facilities

Associated City	*Airport*	*Total Hangars*	*Apron Capacity (spaces)*	*Fuel*	*Commercial Service Terminal*	*General Aviation Terminal*
Primary Commercial Service						
Bullhead City	Laughlin/Bullhead Intl.	34	68	AvGas, Jet-A	Yes	Yes
Flagstaff	Flagstaff Pulliam	61	47	AvGas, Jet-A	Yes	Yes-FBO
Grand Canyon	Grand Canyon National Park	4	72	AvGas, Jet-A	Yes	Yes
Mesa	Phoenix-Mesa Gateway	73	98	AvGas, Jet-A, MoGas	Yes	Yes-FBO
Page	Page	60	107	AvGas, Jet-A	Yes	Yes-FBO
Peach Springs	Grand Canyon West	0	0	None	No	Yes
Phoenix	Phoenix Sky Harbor Intl.	54	50	AvGas, Jet-A, MoGas	Yes	Yes-FBO
Tucson	Tucson Intl.	246	411	AvGas, Jet-A	Yes	Yes
Yuma	Yuma Intl.	47	180	AvGas, Jet-A	Yes	Yes-FBO
Commercial Service						
Kingman	Kingman	50	214	AvGas, Jet-A	Yes	Yes-FBO
Prescott	Ernest A. Love Field	197	252	AvGas, Jet-A	Yes	Yes
Show Low	Show Low Regional	71	96	AvGas, Jet-A	Yes	No
Reliever						
Chandler	Chandler Municipal	238	263	AvGas, Jet-A	No	Yes
Glendale	Glendale Municipal	275	302	AvGas, Jet-A	No	Yes
Goodyear	Phoenix Goodyear	147	52	AvGas, Jet-A	No	Yes
Marana	Marana Regional	251	158	AvGas, Jet-A	No	Yes-FBO
Mesa	Falcon Field	538	422	AvGas, Jet-A	No	Yes
Phoenix	Phoenix Deer Valley	779	368	AvGas, Jet-A	No	Yes
Scottsdale	Scottsdale	80	263	AvGas, Jet-A	No	Yes
Tucson	Ryan Field	187	224	AvGas, Jet-A	No	Yes
General Aviation						
Ajo	Eric Marcus Municipal	8	13	No	No	No
Bagdad	Bagdad	0	13	No	No	No
Benson	Benson Municipal	14	52	AvGas, Jet-A	No	Yes
Bisbee	Bisbee Municipal	4	30	AvGas	No	Yes
Buckeye	Buckeye Municipal	46	61	AvGas, Jet-A	No	Yes
Casa Grande	Casa Grande Municipal	54	196	AvGas, Jet-A	No	Yes
Chinle	Chinle Municipal	0	11	No	No	No

Figure 3-8: Existing Landside Facilities (Continued)

Associated City	*Airport*	*Total Hangars*	*Apron Capacity (spaces)*	*Fuel*	*Commercial Service Terminal*	*General Aviation Terminal*
General Aviation						
Cibecue	Cibecue	0	0	No	No	No
Clifton/Morenci	Greenlee County	2	21	No	No	Yes
Colorado City	Colorado City Municipal	9	16	AvGas, Jet-A	No	Yes
Coolidge	Coolidge Municipal	19	6	AvGas, Jet-A	No	Yes
Cottonwood	Cottonwood	25	71	AvGas	No	Yes
Douglas Bisbee	Bisbee Douglas International	4	50	AvGas, Jet-A	No	Yes
Eloy	Eloy Municipal	16	28	AvGas, Jet-A	No	No
Gila Bend	Gila Bend Municipal	2	25	No	No	Yes
Globe	San Carlos Apache	2	80	No	No	No
Holbrook	Holbrook Municipal	3	43	AvGas	No	Yes
Kayenta	Kayenta	0	6	No	No	No
Lake Havasu	Lake Havasu City	79	264	AvGas, Jet-A	Yes	Yes-FBO
Marana	Pinal Airpark	3	20	AvGas, Jet-A	No	No
Nogales	Nogales International	19	28	AvGas, Jet-A	No	Yes
Parker	Avi Suquilla	21	61	AvGas, Jet-A	No	Yes
Payson	Payson	20	85	AvGas, Jet-A	No	Yes
Polacca	Polacca	0	3	No	No	No
Safford	Safford Regional	25	45	AvGas, Jet-A	No	Yes
San Manuel	San Manuel/Ray/Blair	28	50	AvGas	No	Yes
Sedona	Sedona	85	90	AvGas, Jet-A	Yes	Yes
Sierra Vista	Sierra Vista Municipal/LAA	62	36	AvGas, Jet-A	Yes	Yes
Springerville	Springerville Municipal	2	48	AvGas, Jet-A	No	Yes
St Johns	St Johns Industrial Air Park	9	30	AvGas, Jet-A	No	Yes
Taylor	Taylor	13	23	AvGas	No	Yes
Tuba City	Tuba City	0	6	No	No	No
Whiteriver	Whiteriver	0	17	No	No	No
Wickenburg	Wickenburg Municipal	55	22	AvGas, Jet-A	No	Yes
Willcox	Cochise County	16	26	AvGas, Jet-A	No	Yes
Williams	H.A. Clark Memorial Field	6	18	AvGas	No	Yes
Window Rock	Window Rock	3	10	No	No	Yes

Figure 3-8: Existing Landside Facilities (Continued)

Associated City	*Airport*	*Total Hangars*	*Apron Capacity (spaces)*	*Fuel*	*Commercial Service Terminal*	*General Aviation Terminal*
General Aviation						
Winslow	Winslow-Lindbergh Regional	3	80	AvGas, Jet-A	No	Yes
Non-NPIAS General Aviation						
Aguila	Eagle Roost	82	0	No	No	No
Bullhead City	Sun Valley	3	12	AvGas	No	No
Carefree	Sky Ranch at Carefree	119	19	AvGas, Jet-A	No	Yes
Chandler	Memorial Airfield	1	0	No	No	Yes
Chandler	Stellar Airpark	127	35	AvGas, Jet-A	No	No
Douglas	Douglas Municipal	11	41	AvGas, Jet-A	No	Yes
Douglas	Cochise College	1	42	Av-Gas	No	Yes
Grand Canyon	Grand Canyon Valle	11	51	AvGas, Jet-A	No	Yes
Kearny	Kearny	4	7	No	No	No
Marble Canyon	Marble Canyon	0	12	No	No	No
Maricopa	Estrella Sailport	1	56	No	No	Yes
Meadview	Pearce Ferry	0	0	No	No	No
Peach Springs	Grand Canyon Caverns	1	4	No	No	No
Peach Springs	Hualapai	NA	NA	NA	NA	NA
Peoria	Pleasant Valley	14	100	AvGas	No	Yes
Phoenix	Phoenix Regional	1	7	No	No	No
Rimrock	Rimrock	16	4	No	No	No
San Luis	Rolle Airfield	0	0	No	No	No
Seligman	Seligman	0	15	No	No	No
Sells	Sells	0	0	No	No	No
Superior	Superior Municipal	0	0	No	No	No
Temple Bar	Temple Bar	0	8	No	No	No
Tombstone	Tombstone Municipal	3	3	No	No	No
Tucson	La Cholla Airpark	25	42	AvGas	No	No
Whitmore	Grand Canyon Bar Ten Airstrip	0	0	No	No	No

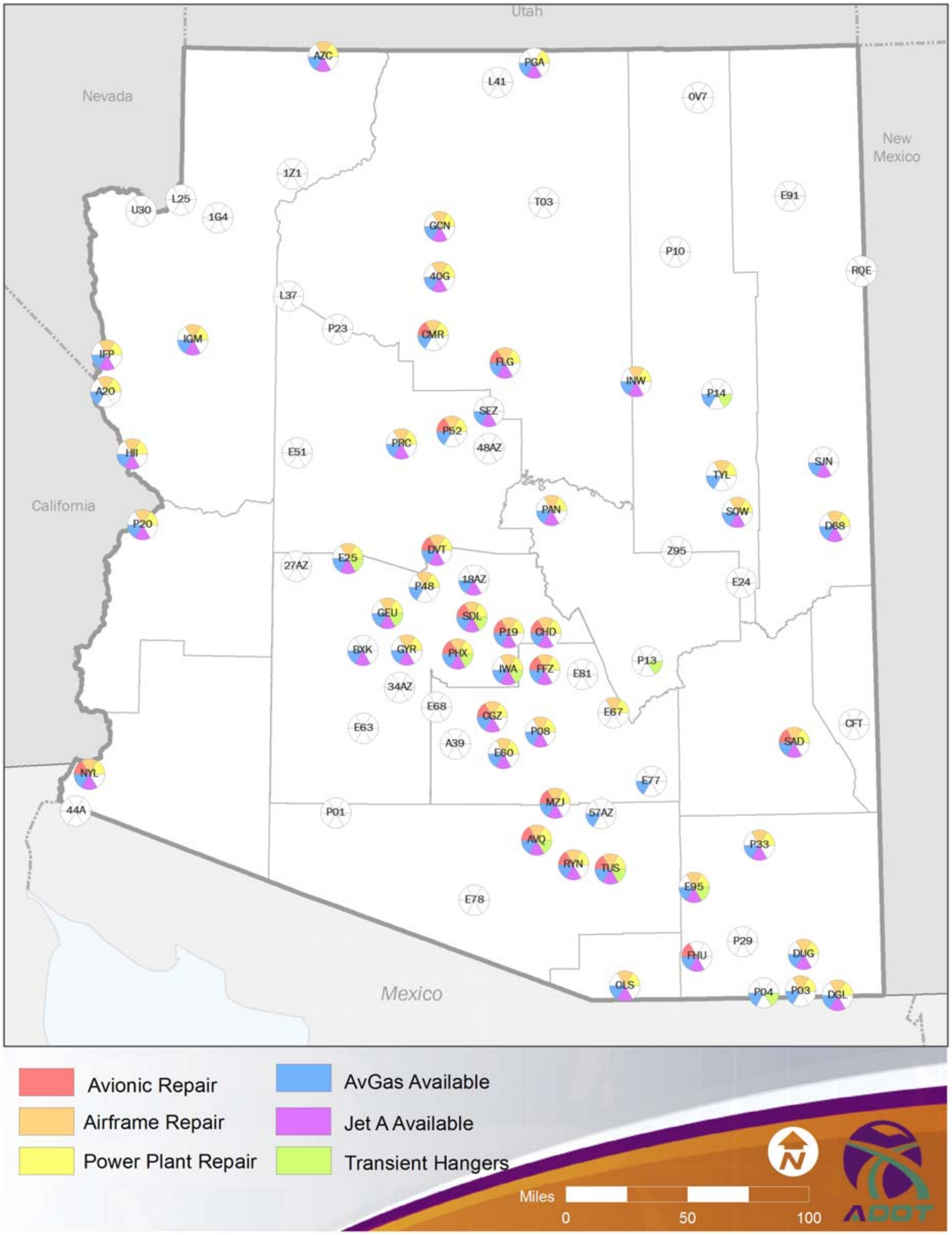
Source: *Airport Inventory & Data Survey* 2008

Within the survey airports, all airports without hangars are also without fuel. Among airports included in the NPIAS, there is a strong correlation between providing fuel and having a terminal. Eloy Municipal and Pinal Airpark are the only NPIAS airports without terminals that have fuel available.

Existing Services

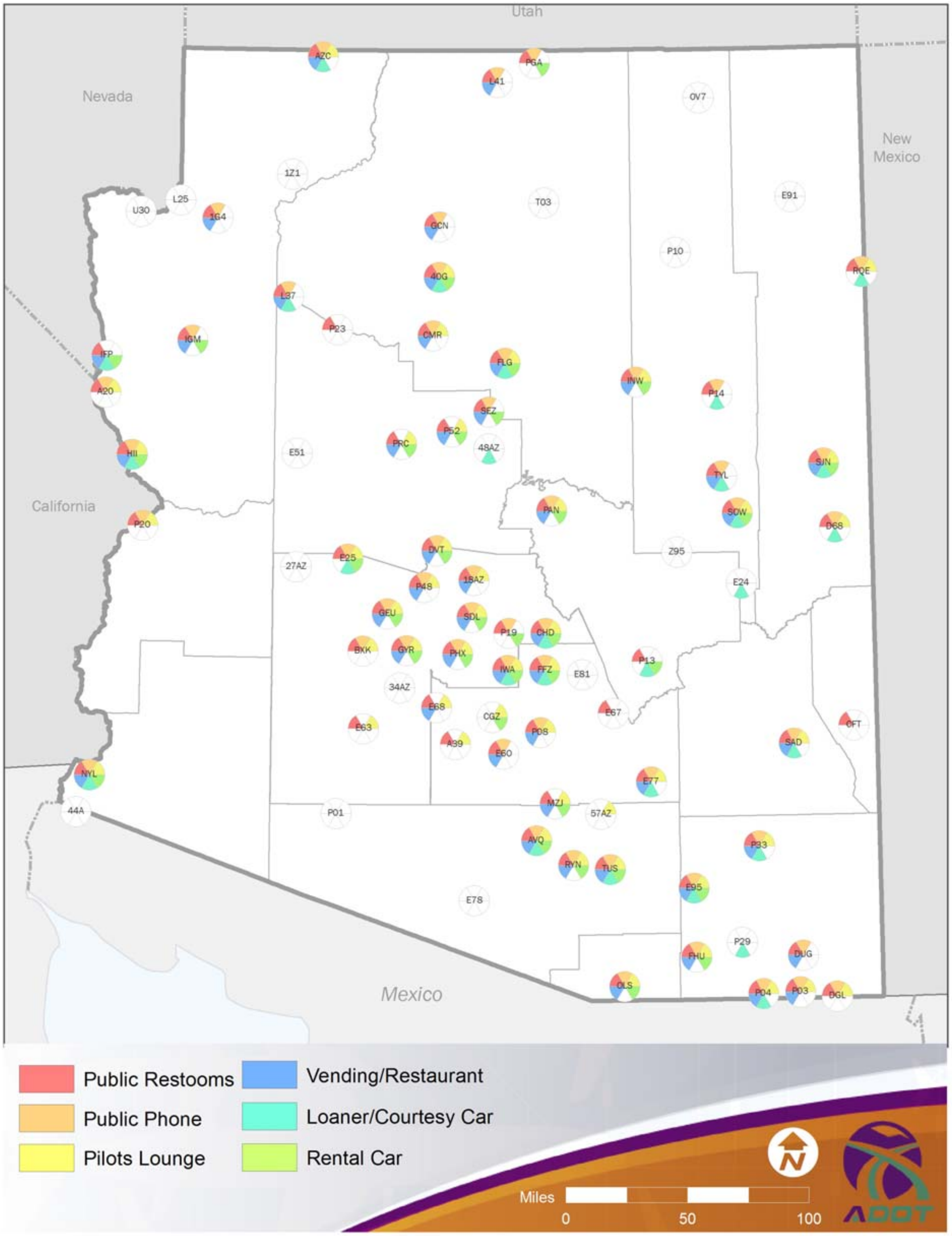
The level of services available at an airport has an impact on both the number and type of operations that typically occur. Airports with better services tend to attract greater numbers of transient or visiting aircraft. Airport services are traditionally provided by a Fixed Base Operator (FBO). At a minimum, these services include fuel and over-night storage rental. Many FBOs provide either a loaner car or a courtesy car to provide local transportation for GA aircraft users. Some FBOs also provide concierge-style services, including restaurant, hotel, and car reservations. Figure 3-9 identifies services available at system airports related to the operation and maintenance of GA aircraft. Figure 3-10 identifies services available for GA and commercial aircraft passengers at system airports.

Figure 3-9: Aircraft Operation and Maintenance Services Available



Source: *Airport Inventory & Data Survey 2008*

Figure 3-10: Passenger Services Available



Source: *Airport Inventory & Data Survey* 2008

AIRPORT ACTIVITY

The number of annual aircraft operations and based aircraft are two of the best measures of the level of activity occurring at an airport. The number of annual operations and based aircraft for each system airport were obtained from the ADOT Airport System Manager (ASM) database and updated during the inventory process. When possible, operations data provided by Air Traffic Control Towers (ATCTs) was used. For some airports, the best available operations data came from estimates made by airport sponsors.

Based Aircraft

A based aircraft is considered to be an aircraft that is operational or air worthy and was based at the airport a majority of the year. For each system airport the total number of based aircraft was identified in addition to the type of aircraft based at each airport. A total of 8,041 aircraft are based at system airports within Arizona, excluding military aircraft. Figure 3-11 presents the types of aircraft based at system airports and the percentage of total system based aircraft they comprise. Not surprisingly, 79 percent of the based aircraft in Arizona are single engine. The number of based aircraft identified at each system airport is presented in Figure 3-12. The total number of based aircraft is presented in addition to the total number of based aircraft by type.

Figure 3-11: Arizona Based Aircraft by Type, 2008

Aircraft Type	*Number of Aircraft*	*Percent of Total*
Single Engine	6,353	79.0%
Multi-Engine	861	10.7%
Jets	358	4.5%
Helicopters	317	3.9%
Gliders	53	0.7%
Ultralights/Other	101	1.2%
ARIZONA TOTAL	8,043	100.0%

Source: *Airport Inventory & Data Survey* 2008
Note: Excludes military aircraft

Figure 3-12: 2007 Based Aircraft

Associated City	*Airport Name*	*Single Engine*	*Multi-Engine*	*Jets*	*Helicopters*	*Gliders*	*Ultralights/ Other*	*Military*	*Total Based Aircraft*
Primary Commercial Service									
Bullhead City	Laughlin/Bullhead International	21	4	2	3	0	0	0	30
Flagstaff	Flagstaff Pulliam	115	15	0	2	0	0	1	133
Grand Canyon	Grand Canyon National Park	8	3	0	37	0	0	0	48
Mesa	Phoenix-Mesa Gateway	60	10	25	8	0	0	0	103
Page	Page	60	11	0	5	0	0	0	76
Peach Springs	Grand Canyon West	0	0	0	2	0	0	0	2
Phoenix	Phoenix Sky Harbor International	27	41	36	10	0	0	8	122
Tucson	Tucson International	188	24	62	34	0	0	68	376
Yuma	Yuma International Airport	119	47	1	11	0	0	90	268
Commercial Service									
Kingman	Kingman	156	95	17	5	1	4	0	278
Prescott	Ernest A. Love Field	284	25	8	17	0	2	0	336
Show Low	Show Low Regional	57	8	0	1	0	0	0	66
Relievers									
Chandler	Chandler Municipal	453	26	2	15	0	3	0	499
Glendale	Glendale Municipal	331	27	2	22	0	31	0	413
Goodyear	Phoenix Goodyear	234	18	24	0	0	0	0	276
Marana	Marana Regional	220	69	10	4	3	0	0	306
Mesa	Falcon Field	846	40	5	56	0	0	0	947
Phoenix	Phoenix Deer Valley	1,090	143	15	20	6	0	3	1,277
Scottsdale	Scottsdale	254	50	126	17	0	0	0	447
Tucson	Ryan Field	276	24	1	3	0	0	0	304
General Aviation									
Ajo	Eric Marcus Municipal	8	0	0	0	0	0	0	8
Bagdad	Bagdad	5	0	0	0	0	0	0	5
Benson	Benson Municipal	32	4	0	3	0	3	0	42
Bisbee	Bisbee Municipal	32	0	0	0	0	2	0	34
Buckeye	Buckeye Municipal	50	0	0	6	0	6	0	62
Casa Grande	Casa Grande Municipal	85	2	0	4	0	0	0	91
Chinle	Chinle Municipal	0	4	0	0	0	0	0	4
Cibecue	Cibecue	0	0	0	0	0	0	0	0

Figure 3-12: 2007 Based Aircraft, Continued

Associated City	*Airport Name*	*Single Engine*	*Multi-Engine*	*Jets*	*Helicopters*	*Gliders*	*Ultralights/ Other*	*Military*	*Total Based Aircraft*
General Aviation									
Clifton/Morenci	Greenlee County	2	0	0	0	0	0	0	2
Colorado City	Colorado City Municipal	4	1	1	0	0	0	0	6
Coolidge	Coolidge Municipal	20	8	1	1	1	3	0	34
Cottonwood	Cottonwood	41	7	1	0	0	0	0	49
Douglas Bisbee	Bisbee Douglas International	12	1	0	3	0	2	0	18
Eloy	Eloy Municipal	29	12	0	0	0	0	0	41
Gila Bend	Gila Bend Municipal	3	0	0	0	0	0	0	3
Globe	San Carlos Apache	40	7	0	0	0	0	0	47
Holbrook	Holbrook Municipal	14	1	0	0	0	5	0	20
Kayenta	Kayenta	0	0	0	0	0	0	0	0
Lake Havasu City	Lake Havasu City	169	43	9	6	0	2	0	229
Marana	Pinal Airpark	0	0	0	0	0	0	0	0
Nogales	Nogales International	27	6	2	0	0	0	0	35
Parker	Avi Suquilla	40	1	0	1	0	0	0	42
Payson	Payson	80	2	0	1	0	3	0	86
Polacca	Polacca	0	0	0	0	0	0	0	0
Safford	Safford Regional	23	17	0	1	0	0	0	41
San Manuel	San Manuel/Ray/Blair	50	0	0	0	0	7	0	57
Sedona	Sedona	91	7	2	4	0	0	0	104
Sierra Vista	Sierra Vista Municipal/LAA	72	4	0	2	0	4	NA	82
Springerville	Springerville Municipal	17	0	0	0	0	2	0	19
St Johns	St Johns Industrial Air Park	15	0	0	0	0	0	0	15
Taylor	Taylor	13	1	0	0	0	0	0	14
Tuba City	Tuba City	0	0	0	0	0	0	0	0
Whiteriver	Whiteriver	0	0	0	0	0	0	0	0
Wickenburg	Wickenburg Municipal	37	4	1	1	1	3	0	47
Willcox	Cochise County	26	0	0	1	0	0	0	27
Williams	H.A. Clark Memorial Field	15	2	0	1	0	0	0	18
Window Rock	Window Rock	1	3	0	0	0	0	0	4

Figure 3-12: 2007 Based Aircraft (Continued)

Associated City	*Airport Name*	*Single Engine*	*Multi-Engine*	*Jets*	*Helicopters*	*Gliders*	*Ultralights/ Other*	*Military*	*Total Based Aircraft*
General Aviation									
Winslow	Winslow-Lindbergh Regional	7	2	0	0	0	0	0	9
Non-NPIAS General Aviation									
Aguila	Eagle Roost	42	3	0	1	2	0	0	48
Bullhead City	Sun Valley	30	1	0	0	2	0	0	33
Carefree	Sky Ranch at Carefree	91	19	0	0	2	3	0	115
Chandler	Memorial Airfield	0	0	0	0	0	0	0	0
Chandler	Stellar Airpark	133	10	5	3	0	1	0	152
Douglas	Douglas Municipal	22	2	0	2	0	1	0	27
Douglas	Cochise College	14	1	0	0	0	0	0	15
Grand Canyon	Grand Canyon Valle	4	0	0	1	0	0	0	5
Kearny	Kearny	4	0	0	0	0	1	0	5
Marble Canyon	Marble Canyon	1	0	0	0	0	0	0	1
Maricopa	Estrella Sailport	3	0	0	0	25	0	0	28
Meadview	Pearce Ferry	0	0	0	0	0	0	0	0
Peach Springs	Grand Canyon Caverns	0	0	0	0	0	0	0	0
Peach Springs	Hualapai	0	0	0	0	0	0	0	0
Peoria	Pleasant Valley	20	0	0	0	10	5	0	35
Phoenix	Phoenix Regional	11	0	0	0	0	0	0	11
Rimrock	Rimrock	27	1	0	0	0	8	0	36
San Luis	Rolle Airfield	0	0	0	0	0	0	0	0
Seligman	Seligman	0	0	0	0	0	0	0	0
Sells	Sells	0	0	0	1	0	0	0	1
Superior	Superior Municipal	0	0	0	0	0	0	0	0
Temple Bar	Temple Bar	0	0	0	0	0	0	0	0
Tombstone	Tombstone Municipal	2	0	0	0	0	0	0	2
Tucson	La Cholla Airpark	90	5	0	2	0	0	0	97
Whitmore	Grand Canyon Bar Ten Airstrip	0	0	0	0	0	0	0	0

Source: *Airport Inventory & Data Survey* 2008

Aircraft Operations

An aircraft operation is defined as a takeoff or a landing. If an aircraft takes off and lands, this accounts for two operations. The number of annual operations identified at each system airport is displayed in Figure 3-13. Operations numbers were derived from the FAA for airports with an air traffic control tower. Operation numbers for airports without control towers are estimates provided by the airport managers during the inventory effort. Operations estimates are for calendar year 2007 and are divided into four categories: commercial service, general aviation local, general aviation itinerant, and military. System-wide, a total of over 4.7 million operations were identified. Of that total, 12.6 percent were conducted by commercial service operators, 42.8 percent general aviation local, 37.9 percent general aviation itinerant, and 6.8 percent military. Commercial service operations include operations by scheduled commercial carriers and air tours operators. Air taxi and air cargo operations are included in general aviation operations for the purpose of this plan.

Figure 3-13: 2007 Aircraft Operations

Associated City	*Airport*	*Total Commercial Service*	*GA Local*	*GA Itinerant*	*Military*	*Total*
Primary Commercial Service						
Bullhead City	Laughlin/Bullhead International	900	4,738	17,198	325	23,161
Flagstaff	Flagstaff Pulliam	4,200	7,403	32,005	1,172	44,780
Grand Canyon	Grand Canyon National Park	95,184	859	3,701	1,172	100,916
Mesa	Phoenix-Mesa Gateway	2,500	188,334	97,000	9,380	297,214
Page	Page	31,280	600	21,282	60	53,222
Peach Springs	Grand Canyon West	10,700	0	109,328	0	120,028
Phoenix	Phoenix Sky Harbor Intl	473,300	9,379	118,184	3,007	603,870
Tucson	Tucson International	41,400	80,684	102,828	31,526	256,438
Yuma	Yuma International Airport	10,500	36,425	44,519	109,502	200,946
Commercial Service						
Kingman	Kingman	1,200	33,880	23,557	240	58,877
Prescott	Ernest A. Love Field	2,630	141,525	81,279	1,917	227,351
Show Low	Show Low Regional	1,400	13,312	16,366	200	31,278
Reliever						
Chandler	Chandler Municipal	0	175,147	89,379	686	265,212
Glendale	Glendale Municipal	0	102,384	43,753	71	146,208
Goodyear	Phoenix Goodyear	0	91,480	87,416	9,029	187,925
Marana	Marana Regional	0	75,000	35,000	2,000	112,000
Mesa	Falcon Field	0	170,026	141,665	2,418	314,109
Phoenix	Phoenix Deer Valley	0	236,472	141,224	653	378,349
Scottsdale	Scottsdale	0	58,129	133,374	479	191,982
Tucson	Ryan Field	0	171,410	75,028	2,978	249,416
General Aviation						
Ajo	Eric Marcus Municipal	0	200	300	100	600
Bagdad	Bagdad	0	5,000	9,000	0	14,000
Benson	Benson Municipal	0	1,772	5,428	1,000	8,200
Bisbee	Bisbee Municipal	0	3,156	1,352	4	4,512
Buckeye	Buckeye Municipal	0	19,137	9,425	100	28,662
Casa Grande	Casa Grande Municipal	0	52,400	11,580	0	63,980
Chinle	Chinle Municipal	0	800	1,600	0	2,400
Cibecue	Cibecue	0	415	1,000	0	1,415
Clifton/Morenci	Greenlee County	0	1,460	7,300	0	8,760
Colorado City	Colorado City Municipal	0	1,000	2,025	25	3,050
Coolidge	Coolidge Municipal	0	160	5,800	40	6,000
Cottonwood	Cottonwood	0	9,000	10,400	10	19,410
Douglas Bisbee	Bisbee Douglas International	0	3,000	800	1,500	5,300
Eloy	Eloy Municipal	0	15,000	8,000	100	23,100
Gila Bend	Gila Bend Municipal	0	8,000	3,000	10	11,010
Globe	San Carlos Apache	0	12,000	4,000	200	16,200
Holbrook	Holbrook Municipal	0	1,000	3,900	0	4,900
Kayenta	Kayenta	0	20	4,504	0	4,524
Lake Havasu City	Lake Havasu City	0	26,000	25,514	140	51,654
Marana	Pinal Airpark	0	7,025	271	3,332	10,628
Nogales	Nogales International	0	22,000	15,300	2,800	40,100
Parker	Avi Suquilla	0	2,000	12,520	0	14,520
Payson	Payson	0	25,000	17,250	250	42,500
Polacca	Polacca	0	100	900	0	1,000
Safford	Safford Regional	0	3,650	13,600	1,500	18,750

Figure 3-13: 2007 Aircraft Operations (Continued)

Associated City	*Airport*	*Total Commercial Service*	*GA Local*	*GA Itinerant*	*Military*	*Total*
General Aviation						
San Manuel	San Manuel/Ray/Blair	0	5,000	7,080	1,000	13,080
Sedona	Sedona	0	10,000	35,000	5,000	50,000
Sierra Vista	Sierra Vista Municipal/LAA	0	31,526	7,461	116,850	155,837
Springerville	Springerville Municipal	0	820	3,180	100	4,100
St Johns	St Johns Industrial Air Park	0	3,000	11,000	1,000	15,000
Taylor	Taylor	0	3,000	1,810	0	4,810
Tuba City	Tuba City	0	45	865	0	910
Whiteriver	Whiteriver	0	850	2,590	0	3,440
Wickenburg	Wickenburg Municipal	0	9,800	7,700	500	18,000
Willcox	Cochise County	0	510	6,800	550	7,860
Williams	H.A. Clark Memorial Field	0	360	3,290	0	3,650
Window Rock	Window Rock	0	1,500	5,500	0	7,000
Winslow	Winslow-Lindbergh Regional	0	4,000	18,650	5,000	27,650
Non-NPIAS General Aviation						
Aguila	Eagle Roost	0	3,500	0	0	3,500
Bullhead City	Sun Valley	0	1,000	0	0	1,000
Carefree	Sky Ranch at Carefree	0	3,392	180	1	3,573
Chandler	Memorial Airfield	0	20,000	5,000	500	25,500
Chandler	Stellar Airpark	0	35,000	10,100	0	45,100
Douglas	Douglas Municipal	0	2,500	8,500	100	11,100
Douglas	Cochise College	0	480	51,700	3,000	55,180
Grand Canyon	Grand Canyon Valle	0	200	600	0	800
Kearny	Kearny	0	3,000	1,200	0	4,200
Marble Canyon	Marble Canyon	0	125	2,460	0	2,585
Maricopa	Estrella Sailport	0	16,000	500	0	16,500
Meadview	Pearce Ferry	0	0	1,100	0	1,100
Peach Springs	Grand Canyon Caverns	0	0	1,350	0	1,350
Peach Springs	Hualapai	0	100	100	0	200
Peoria	Pleasant Valley	0	60,000	0	0	60,000
Phoenix	Phoenix Regional	0	10,950	3,650	0	14,600
Rimrock	Rimrock	0	500	100	0	600
San Luis	Rolle Airfield	0	2,900	0	2,000	4,900
Seligman	Seligman	0	500	600	0	1,100
Sells	Sells	0	0	1,200	10	1,210
Superior	Superior Municipal	0	0	200	0	200
Temple Bar	Temple Bar	0	0	1,800	0	1,800
Tombstone	Tombstone Municipal	0	0	300	0	300
Tucson	La Cholla Airpark	0	4,000	0	0	4,000
Whitmore	Grand Canyon Bar Ten Airstrip	0	0	1,275	0	1,275

Sources: *Airport Inventory & Data Survey* 2008, FAA ATADS

AIRSPACE

The primary purpose of airspace class designations is to prevent mid-air collisions. This is accomplished by establishing rules that apply in each airspace class for keeping aircraft separated. In general, aircraft operate under one of two sets of rules – visual flight rules (VFR) or instrument flight rules (IFR) and each set of rules uses a different methodology to separate aircraft.

Under VFR, pilots rely on the “see-and-avoid” methodology to prevent mid-air collisions. Under this methodology, aviators are expected to maintain a visual lookout for other aircraft and alter course accordingly to avoid collisions and near misses. Different classes of airspace require different visibility and cloud ceiling requirements in order to ensure adequate visibility and safe VFR flight. Generally, as airspace becomes more crowded, visibility and cloud ceiling requirements increase to allow air crews more time and opportunity to see and avoid other aircraft. Additionally, more complex airspace requires more equipment, more communication, and higher pilot qualifications.

Under IFR, air traffic control provides separation between IFR flights through the use of radar and radio communications. When conditions allow IFR and VFR flights to mix, the “see-and-avoid” methodology is still required of both IFR and VFR flights to keep IFR and VFR aircraft separated.

The FAA ensures that the see-and-avoid concept works by designating different classes of airspace, each of which has its own requirements. The two broad categories of airspace, controlled and uncontrolled, are explained below.

Controlled Airspace

Controlled airspace is a generic term that covers the different classifications of airspace (A, B, C, D and E) as defined by the FAA in the 1993 redesignation of our nation’s airspace. The following sections define the controlled airspace classifications and operating requirements.

Class A – Airspace at or above 18,000 feet mean sea level (MSL) and up to 60,000 feet MSL, unless otherwise designated, is considered Class A. All aircraft within Class A airspace must operate under IFR, and are under positive control of air traffic control (ATC). All aircraft operating in Class A airspace must have a radio and a transponder, a device that helps identify the aircraft on radar and informs air traffic control of the aircraft’s altitude.

Class B – Class B airspace typically extends from the ground level to 10,000 feet MSL at the nation's busiest commercial airports. The configuration of each Class B airspace area is tailored to the individual airport and consists of a surface area and two or more layers intended to protect approach and departure paths used by commercial airlines. Like Class A airspace, all aircraft in Class B airspace must have a radio and a transponder. Air traffic control clearance is required for all aircraft to enter Class B airspace. Phoenix Sky Harbor International Airport is the only airport in Arizona with Class B airspace.

Class C – Class C airspace generally surrounds airports which have an operating control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements, but are less busy than airports surrounded by Class B airspace. Class C airspace typically extends from the ground level to 4,000 feet above the airport elevation (above ground level, AGL). Aircraft in Class C airspace must have a radio and transponder. Pilots are required to establish two-way radio communication with air traffic control prior to entering Class C airspace. Tucson International Airport and Davis Monthan Air Force Base are the only airports in Arizona with Class C airspace.

Class D – Class D airspace exists around those airports that have an air traffic control tower, but have less traffic than airports in Class C airspace. Class D airspace typically extends from the ground level to 2,500 feet AGL. Pilots must establish two-way radio communication with the air traffic control tower, before entering this classification of airspace so that air traffic control can sequence the aircraft for landing. During periods when the control tower is not in operation, Class D airspace reverts to the underlying airspace, typically class E or G. Figure 3-14 presents the airports in Arizona that currently have Class D airspace.

Figure 3-14: Arizona Airports with Class D Airspace

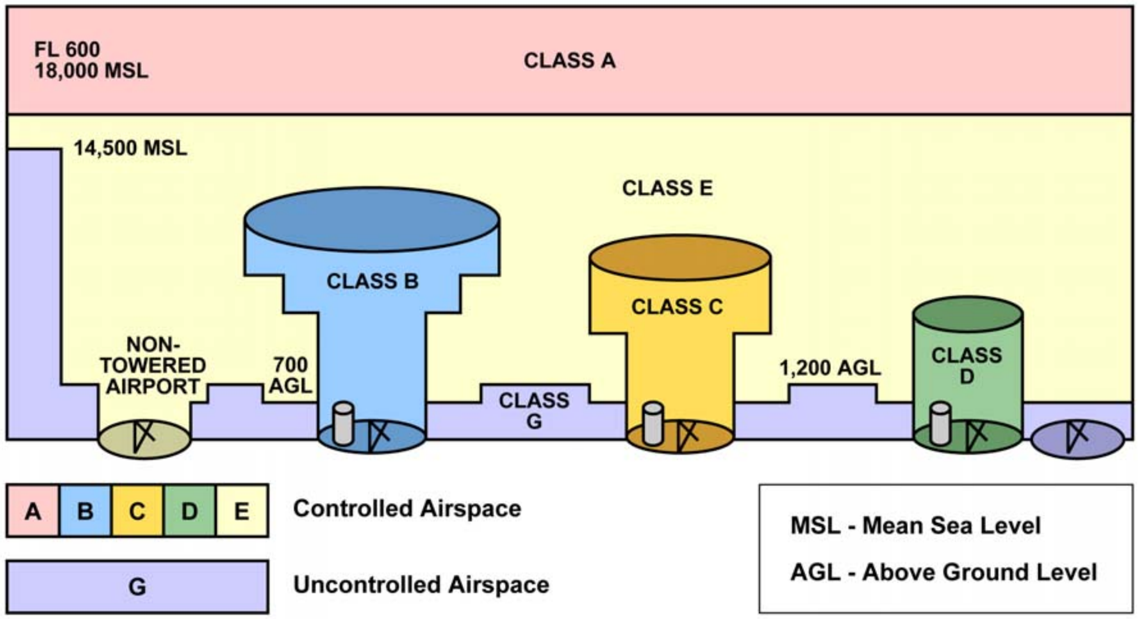
Associated City	*Airport Name*
Bullhead City	Laughlin/Bullhead International
Chandler	Chandler Municipal
Flagstaff	Flagstaff Pulliam
Gila Bend	Gila Bend Air Force Auxiliary Field
Glendale	Luke AFB
Glendale	Glendale Municipal
Goodyear	Phoenix Goodyear
Grand Canyon	Grand Canyon National Park
Mesa	Phoenix-Mesa Gateway
Mesa	Falcon Field
Phoenix	Phoenix Deer Valley
Prescott	Ernest A. Love Field
Scottsdale	Scottsdale
Sedona	Sedona
Sierra Vista	Sierra Vista Municipal/Libby Army Airfield
Yuma	Yuma MCAS/Yuma International
Tucson	Ryan Field Airport

Source: Wilbur Smith Associates

Class E – Most controlled airspace that is not Class A, B, C or D, is designated as Class E airspace. In most places, Class E airspace starts at 1,200 feet AGL (but no lower than 14,500 feet MSL) and goes up to the boundary of the next class of airspace, which is usually Class A at 18,000 feet. Around airports with instrument approaches and instrument approach corridors, a cylinder of Class E airspace starts at 700 feet AGL and continues up to the next class of airspace. At certain airports, the Class E airspace starts at the surface and continues upward to the next class of airspace, in order to provide the more restrictive visibility and cloud clearance requirements of Class E airspace all the way to the surface of the airport.

A basic depiction of the types of airspace found in the national airspace system is shown in Figure 3-15.

Figure 3-15: National Airspace System



Source: Federal Aviation Administration

Uncontrolled Airspace – Uncontrolled airspace is designated Class G airspace and consists of all the airspace that is not classified as Class A, B, C, D or E airspace. It is generally found beneath Class E airspace. Visibility and cloud clearance limitations are not as strict as controlled airspace since IFR traffic is not expected to operate in this airspace.

Special Use Airspace

Special use airspace consists of that airspace where activities must be confined because of their nature or where limitations are imposed upon aircraft that are not part of those activities. Much of the airspace with a special use designation is related to military activities. There are three kinds of special use airspace found in Arizona – Restricted Areas, Military Operations Areas (MOA) and Alert Areas.

Restricted Areas – There are a number of restricted areas in Arizona located in the south and southwest portion of the state. Restricted areas are established, pursuant to FAR Part 73, to restrict (not prohibit) flight, to permit the user large blocks of unimpeded airspace for their operations. Restricted Areas are usually military related or have tethered radar balloons and related equipment. When active, Restricted Areas are closed to over-flight up to specified flight levels. Non-military access to restricted areas in Arizona, when active, is gained through the controlling agency, and can be designated for VFR and IFR use.

Military Operations Areas (MOAs) – There are 22 MOAs in Arizona. The MOAs occupy large areas of airspace. All are located in the central and southern portions of the state with the exception of the Sunny MOA which is located northeast of Flagstaff. MOAs are airspace areas assigned to segregate certain military activities from IFR traffic, to identify VFR traffic to the user and to make non-participating aircraft aware of these operations. Unlike restricted areas, civilian flights are not prohibited from flying into MOAs when active. Scheduling, coordination, and flight procedures for MOAs are established by letters of agreement between local military authorities and concerned air traffic control facilities. MOAs are intermittently used. They are scheduled by the designated military scheduling point and are activated by ATC. They are frequently subdivided for better utilization of the airspace. Figure 3-16 lists the MOAs within Arizona.

Figure 3-16: Military Operations Areas within Arizona

MOA Name	*MOA Name*
Abel Bravo	Outlaw
Abel North South	Quail
Abel East	Reserve
Bagdad 1	Ruby 1
Cato MOA	Sells 1
Dome	Sells Low
Fuzzy	Sunny
Gladden 1	Tombstone A
Jackal Low	Tombstone B
Jackal	Tombstone C
Morenci	Turtle

Source: Phoenix Sectional Aeronautical Chart, 79th edition

Alert Areas – An Alert Area is airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. There is one Alert Area in Arizona, A-231. This is the area where pilots at Luke Air Force Base complete much of their jet training and is in operation from 500 AGL to 6500 feet all the time. This area is depicted for the information of non-participating pilots.

Other Arizona Airspace

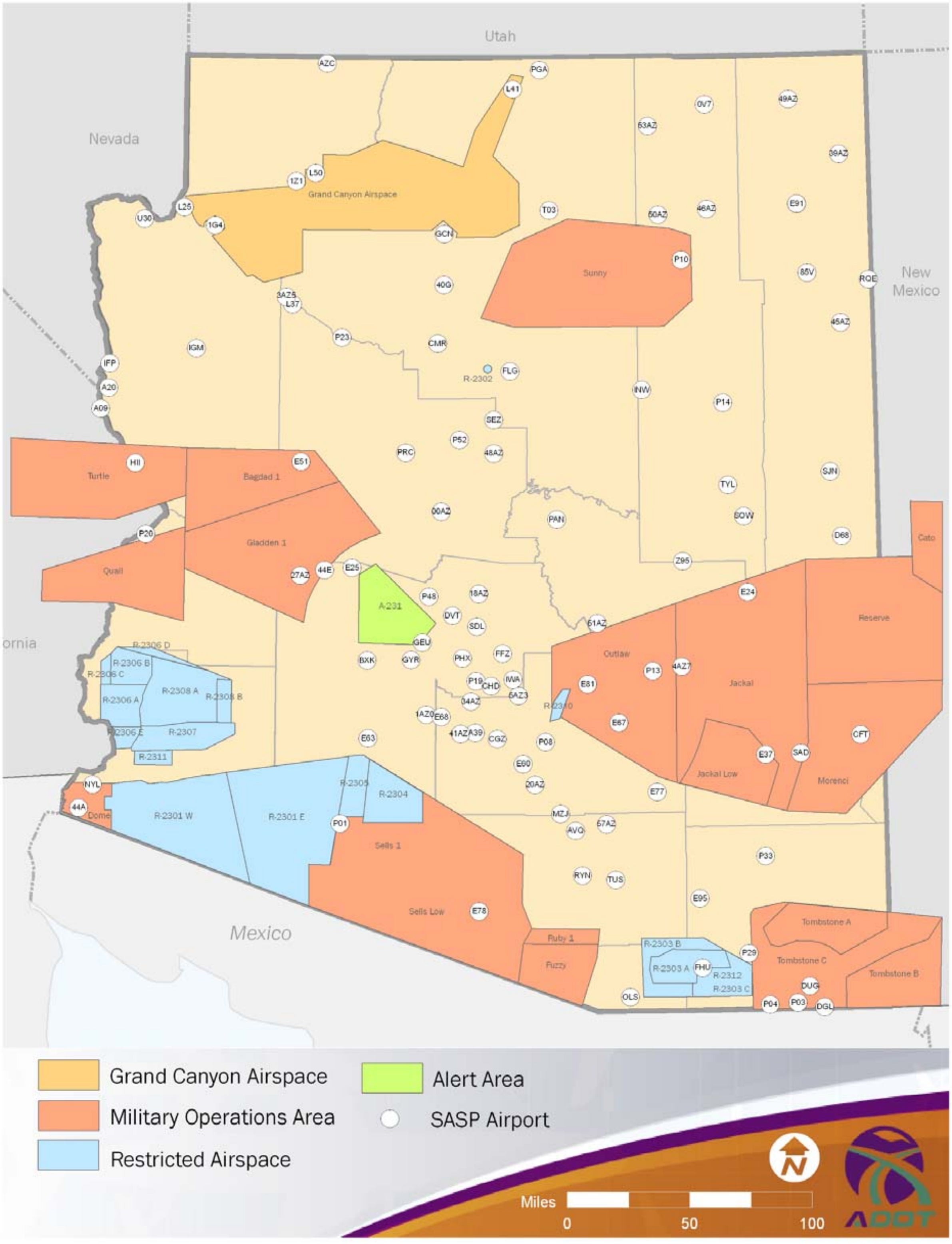
In addition to special use airspace, there are other specialized airspace areas within Arizona. These are discussed below.

Military Training Routes (MTRs) – MTRs are air corridors of defined lateral dimensions established for the conduct of military training at speeds in excess of 250 knots. These routes are designated IR or VR to indicate visual flight rules (VFR) or instrument flight rule (IFR) use. IR routes are usable either in VFR or IFR conditions; VR routes are usable only during VFR. MTRs may be bi-directional or unidirectional. Similar to MOAs, the routes are scheduled by the using military unit via flight plans. Since these routes are below the radar coverage of ATC, the user is responsible to see and avoid other traffic. Entry to the route and exit is reported to the Flight Service Station (FSS) as an advisory to other VFR traffic and for purposes of flight following. Each MTR is plotted on aeronautical charts and is designated to indicate whether the route is above or below 1,500 feet AGL. Most of Arizona's MTRs are located in the southern and western parts of the state.

National Parks, National Forests, and Wildlife Areas – Arizona is home to numerous National Parks, National Forests, and wildlife areas. Because the government regards these areas as noise sensitive, many boundaries of National Park Service areas, U.S. Fish and Wildlife Service areas, and U.S. Forest Service Wilderness and Primitive areas are marked on aeronautical charts. Pilots are requested to maintain a minimum altitude of 2,000 feet above ground level when over these areas. In addition to these areas, Federal Aviation Regulation SFAR No. 50-2 "Special Flight Rules In The Vicinity Of The Grand Canyon National Park, AZ." has been established to restrict flight over the Grand Canyon National Park. The regulation is even more restrictive than the operating rules over other national parks, and prohibits the operation of aircraft inside the boundary of the restricted airspace with some exceptions. The exceptions allow for transition of the restricted airspace along specified flight corridors and permit commercial air tour operators to conduct site seeing flights within specified areas of the restricted airspace.

Figure 3-17 presents the locations of Special Use Airspace within Arizona.

Figure 3-17: Special Use Airspace within Arizona



Source: Wilbur Smith Associates

NAVIGATIONAL AIDS AND APPROACH TYPES

Initially, navigational aids were only used to provide directional information suitable for navigation from place to place. But with the proliferation of navigational aids and improvements in technology, it became possible to use navigational aids to obtain a 'fix' representing a fixed physical location.

In effect, a fix is a radio-generated landmark. As a result, pilots could use a series of fixes to follow a specific course. This made it possible for approaching aircraft to align with the runway without the need to first circle and obtain visual confirmation of the runway. A series of fixes could also be used to regulate an aircraft's rate of descent, with pilots descending to a lower altitude when reaching a certain point.

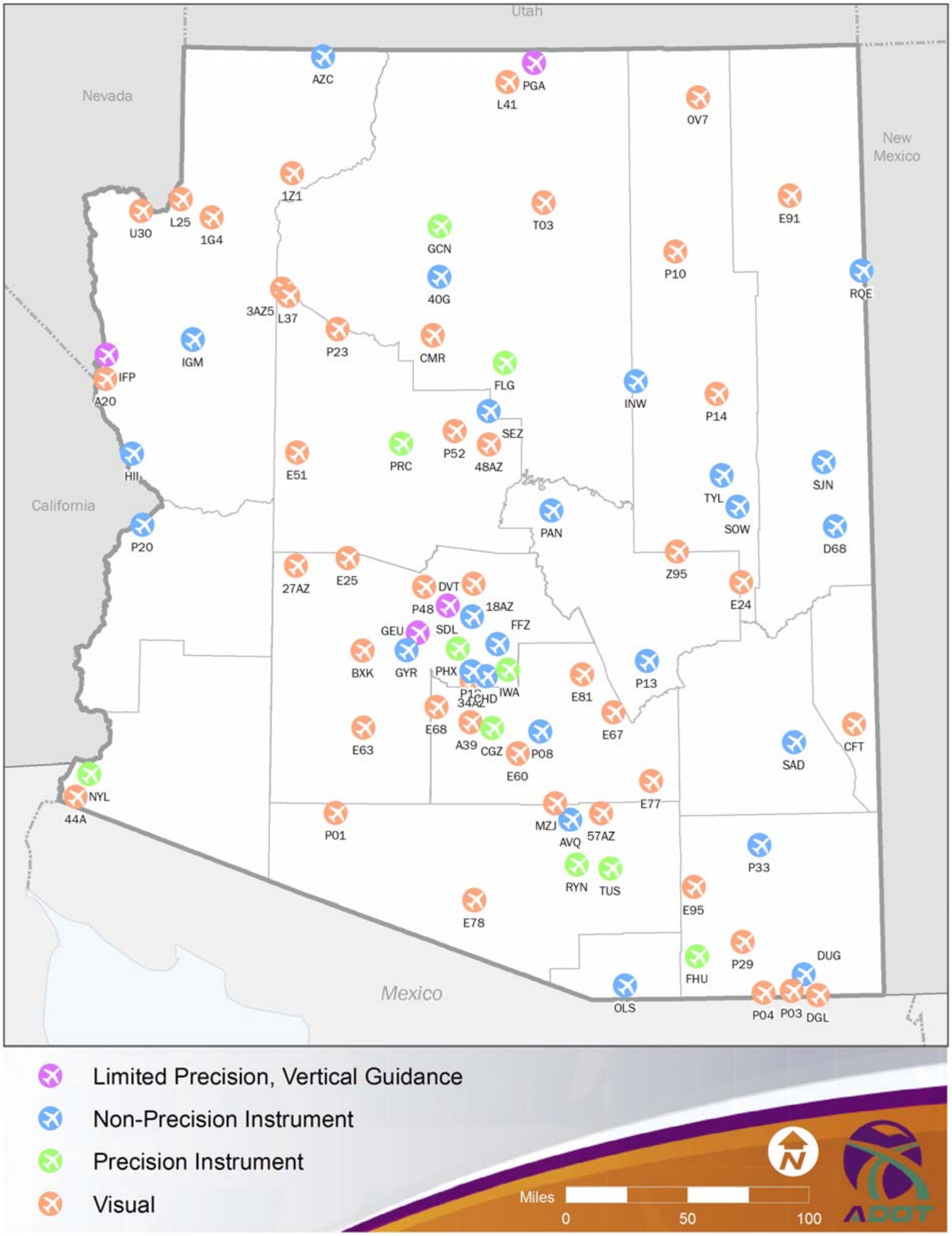
The series of procedures dictating route, direction, and rate of descent is known as an 'approach'. In modern times, the precision of the course guidance provided by navigational aids has improved to such a degree that it is possible to execute an approach within a few hundred feet of the ground.

Instrument Approach Procedures

The use of radio-provided positional and elevation information when making a landing is known as an 'Instrument Approach'. The procedures for executing an approach vary with the equipment providing the pilot with the information.

There are three categories of instrument approach procedures: Precision, Non-precision, and Near-precision. The following paragraphs describe the various types of instrument approaches, approach lighting systems, and automated weather reporting systems available at Arizona's airports. The most sophisticated approach located at each of the system airports is depicted in Figure 3-18.

Figure 3-18: Approaches at Arizona System Airports



Source: Wilbur Smith Associates

Non-Precision Approaches

Older navigation aids were primarily designed to provide guidance to an airport and so provide only limited guidance when flying a specific approach. These were referred to as non-precision approach procedures wherein no electronic glide slope information is provided. Non-precision approach procedures can be enhanced to provide more "exact" guidance through the provision of runway lighting and visual glide slope indicators (VGSI). The following are types of non-precisions approaches:

- Non-Directional Beacon (NDB) – An NDB is a low or medium frequency ground-based radio navigation aid that broadcasts a continuous wave signal with a Morse Code identifier on an assigned frequency signal. NDBs are used by pilots to determine the aircraft's bearing to the ground station. Some state and locally owned NDB frequencies are also used to provide weather information to pilots.
- Very High Frequency Omni-directional Range (VOR) – A VOR is a ground-based very high frequency (VHF) radio navigation aid that provides directional bearing relative to the VOR. The Morse-code identified bearings are known as radials and establish the direction of an aircraft relative to a VOR. VOR approaches typically use the intersection of two VOR radials to regulate approach descent rates. Some locally owned or operated VORs also provide weather information.
- VOR + Distance Measuring Equipment (VOR/DME) – DME is a ground-based Ultra High Frequency (UHF) navigation aid that responds to aircraft DME avionics, thereby enabling the avionics to determine the slant range distance between the aircraft and the ground station. On a VOR/DME approach, the VOR provides directional guidance while the DME provides distance guidance.
- Tactical Area Navigation (TACAN) – TACAN is the military equivalent of the VOR/DME system, and provides both distance and direction guidance. It is more accurate than a VOR approach, but typically provides course guidance from restricted airspace. When a VOR and TACAN are co-located, the resulting set-up is known as a VORTAC, with the TACAN providing DME guidance to civilian aircraft.

Near-Precision Approaches

Near-precision approaches are made possible through the use of the Global Positioning System (GPS), a network of orbiting satellites that broadcasts a signal to a ground based receivers. GPS receivers can process the signals to determine a user's three-dimensional position (i.e., latitude, longitude, and altitude), velocity (if applicable), and the precise time of day. Due to inherent limits in transmissions, there are limits to the precision of the location that can be provided.

The precision that can be provided by GPS can be augmented by a Wide Area Augmentation System (WAAS), a national system of ground-based reference stations designed to improve the reliability, availability, and precision of GPS coordinates. It is possible to implement a near-precision approach with only minimal new equipment costs, while the precision approaches remain very expensive.

However, according to FAA projections, only those airports serving commercial air carriers (certificated under FAA Part 139) and public use airports with runways longer then 5,000 feet will have published GPS/WAAS instrument approaches before 2010. GPS/WAAS procedures for the remaining public airports with paved runways of less than 5,000 feet will be developed after 2010. The following are types of near-precisions approaches:

- Lateral Navigation (LNAV) – An approach that uses GPS and/or WAAS for horizontal course guidance. On an LNAV approach, the pilot flies the final approach with lateral course, but does not receive vertical guidance for a controlled descent to the runway. Instead, when the aircraft reaches the final approach fix, the pilot descends to a minimum descent altitude using the barometric altimeter. Typically, LNAV procedures achieve a minimum descent altitude (MDA) of 400 feet height above the runway.
- Lateral Navigation/Vertical Navigation (LNAV/VNAV) – An approach using lateral guidance from a GPS and/or WAAS and vertical guidance provided by either the barometric altimeter or WAAS. Aircraft that don't use WAAS for the vertical guidance portion must have VNAV-capable altimeters, which are typically part of a flight management system (FMS). FMS avionics are more expensive than WAAS receivers. The decision altitudes on these approaches are usually 350 feet above the runway.
- Localizer Performance with Vertical Guidance (LPV) – An approach similar to LNAV/VNAV except it is much more precise. It enables descent to 200-250 feet above the runway, and requires a WAAS receiver. LPV approaches are operationally equivalent to the legacy instrument landing systems (ILS) but are more economical because no navigation infrastructure has to be installed at the runway. There are over 675 LPV approaches in use today and the FAA is publishing 300 new LPV approaches per year.

Precision Approaches

Today's precision approach uses ground-based radio navigational aids to provide very precise vertical and horizontal course guidance, allowing approaches and landings to occur during conditions of very low visibility and cloud ceilings. The only currently available precision approach is an instrument landing system (ILS). An ILS approach is a precision approach that uses ground-based radio navigation aids to provide exact vertical and horizontal course guidance using both a localizer and a glide-slope indicator. Aircraft following an ILS approach typically follow a three degree continuous descent path provided by the glide slope portion of the ILS. This guides an aircraft directly to the touchdown zone of a runway. There are three categories of ILS approaches, and Cat-3 ILS approaches has three sub-categories—I, II, and III. Each category has different requirements for visibility minima, aircraft equipment, and pilot certifications.

Approach Visibility Minimums

Before a pilot is allowed to make an approach and attempt to land, they must have 'visual confirmation' of a runway. The 'approach visibility minima' defines how close a pilot can get to the runway before visual contact with the runway environment must be achieved.

Approach visibility minimums vary among airports and by approach types. Approach minimums are determined by individual airport and runway facilities, as well as topography and terrain characteristics of the approach and characteristics of the area surrounding the airport. Visibility minimums of one mile can be supported with visual runway markings and low intensity runway lights (LIRL) for nighttime operations. Medium intensity runway lights (MIRL) and precision or non-precision runway markings are required to reduce visibility minima to ¾ mile. To establish half mile-visibility minimums, the additional equipment requirements are precision runway markings, medium intensity runway lights (MIRL) for nighttime operations, and an approved approach lighting system.

Approach Lighting Systems

An Approach Lighting System is a series of marker lights designed to improve the ability of pilots to obtain visual contact of the runway environment during an instrument approach. Approach lighting systems found within the Arizona system of airports include the following:

- Medium Intensity Approach Lighting System (MALS)
- Medium Intensity Approach Lighting with Runway Alignment Indicator Lights (MALSR)

Automated Weather Reporting Facilities

Before an instrument approach is executed, current weather conditions including a local altimeter setting must be obtained. At airports without Air Traffic Control Towers (ATCTs) this information is most commonly provided by an Automated Weather Reporting system.

The following describes the weather reporting systems in place at system airports in Arizona.

- Automated Weather Observation System (AWOS) – AWOS equipment automatically gathers weather data from various locations on and around an airport and transmits the information directly to pilots by means of computer generated voice messages over a discreet radio frequency.
- Automated Surface Observation System (ASOS) – The ASOS provides continuous minute-by-minute weather data observations and generates necessary aviation weather information via a discrete radio frequency by means of a computer generated voice message.
- Low Level Wind Shear Alert System (LLWAS) – Provides the air traffic control tower with information on wind conditions near the runway. It consists of an array of anemometers that read wind velocity and direction around the airport and signal sudden changes that indicate wind shear.
- Limited Aviation Weather Reporting Station (LAWRS) – This system can be supplemental to an existing ASOS or AWOS system to provide additional weather data.
- Super Unicom – The Super Unicom is FAA certified for altimeter settings and other weather data required for instrument approach implementation. Information is broadcast via the airport traffic advisory frequency by a computer generated voice.
- Terminal Doppler Weather Radar (TDWR) – TDWR systems detect and report hazardous weather in and around airport terminal approach and departure zones. The TDWR identifies and warns air traffic controllers of low altitude wind shear hazards caused by microbursts and gust fronts, in addition to reporting on precipitation intensities and providing advanced warning of wind shifts.

Figure 3-19 presents data on approach visibility minimums, approach types for each runway end, and weather reporting capabilities at Arizona system airports.

Figure 3-19: Navigational Aids and Approach Types

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
Primary Commercial Service						
Bullhead City	Laughlin/Bullhead International	16	GPS	1,200' \ 1 1/4	N	ATCT
		34	GPS, VOR	1,000' \ 1 1/4	N	
Flagstaff	Flagstaff Pulliam	03	GPS	400' \ 1	Y	ATCT
		21	GPS, ILS, VOR	300' \ 1/2	Y	
Grand Canyon	Grand Canyon National Park	03	GPS, ILS, VOR	200' \ 3/4	Y	ATCT
		21	NA	NA	Y	
Mesa	Phoenix-Mesa Gateway	12R	GPS	400' \ 1	N	ATCT
		30L	GPS	400' \ 1	N	
		12C	GPS	300' \ 1	N	
		30C	GPS, ILS, VOR	200' \ 3/4	N	
		12L	NA	NA	N	
		30R	NA	NA	N	
Page	Page	15	GPS	300' \ 11/4	N	ASOS
		33	GPS	300' \ 1	N	
		07	NA	NA	N	
		25	NA	NA	N	
Peach Springs	Grand Canyon West	17	NA	NA	N	None
		35	NA	NA	N	
Phoenix	Phoenix Sky Harbor International	08	GPS, ILS	300' \ 1	Y	ATCT
		26	GPS, ILS	300' \ 3/4	N	
		07L	GPS, ILS	200' \ 3/4	Y	
		25R	GPS	400' \ 1	N	
		07R	GPS, ILS	300' \ 3/4	Y	
		25L	GPS, ILS	200' \ 1/2	Y	
Tucson	Tucson International	11L	GPS, VOR	300' \ 1/2	Y	ATCT
		29R	GPS, LOC, VOR	300' \ 1	N	
		11R	GPS,ILS	200' \ 1/2	N	
		29L	GPS	400' \ 1 1/2	N	
		03	GPS	600' \ 1	N	
		21	GPS	500' \ 1 3/4	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
Primary Commercial Service						
Yuma	Yuma International Airport	03L	TACAN	400’ \ 1	N	ATCT
		21R	GPS, ILS, TACAN	200’ \ 1/2	Y	
		03R	NA	NA	N	
		21L	NA	NA	N	
		08	NA	NA	N	
		26	NA	NA	N	
		17	GPS, VOR, VOR\DME	500’ \ 1	N	
		35	NA	NA	N	
Commercial Service						
Kingman	Kingman	03	GPS	500’ \ 1	N	ASOS
		21	VOR/DME, GPS	400’ \ 1	N	
		17	NA	NA	N	
		35	NA	NA	N	
Prescott	Ernest A. Love Field	03R	NA	NA	N	ATCT
		21L	GPS, ILS	200’ \ 1/2	Y	
		03L	NA	NA	N	
		21R	NA	NA	N	
		12	GPS, VOR	400’ \ 1	N	
		30	NA	NA	N	
Show Low	Show Low Regional	06	NDB-A (Circling)	1,200’ \ 1 1/4	N	AWOS
		24	GPS	500’ \ 1	N	
		03	NA		N	
		21	NA		N	
Reliever						
Chandler	Chandler Municipal	04R	GPS, VOR, NDB	500’ \ 1	N	ATCT
		22L	NA	NA	N	
		04L	NA	NA	N	
		22R	NA	NA	N	
Glendale	Glendale Municipal	01	GPS	400’ \ 1 1/4	N	ATCT
		19	GPS	300’ \ 1	N	
Goodyear	Phoenix Goodyear	03	GPS	600’ \ 1	N	ATCT
		21	NA	NA	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
Reliever						
Marana	Marana Regional	12	GPS, NDB	500' \ 1	N	AWOS
		30	NA	NA	N	
		03	GPS	500' \ 1	N	
		21	GPS	700' \ 1	N	
Mesa	Falcon Field	04R	GPS	500' \ 1	N	ATCT
		22L	NA	NA	N	
		04L	NA	NA	N	
		22R	NA	NA	N	
Phoenix	Phoenix Deer Valley	07R	GPS	600' \ 1	N	ATCT
		25L	GPS	400' \ 1 1/4	N	
		07L	NA	NA	N	
		25R	NA	NA	N	
Scottsdale	Scottsdale	03	GPS (Circling)	600' \ 1	N	ATCT
		21	VOR (Circling)	900' \ 2 1/2	N	
Tucson	Ryan Field	06R	GPS ,NDB, ILS	200' \ 3/4	N	AWOS
		24L	NA	NA	N	
		06L	NA	NA	N	
		24R	NA	NA	N	
		15	NA	NA	N	
		33	NA	NA	N	
General Aviation						
Ajo	Eric Marcus Municipal	12	NA	NA	N	None
		30	NA	NA	N	
Bagdad	Bagdad	05	NA	NA	N	None
		23	NA	NA	N	
Benson	Benson Municipal	10	NA	NA	N	None
		28	NA	NA	N	
Bisbee	Bisbee Municipal	17	GPS, VOR	300' \ 1	N	ASOS
		35	NA	NA	N	
		02	NA	NA	N	
		20	NA	NA	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
General Aviation						
Buckeye	Buckeye Municipal	17	NA	NA	N	AWOS-
		35	NA	NA	N	2008
Casa Grande	Casa Grande Municipal	05	ILS, VOR	300' \ 1/2	Y	AWOS
		23	GPS	400' \ 1	N	
Chinle	Chinle Municipal	18	NA	NA	N	None
		36	NA	NA	N	
Cibecue	Cibecue	07	NA	NA	N	None
		25	NA	NA	N	
Clifton/Morenci	Greenlee County	07	NA	NA	N	AWOS
		25	NA	NA	N	
Colorado City	Colorado City Municipal	11	GPS, NDB (Circling)	900' \ 1	N	AWOS
		29	NA	NA	N	
		02	NA	NA	N	
		20	NA	NA	N	
Coolidge	Coolidge Municipal	05	VOR/DME	500' \ 1	N	None
		23	GPS	500' \ 1	N	
		17	NA	NA	N	None
		35	NA	NA	N	
Cottonwood	Cottonwood	14	NA	NA	N	None
		32	NA	NA	N	
Douglas Bisbee	Bisbee Douglas International	17	VOR, GPS	300' \ 1	N	ASOS
		35	NA	NA	N	
		08	NA	NA	N	
		26	NA	NA	N	
Eloy	Eloy Municipal	02	NA	NA	N	None
		20	NA	NA	N	
Gila Bend	Gila Bend Municipal	04	NA	NA	N	None
		22	NA	NA	N	
Globe	San Carlos Apache	09	NA	NA	N	AWOS
		27	GPS	600' \ 1	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
General Aviation						
Holbrook	Holbrook Municipal	03	NA	NA	N	AWOS
		21	NA	NA	N	
		11	NA	NA	N	
		29	NA	NA	N	
Kayenta	Kayenta	05	NA	NA	N	None
		23	NA	NA	N	
Lake Havasu	Lake Havasu City	14	VOR/DME, GPS (Circling)	1,100’ \ 1 1/4	N	AWOS-2008
		32	NA	NA	N	
Marana	Pinal Airpark	12	NA	NA	N	AWOS-2008
		30	NA	NA	N	
Nogales	Nogales International	03	VOR/DME, GPS (Circling)	1,300’ \ 1 1/4	N	ASOS
		21	NA	NA	N	
Parker	Avi Suquilla	01	VOR/DME, GPS (Circling)	1,500’ \ 1 1/4	N	AWOS-2008
		19	NA	NA	N	
Payson	Payson	06	GPS (Circling)	600’ \ 1	N	AWOS
		24	NA	NA	N	
Polacca	Polacca	04	NA	NA	N	
		22	NA	NA	N	
Safford	Safford Regional	12	GPS	400’ \ 1	N	ASOS
		30	GPS	400’ \ 1	N	
		08	NA	NA	N	
		26	NA	NA	N	
San Manuel	San Manuel/Ray/Blair	11	NA	NA	N	None
		29	NA	NA	N	
Sedona	Sedona	03	GPS	1,400’ \ 1 1/2	N	AWOS
		21	NA	NA	N	
Sierra Vista	Sierra Vista Municipal/LAA	08	GPS	700’ \ 1	N	ASOS
		26	VOR, GPS, ILS, NDB	200’ \ 3/4	N	
		12	NA	NA	N	
		30	NA	NA	N	
		03	NA	NA	N	
		21	NA	NA	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
General Aviation						
Springerville	Springerville Municipal	03	NA	NA	N	ASOS
		21	GPS	400’ \ 1	N	
		11	NA	NA	N	
		29	NA	NA	N	
St Johns	St Johns Industrial Air Park	14	GPS	500’ \ 1	N	ASOS
		32	GPS	500’ \ 1 1/2	N	
		03	VOR/DME (Circling)	600’ \ 1	N	
		21	NA	NA	N	
Taylor	Taylor	03	GPS	500’ \ 1	N	AWOS
		21	NA	NA	N	
Tuba City	Tuba City	15	NA	NA	N	None
		33	NA	NA	N	
Whiteriver	Whiteriver	01	NA	NA	N	None
		19	NA	NA	N	
Wickenburg	Wickenburg Municipal	05	NA	NA	N	AWOS
		23	NA	NA	N	
Willcox	Cochise County	03	GPS (Circling)	500’ \ 1	N	None
		21	GPS	400’ \ 1	N	
Williams	H.A. Clark Memorial Field	18	NA	NA	N	AWOS
		36	NA	NA	N	
Window Rock	Window Rock	02	GPS	800’ \ 1	N	ASOS
		20	GPS, VOR/DME (Circling)	1,000’ \ 1 1/4	N	
Winslow	Winslow-Lindbergh Regional	04	NA	NA	N	ASOS
		22	NA	NA	N	
		11	GPS, VOR	400’ \ 1	N	
		29	NA	NA	N	
Non-NPIAS General Aviation						
Aguila	Eagle Roost	17	NA	NA	N	None
		35	NA	NA	N	
Bullhead City	Sun Valley	18	NA	NA	N	None
		36	NA	NA	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
Non-NPIAS General Aviation						
Carefree	Sky Ranch at Carefree	06	NA	NA	N	None
		24	NA	NA	N	
Chandler	Memorial Airfield	12	NA	NA	N	None
		30	NA	NA	N	
Chandler	Memorial Airfield	03	NA	NA	N	None
		21	NA	NA	N	
Chandler	Stellar Airpark	17	GPS, VOR (Circling)	500' \ 1	N	None
		35	NA	NA	N	
Douglas	Douglas Municipal	03	NA	NA	N	None
		21	NA	NA	N	
		18	NA	NA	N	
		36	NA	NA	N	
Douglas	Cochise College	05	NA	NA	N	None
		23	NA	NA	N	
Grand Canyon	Grand Canyon Valle	01	GPS	500' \ 1	None	None
		19	GPS, VOR/DME	500' \ 1	None	
Kearny	Kearny	08	NA	NA	N	None
		26	NA	NA	N	
Marble Canyon	Marble Canyon	03	NA	NA	N	None
		21	NA	NA	N	
Maricopa	Estrella Sailport	6R	NA	NA	N	None
		24L	NA	NA	N	
		07	NA	NA	N	None
		25	NA	NA	N	
		06C	NA	NA	N	None
		24C	NA	NA	N	
		06L	NA	NA	N	None
		24R	NA	NA	N	
Meadview	Pearce Ferry	01	NA	NA	N	None
		19	NA	NA	N	
Peach Springs	Grand Canyon Caverns	05	NA	NA	N	None
		23	NA	NA	N	

Figure 3-19: Navigational Aids and Approach Types (Continued)

Associated City	*Airport*	*Runway End*	*Instrument Approach*	*Approach Minimums (Decision Height\Visibility*)*	*Approach Light System*	*Automated Weather*
Non-NPIAS General Aviation						
Peach Springs	Hualapai	07	NA	NA	N	None
		25	NA	NA	N	
Peoria	Pleasant Valley	05C	NA	NA	N	None
		23C	NA	NA	N	
		05L	NA	NA	N	None
		23R	NA	NA	N	
		05R	NA	NA	N	None
		23L	NA	NA	N	
		14	NA	NA	N	None
		33	NA	NA	N	
Phoenix	Phoenix Regional	03	NA	NA	N	None
		21	NA	NA	N	
Rimrock	Rimrock	05	NA	NA	N	None
		23	NA	NA	N	
San Luis	Rolle Airfield	17	NA	NA	N	None
		35	NA	NA	N	
Seligman	Seligman	04	NA	NA	N	None
		22	NA	NA	N	
Sells	Sells	04	NA	NA	N	None
		22	NA	NA	N	
Superior	Superior Municipal	04	NA	NA	N	None
		22	NA	NA	N	
Temple Bar	Temple Bar	18	NA	NA	N	None
		36	NA	NA	N	
Tombstone	Tombstone Municipal	06	NA	NA	N	None
		24	NA	NA	N	
Tucson	La Cholla Airpark	01	NA	NA	N	None
		19	NA	NA	N	
Whitmore	Grand Canyon Bar Ten Airstrip	16	NA	NA	N	None
		34	NA	NA	N	

Sources: FAA Terminal Instrument Procedures, SW-4 05 JUN 2008 to 03 JUL 2008, Wilbur Smith Associates
Note: *Figures represent the best approach minimums where multiple instrument approach procedures are available.

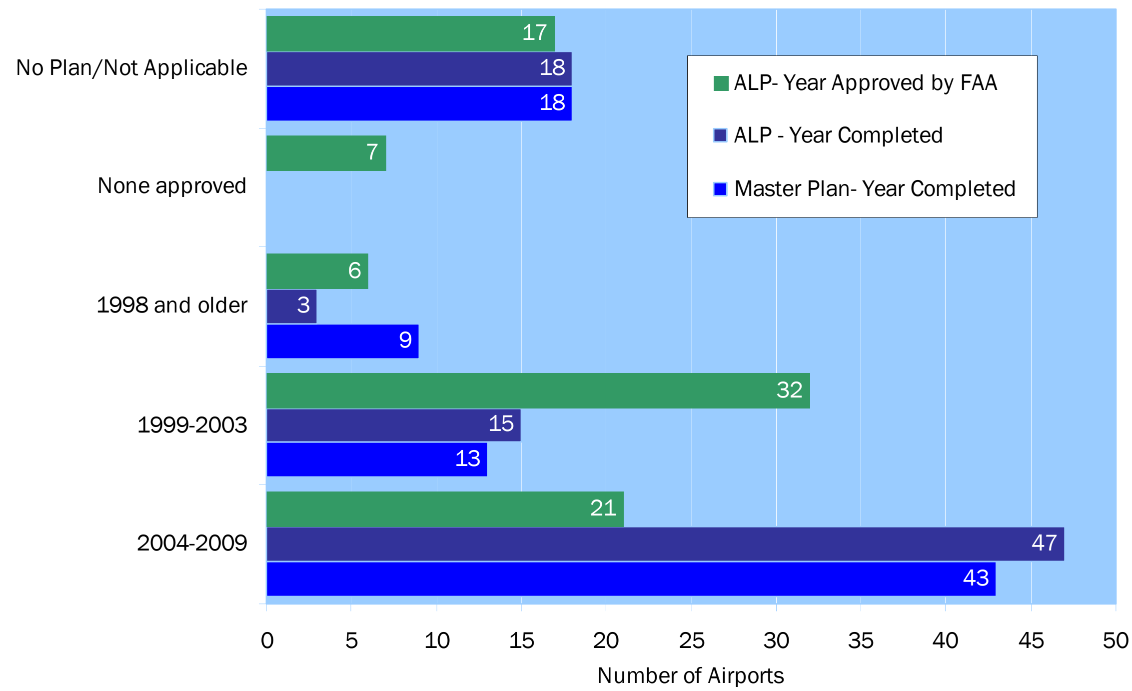
AIRPORT PLANNING DOCUMENTATION

Each of the system airports was surveyed regarding the dates of their most recent master plan and airport layout plan (ALP). In order to be eligible for federal and state funding, airports must have an airport master plan or airport layout plan approved and on file with the FAA and ADOT. Projects are not eligible for FAA or ADOT funds if they are not identified in an airport master plan and shown on an approved airport layout plan.

FAA grant assurances require that the airport sponsor keep ALPs updated at all times. It is recommended that airports complete a full ALP update at least every 10 years. Airports with ALPs less than 10 years old with significant airport expansion or development plans not shown on the current ALP should prepare a full ALP update. Minor development projects may only require certain ALP sheets to be updated to meet FAA requirements.

Figure 3-20 summarizes the completion dates of master plans and ALPs at Arizona system airports. The FAA approval date of the ALPs is also presented. In the last five years, 43 airports have completed master plans and 47 have completed airport layout plans or are currently underway. However, just 21 of the ALPs have been approved by the FAA since 2004. Another 13 master plans and 15 layout plans have been completed since 1999. The FAA approved 32 ALPs between 1999 and 2003. Several airports have master plans and ALPs on file that are more than 10 years old. Seven airports have no ALPs officially approved by the FAA, even though plans were submitted at one time. Nearly one-quarter of system airports have neither of these plans and these airports are not required to have plans on file since they do not receive state or FAA funding for projects.

Figure 3-20: Summary of Airport Master Plans and Airport Layout Plans



Source: ADOT Aeronautics Division, *Airport Inventory & Data Survey* 2008

Master plan and ALP completion dates by Arizona system airport are detailed in **Figure 3-21**.

Figure 3-21: Airport Master Plans and Airport Layout Plans

Associated City	*Airport Name*	*FAA ID*	*Master Plan*	*ALP*	*FAA ALP Approval Date*
Primary Commercial Service					
Bullhead City	Laughlin/Bullhead International	IFP	2009	2007	2007
Flagstaff	Flagstaff Pulliam	FLG	2007	2007	2002
Grand Canyon	Grand Canyon National Park	GCN	2006	2006	2006
Mesa	Phoenix-Mesa Gateway	IWA	2008	2008	2005
Page	Page	PGA	2007	2007	2001
Peach Springs	Grand Canyon West	1G4	2007	2007	2007
Phoenix	Phoenix Sky Harbor International	PHX	1997	2008	2008
Tucson	Tucson International	TUS	2004	2004	2004
Yuma	Yuma International Airport	NYL	2009	2007	2001
Commercial Service					
Kingman	Kingman	IGM	2006	2006	2006
Prescott	Ernest A. Love Field	PRC	2008	2008	2000
Show Low	Show Low Regional	SOW	2003	2005	2005
Reliever					
Chandler	Chandler Municipal	CHD	2007	2007	2000
Glendale	Glendale Municipal	GEU	2008	2008	1998
Goodyear	Phoenix Goodyear	GYR	2008	2008	1999
Marana	Marana Regional	AVQ	2008	2007	2007
Mesa	Falcon Field	FFZ	2008	2008	2007
Phoenix	Phoenix Deer Valley	DVT	2007	2008	2002
Scottsdale	Scottsdale	SDL	2009	2009	2002
Tucson	Ryan Field	RYN	2008	2008	2001
General Aviation					
Ajo	*Eric Marcus Municipal*	*P01*	*1999*	*1999*	*1999*
Bagdad	Bagdad	E51	2000	2008	2000
Benson	Benson Municipal	E95	2007	2007	2000
Bisbee	Bisbee Municipal	P04	2001	2001	2001
Buckeye	Buckeye Municipal	BXK	2007	2007	2007
Casa Grande	Casa Grande Municipal	CGZ	2008	2008	2001
Chinle	Chinle Municipal	E91	NA	1992	1992
Cibecue	Cibecue	Z95	NA	2006	2006
Clifton/Morenci	Greenlee County	CFT	2008	2008	2003
Colorado City	Colorado City Municipal	AZC	2008	2008	2000
Coolidge	Coolidge Municipal	P08	2009	2009	2001
Cottonwood	Cottonwood	P52	2007	2007	2006
Douglas Bisbee	Bisbee Douglas International	DUG	1997	2002	1998
Eloy	Eloy Municipal	E60	2001	2001	2001
Gila Bend	Gila Bend Municipal	E63	2009	2009	2000
Globe	San Carlos Apache	P13	2007	2000	2007
Holbrook	Holbrook Municipal	P14	2000	2000	2000
Kayenta	Kayenta	0V7	2005	2005	2006
Lake Havasu City	Lake Havasu City	HII	2008	2008	2003
Marana	Pinal Airpark	MZJ	2004	2004	2000
Nogales	Nogales International	OLS	2006	2002	1993
Parker	Avi Suquilla	P20	2008	2008	2001

Figure 3-21: Airport Master Plans and Airport Layout Plans (Continued)

Associated City	*Airport Name*	*FAA ID*	*Master Plan*	*ALP*	*FAA ALP Approval Date*
General Aviation					
Payson	Payson	PAN	2008	2008	2001
Polacca	Polacca	P10	1997	NA	None
Safford	Safford Regional	SAD	2008	2008	2001
San Manuel	San Manuel/Ray/Blair	E77	2003	2007	2007
Sedona	Sedona	SEZ	2000	2006	2001
Sierra Vista	Sierra Vista Municipal/LAA	FHU	2003	2000	2000
Springerville	Springerville Municipal	D68	2008	2007	2007
St Johns	St Johns Industrial Air Park	SJN	1998	2008	1999
Taylor	Taylor	TYL	2005	2005	2005
Tuba City	Tuba City	T03	2005	2005	2001
Whiteriver	Whiteriver	E24	1998	2003	2007
Wickenburg	Wickenburg Municipal	E25	2003	2000	2005
Willcox	Cochise County	P33	1997	1997	1999
Williams	H.A. Clark Memorial Field	CMR	2008	2007	2008
Window Rock	Window Rock	RQE	1998	1998	2001
Winslow	Winslow-Lindbergh Regional	INW	2008	2002	2002
Non-NPIAS General Aviation					
Aguila	Eagle Roost	27AZ	NA	NA	
Bullhead City	Sun Valley	A20	NA	NA	
Carefree	Sky Ranch at Carefree	18AZ	NA	NA	
Chandler	Memorial Airfield	34AZ	2005	2005	1984
Chandler	Stellar Airpark	P19	1981	NA	
Douglas	Douglas Municipal	DGL	1994	2003	None
Douglas	Cochise College	P03	2001	2001	None
Grand Canyon	Grand Canyon Valle	40G	NA	NA	
Kearny	Kearny	E67	2006	2006	None
Marble Canyon	Marble Canyon	L41	NA	NA	
Maricopa	AK Chin Community Airfield	E68	NA	NA	
Meadview	Pearce Ferry	L25	NA	NA	
Peach Springs	Grand Canyon Caverns	L37	NA	NA	
Peach Springs	Hualapai	3AZ5	NA	NA	
Peoria	Pleasant Valley	P48	NA	NA	
Phoenix	Phoenix Regional	A39	NA	NA	
Rimrock	Rimrock	48AZ	NA	NA	
San Luis	Rolle Airfield	44A	2001	2003	None
Seligman	Seligman	P23	2005	2006	None
Sells	Sells	E78	NA	NA	
Superior	Superior Municipal	E81	2002	2001	
Temple Bar	Temple Bar	U30	NA	NA	
Tombstone	Tombstone Municipal	P29	1999	1999	1999
Tucson	La Cholla Airpark	57AZ	NA	NA	
Whitmore	Grand Canyon Bar Ten Airstrip	1Z1	NA	NA	

Source: ADOT Aeronautics Division, *Airport Inventory & Data Survey* 2008
Note: NA= Not applicable

AIRPORT DEVELOPMENT CONSTRAINTS

Assessing the needs of the airports within the Arizona system is accomplished within the SASP through a top-down approach. This method looks at factors such as population and employment served by each airport within the system to help determine system airport needs. However, local land use issues and development constraints must also be taken into consideration.

Identification of airport development constraints at each system airport was obtained during the SASP inventory process. Each airport sponsor was asked to indicate what factors might limit or restrict the future growth or development of their airport. Future airport development constraint factors identified and their definitions are as follows:

- Man-made Factors: Airport development constrained due to man-made development in the vicinity of the airport such as roads, utilities, housing, or other structures.
- Environmental Factors: Airport development constrained due to environmental factors. These factors typically include wetlands, endangered species, and noise impacts.
- Community Relations: Political or community opposition to airport development or expansion.
- Financial Shortfalls: Lack of financial resources within the community or airport to fund airport development or expansion.

Among the 83 airports surveyed, 'Financial Shortfalls' was the most common constraint identified, with 65 airports reporting this factor. 'Community Relations' was the least common, with only 18 airports reporting this factor. Development constraints related to 'Man-made' and 'Environmental Factors' were reported by an almost equal number of airports. 'Man-made' was identified as a constraint by 33 airports and 'Environmental Factors' was identified as a constraint by 30 airports.

Figure 3-22 presents the constraints identified by each system airport. These constraints were based on information provided by airport managers or sponsors. The constraints are graphically depicted in Figure 3-23.

Figure 3-22: Airport Development Constraints

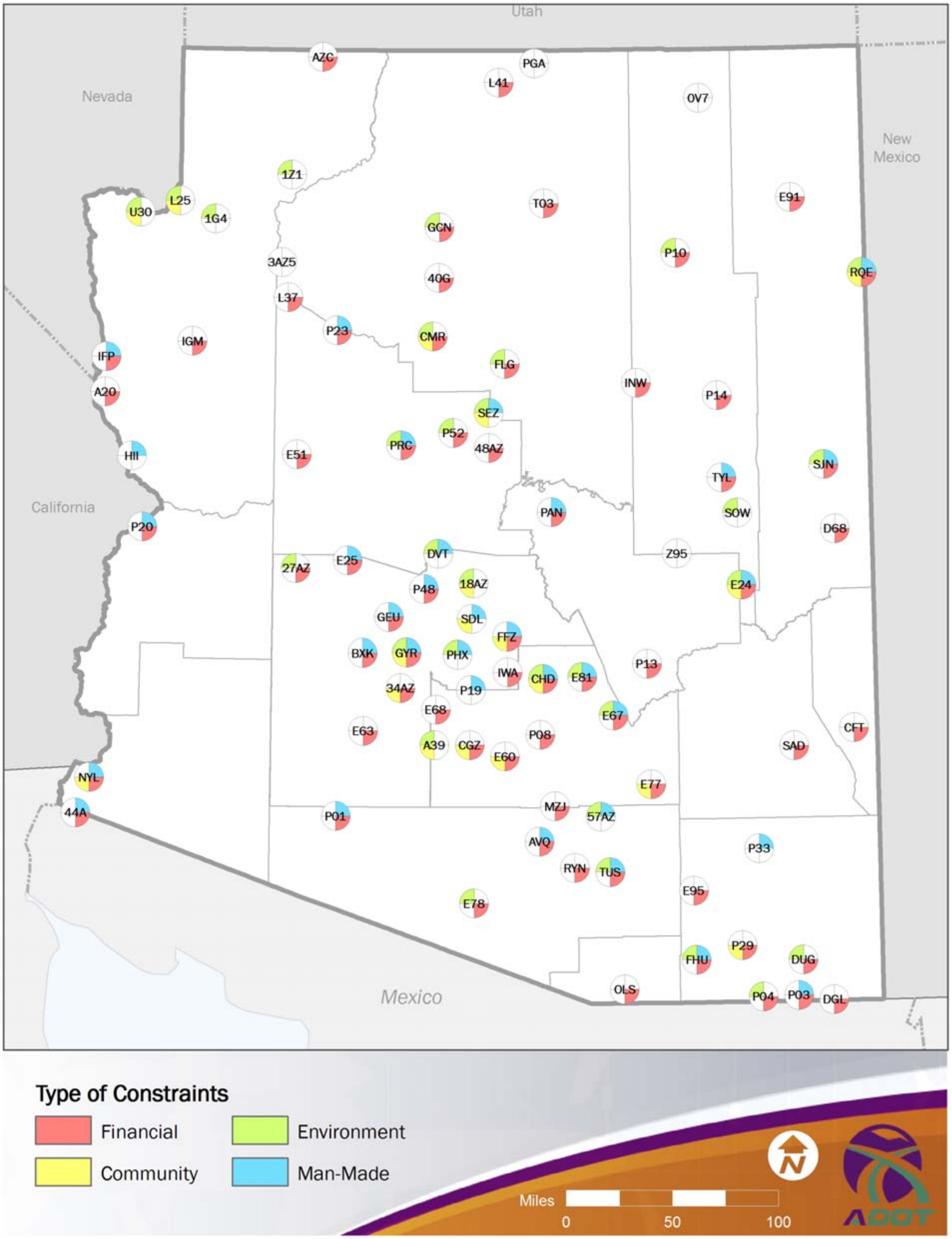
Associated City	*Airport Name*	*Man-made*	*Environmental*	*Community*	*Financial*
Primary Commercial Service					
Bullhead City	Laughlin/Bullhead International	✓			✓
Flagstaff	Flagstaff Pulliam		✓		✓
Grand Canyon	Grand Canyon National Park		✓		✓
Mesa	Phoenix-Mesa Gateway				✓
Page	Page				
Peach Springs	Grand Canyon West		✓		
Phoenix	Phoenix Sky Harbor International	✓	✓		
Tucson	Tucson International	✓	✓		✓
Yuma	Yuma International Airport	✓		✓	✓
Commercial Service					
Kingman	Kingman				✓
Prescott	Ernest A. Love Field	✓	✓		✓
Show Low	Show Low Regional		✓		
Reliever					
Chandler	Chandler Municipal	✓	✓	✓	✓
Glendale	Glendale Municipal	✓			✓
Goodyear	Phoenix Goodyear	✓	✓	✓	✓
Marana	Marana Regional	✓			✓
Mesa	Falcon Field	✓		✓	✓
Phoenix	Phoenix Deer Valley	✓	✓		
Scottsdale	Scottsdale	✓		✓	✓
Tucson	Ryan Field				✓
General Aviation					
Ajo	Eric Marcus Municipal	✓			✓
Bagdad	Bagdad				✓
Benson	Benson Municipal				✓
Bisbee	Bisbee Municipal		✓		✓
Buckeye	Buckeye Municipal	✓			✓
Casa Grande	Casa Grande Municipal			✓	✓
Chinle	Chinle Municipal				✓
Cibecue	Cibecue				
Clifton/Morenci	Greenlee County				✓
Colorado City	Colorado City Municipal				✓
Coolidge	Coolidge Municipal				✓
Cottonwood	Cottonwood		✓		✓
Douglas Bisbee	Bisbee Douglas International		✓		✓
Eloy	Eloy Municipal			✓	✓
Gila Bend	Gila Bend Municipal				✓
Globe	San Carlos Apache				✓
Holbrook	Holbrook Municipal				✓
Kayenta	Kayenta				
Lake Havasu City	Lake Havasu City	✓			
Marana	Pinal Airpark				✓
Nogales	Nogales International				✓
Parker	Avi Suquilla	✓			✓
Payson	Payson	✓			✓

Figure 3-22: Airport Development Constraints (Continued)

Associated City	*Airport Name*	*Man-made*	*Environmental*	*Community*	*Financial*
General Aviation					
Polacca	Polacca		✓		✓
Safford	Safford Regional				✓
San Manuel	San Manuel/Ray/Blair			✓	✓
Sedona	Sedona	✓	✓	✓	
Sierra Vista	Sierra Vista Municipal/LAA	✓	✓		✓
Springerville	Springerville Municipal				✓
St Johns	St Johns Industrial Air Park	✓	✓		✓
Taylor	Taylor	✓			✓
Tuba City	Tuba City				✓
Whiteriver	Whiteriver	✓	✓	✓	✓
Wickenburg	Wickenburg Municipal	✓			✓
Willcox	Cochise County	✓			
Williams	H.A. Clark Memorial Field		✓	✓	✓
Window Rock	Window Rock	✓	✓	✓	✓
Winslow	Winslow-Lindbergh Regional				✓
Non-NPIAS General Aviation					
Aguila	Eagle Roost		✓		✓
Bullhead City	Sun Valley				✓
Carefree	Sky Ranch at Carefree		✓	✓	
Chandler	Memorial Airfield			✓	✓
Chandler	Stellar Airpark	✓			
Douglas	Douglas Municipal				✓
Douglas	Cochise College	✓			✓
Grand Canyon	Grand Canyon Valle				✓
Kearny	Kearny	✓	✓		✓
Marble Canyon	Marble Canyon				✓
Maricopa	Estrella Sailport				✓
Meadview	Pearce Ferry		✓	✓	
Peach Springs	Grand Canyon Caverns				✓
Peach Springs	Hualapai				
Peoria	Pleasant Valley	✓			✓
Phoenix	Phoenix Regional		✓	✓	
Rimrock	Rimrock				✓
San Luis	Rolle Airfield	✓			✓
Seligman	Seligman	✓			✓
Sells	Sells		✓		✓
Superior	Superior Municipal	✓	✓		✓
Temple Bar	Temple Bar		✓	✓	
Tombstone	Tombstone Municipal			✓	✓
Tucson	La Cholla Airpark	✓	✓		
Whitmore	Grand Canyon Bar Ten Airstrip		✓		

Source*: Airport Inventory & Data Survey* 2008

Figure 3-23: Airport Development Constraints at Arizona System Airports



Source: *Airport Inventory & Data Survey 2008*

BUSINESS SURVEY RESULTS

In May 2008, over 2,500 Arizona businesses were mailed a survey to obtain input on the state's airport system and business use of aviation. The 2,500 businesses were selected based on their higher propensity to use aviation. This includes a minimum employee size and certain industries. In addition to the mail survey, a web-based survey was developed and the Internet address was included in the letter transmitting the survey to provide another option to survey respondents. Over 220 businesses responded to the survey request.

Businesses responding to the survey were from a variety of industries including manufacturing, health care, civil engineering and consulting, construction, and architecture. The primary locations of the respondents were from the Phoenix and Tucson metropolitan areas; however responses were received from businesses throughout the state. These businesses employ 57,519 full-time employees and 5,679 part-time employees, and were estimated to take 22,420 commercial airline trips each year. Businesses were also asked to estimate the percentage of their activity that depends on the availability of aviation. The commercial service and general aviation dependence responses both ranged from 0-100 percent. Where there is dependence noted by the business respondents, the average percentages for dependence on commercial service and general aviation is 44 percent and 25 percent, respectively.

Scheduled Commercial Airline Service

Businesses were asked about their commercial service travel. Seventy-nine percent responded that their employees take 10 or more trips per year and 45 percent take 50 or more trips per year. Some of the top destinations noted by the business respondents included Las Vegas, Denver, and Albuquerque. Seventy-two percent of businesses identified Phoenix Sky Harbor International Airport as their most commonly used departure airport. Eighteen percent of businesses reported that Tucson International Airport is their main departure airport.

Businesses were asked if their clients or vendors depended on the availability of commercial airline service to conduct business-related activity. Seventy-two percent responded that their clients and vendors do rely on commercial airline service. The number of trips per year ranged between one to 1,500 trips per year by clients or vendors, with an average of 55 trips per year. The top locations that clients and vendors are traveling from consist of California (including Los Angeles, San Francisco, and San Diego), Illinois (including Chicago and Peoria), and New York.

General Aviation Usage

Businesses were asked if their clients or vendors depended on general aviation to conduct business-related activity. Eighty-seven percent responded that none of their clients or vendors used general aviation. Of the 26 businesses that responded that their clients and vendors do use general aviation, they average 60 trips per year, with a range from two to 300 trips. The top three locations the clients and vendors are traveling from are Phoenix, Denver, and Show Low.

Businesses were asked about general aviation usage within their company, including ownership or lease of general aviation aircraft or the use of general aviation charters or air taxis. Twelve percent of businesses reported that they own general aviation aircraft and three percent stated that they lease aircraft. Only one business out of 186 respondents to the question reported fractional ownership of an aircraft. Six percent of businesses stated that they use general aircraft aviation charters or air taxis.

Air Cargo

Businesses were asked about their use of air cargo, including shipping of parcels, documents, and freight. Thirty-four percent of businesses reported that they use no air cargo service. Fifty-three percent of businesses responded that they use parcel service. Parcel and document services are used by over 50 percent of businesses. Freight air cargo is only used by 23 percent of businesses.

Important Factors for Businesses

When a company is looking to expand or relocate, there are many factors that affect their decision-making process. Businesses were asked, on a scale of 1 to 5, to rank the importance of the following factors when considering expansion or relocation (see Figure 3-24). A score of five represents the most important factor, while one represents the least important factor in their decision-making process.

Figure 3-24: Important Factors for Businesses Considering Expansion or Relocation

Factor	*Average Score*
Convenient highway access	4.25
Availability of trained workforce	3.98
Cost of living	3.87
A commercial service airport	3.67
Tax incentives	3.45
Proximity of suppliers	3.03
An urban business district	3.00
Academic or cultural centers	2.96
Universities or R&D centers	2.95
Airport with international flights	2.65
A general aviation airport	2.41
Historic location of business	2.39
Raw materials/natural resources	2.34
Rail transportation facilities	2.19

Source: Arizona Business Air Travel Survey 2008

Out of the 14 factors listed, businesses chose convenient highway access as the most important in considering expansion or relocation of their business. Location of a commercial service airport ranked fourth, while proximity to a general aviation airport ranked 11th. Also interesting to note from the respondents is the importance of the location of an airport with international flights, which ranked 10th out of the 14 factors.

PILOT SURVEY RESULTS

In May 2008, over 4,000 Arizona pilots were mailed a survey to obtain input on the state's airport system and their use of aviation. In addition to the mail survey, a web-based survey was developed and the Internet address was included in the letter transmitting the survey to provide another option to survey respondents. A link to the survey was provided through both the Arizona Pilots Association (APA) and the Arizona chapter of Aircraft Owners and Pilots Association (AOPA). To ensure a wide response throughout Arizona, the survey population for the mail-out survey was targeted. If there were less than 1,000 pilots from a county, then all pilots in that county were mailed the survey. Counties with over 1,000 pilots (Maricopa, Pima, and Yavapai) had proportional numbers of surveys distributed. In total, 1,105 surveys were returned either via U.S. mail or through the Internet website.

Pilots in Maricopa County had the highest number of respondents at 346 or 31 percent of the total respondents. The second highest number of respondents by county was Pima, with 13 percent of the responding pilots. Figure 3-25 maps the number of respondent pilots by zip codes in Arizona. Large concentrations of registered pilots can be seen around the Phoenix and Tucson metropolitan regions. Significant numbers of respondent pilots also appear in the Prescott and Sierra Vista regions. Much like population density in the state, registered pilots are largely concentrated in a few heavily urbanized areas.

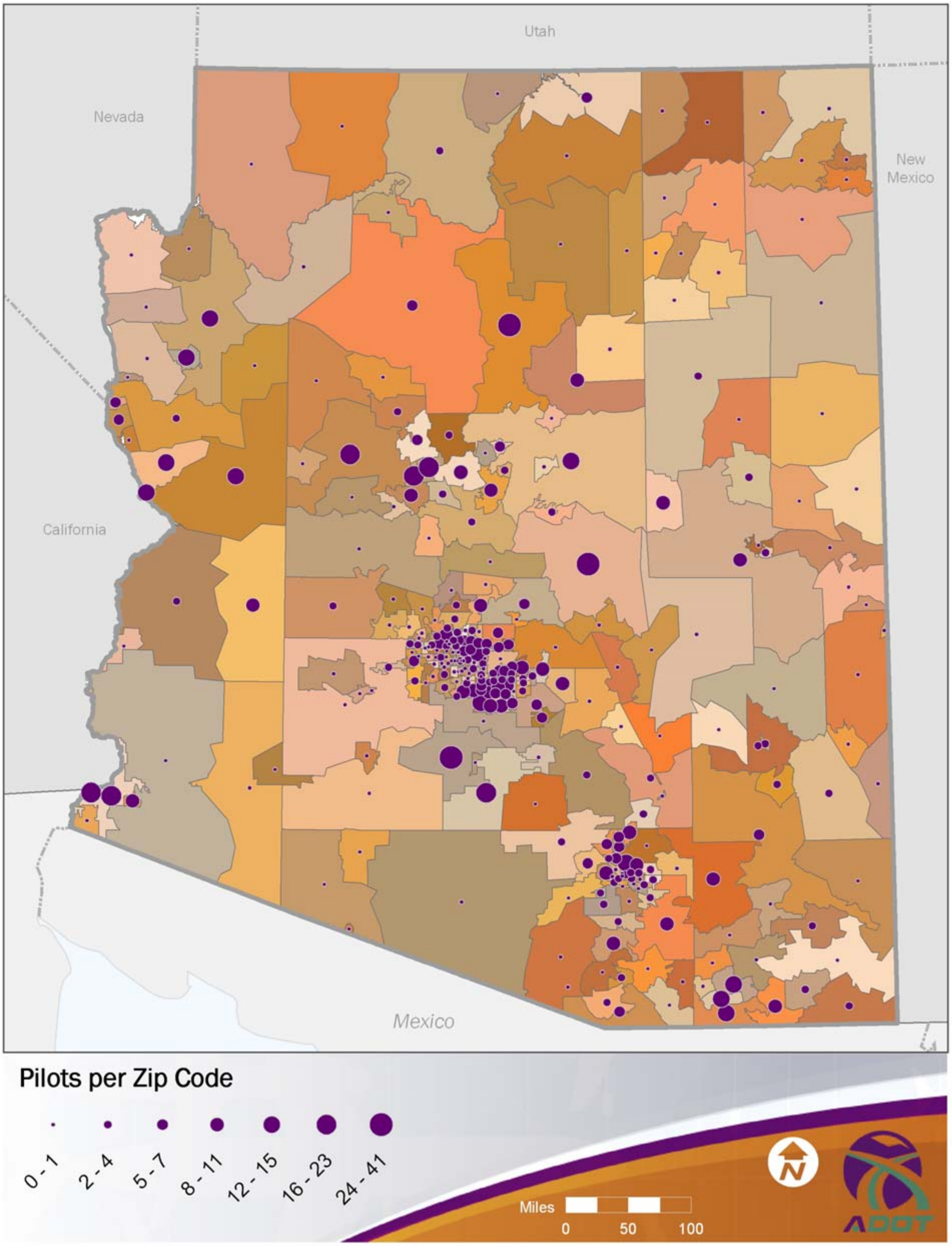
Pilot Information

Pilots were asked their employment status. Seventy-five percent of the respondents stated that they were not employed as pilots. Sixteen percent of pilots responded that they were full-time pilots, while two percent (27 pilots) identified that they were employed in both a full-time and part-time position.

The survey inquired about the pilots' certifications. Sixty-five percent of pilots have single-engine ratings and 47 percent stated they have an instrument rating. Fifty-four percent of pilots responded that they are private pilots, while 36 percent were classified as commercial pilots.

Survey respondents were asked to indicate which aviation groups they participated in. The largest group was Aircraft Owners and Pilots Association (AOPA), with 83 percent of respondents (811 pilots) identifying themselves as members. The second largest group was Experimental Aircraft Association (EAA), with 33 percent of pilots indicating they are members. Other groups with more than 50 members include APA, Civil Air Patrol (CAP), and pilots serving on local airport advisory boards.

Figure 3-25: Pilot Survey Respondents by Zip Code in Arizona



Source: 2008 Arizona SASP Pilot Surveys

Aircraft

Pilots were asked if they or their company owned any general aviation aircraft. If yes, they were also asked more questions about their aircraft, including the make and model, the aircraft's base airport, and how the aircraft was stored. Fifty-six percent of pilots stated that they owned an aircraft. Eight percent of pilots answered that they did not own an aircraft, yet listed information about the aircraft, including its make and model. The most frequently noted type of aircraft was a single-engine model, with 79 percent of the respondents identifying specific single-engine aircraft types. Over 8 percent of the respondents identified a multiengine piston aircraft was their primary aircraft.

Pilots were asked if their aircraft was equipped with a global positioning system (GPS) unit. Eighty-six percent responded yes, while 18 percent responded both yes and no. If the aircraft was equipped with GPS, the pilots were asked if it was capable of being utilized for IFR approaches. Seventy-three percent of pilots stated yes.

Airports

Pilots were requested to identify information on the airport where they base their aircraft. Responding pilots identified 67 airports where they base aircraft, with the highest number of respondents indicating the following airports as their base airport:

- 9.8% Falcon Field
- 8.3% Deer Valley
- 7.4% Yuma
- 5.9% Chandler
- 5.9% Prescott
- 4.9% Scottsdale
- 4.4% Stellar Airpark
- 3.9% Tucson

The average number of years for aircraft to be based at one airport is eight years. Sixty-one percent of pilots responded that they stored their aircraft in hangars, while 26 percent stated they use tie-downs. For pilots that do not currently have a hangar, 65 percent of them stated they would use one if it became available at the airport's current rates.

Pilots were asked to rate their airports on their facilities. The rankings were good, fair, and poor. Hangars and FBO services were tied for the highest number of poor rankings, with 166 each. Length of runway(s) received the highest number of good rankings with 748 pilots ranking these facilities as good at the airport where they base their primary aircraft. Overall, the average ranking for all facilities was above fair, with length of runway ranking the highest and hangars ranking the lowest.

Pilots were asked the distance they travel to their home base airport from both home and work. Thirty-two percent of pilots reside within zero to five miles of their airport. Forty-one percent of pilots work within zero to five miles of their airport. Eighty-five percent of pilots live within 20 miles of their airport and over 89 percent work within 30 miles of their airport.

Rising fuel costs has become a concern of many in the industry. However, 30 percent of pilots stated that fuel prices have had no effect on the number of hours they have flown in the past year. Thirty percent of pilots said that fuel costs have affected their number of flying hours by 10 to 15 percent, while only 13 percent report that fuel costs have reduced their hours by 50 to 100 percent.

Pilots were asked their primary purpose for flying in the past 12 months. Fifty-eight percent reported that they flew on personal business, while 18 percent stated they flew for business. Instructional, search and rescue, and commercial flights were also in the top five reasons for recent flying.

Pilots were asked to identify the top three reasons why they fly out of their most common airport. Place of employment was the top reason, with 63 percent of pilots marking that as one of their top three reasons. Proximity to home was second with 61 percent of pilots responding this as a top reason for choosing their airport. Fifty-nine percent stated that cost of services was in their top three reasons.

Pilots were also asked to suggest which improvements their most used airport needed. Hangars were the top choice with 51 percent of pilots identifying this need. Thirty percent stated that FBO services at their airport needed to be improved. Airport services were also in the top three for improvement with 21 percent of pilots responding that additional services were needed.

CHAPTER FOUR: FORECASTS OF AVIATION ACTIVITY

This chapter provides forecasts of aviation activity at each airport included in the Arizona State Airports System Plan. This chapter includes an overview of national and statewide trends which have the potential to impact future aviation activity in the state. These trends include such factors as historic aviation growth, the rising cost of fuel, technological advances, and socioeconomic trends in Arizona, among others. The forecasts of aviation activity in Arizona follow the summary of aviation trends.

INTRODUCTION & APPROACH

The primary objective of a forecasting effort is to define the magnitude of change that can be expected over time. Because of the cyclical nature of the economy, it is virtually impossible to predict with certainty year-to-year fluctuations in activity when looking 20 years into the future. This is especially true today, as fuel prices have reached record highs and all sectors of aviation have felt the impact. Near-term projections are especially difficult under the current operating environment. However, a trend and range of projections can be established that characterizes long-term growth potential in aviation activity.

The development of aviation activity projections for Arizona's system of airports is a necessary step in assessing the need for and phasing of future airport development. The activity projections presented in this chapter are used in part to determine the role of airports within the Arizona system, evaluate the ability of the existing system to accommodate projected aviation demand, and plan future airside and landside facilities for the system. In this chapter, aviation activity forecasts were developed for the following indicators:

- Commercial Service Enplanements and Operations
- Air Cargo Tonnage
- Based Aircraft
- General Aviation Operations
- Military Operations

To ensure reasonable results, forecasts for each aviation indicator were developed using several different forecasting methodologies. These methodologies include both "top down" and "bottom up" approaches. A "top down" approach projects aviation activity for the entire Arizona airport system, then relates the projections back to each individual airport based on the current share of statewide activity. The "bottom up" approach relates local factors including historic based aircraft trends and projected population and employment growth to future aviation activity at individual airports. The "bottom up" approach adds each individual airport's forecasts together to arrive at the system-wide total.

Preferred methodologies for each aviation activity indicator were selected based on historic and projected demographic trends, FAA projections, and the possible impacts of industry trends. The projections of aviation demand are then compared to the FAA's Terminal Area Forecast (TAF) and airport master plans, where available, to ensure a reasonableness check of the SASP preferred forecasts.

TRENDS IMPACTING AVIATION

Recent trends, both national and statewide, are important considerations in the development of aviation activity projections. At the national level, fluctuating trends regarding aviation usage and economic swings resulting from the nation's business cycle and record high oil prices have all impacted aviation demand. At the state level, demographic and economic growth experienced in Arizona has impacted aviation demand. This chapter examines commercial service, air cargo and general aviation trends, and the numerous factors that have influenced those trends in the U.S. and the state of Arizona.

Nationally, demand for commercial air service and general aviation has remained strong and returned aviation activity to pre-September 11, 2001 levels. However, the domestic commercial airline industry continues to struggle with high operational costs in an environment of intense pricing competition. In both the commercial and general aviation sectors, accelerating fuel prices have rapidly escalated the cost of flying. In 2008, it is projected that both aviation sectors will experience declines in activity.

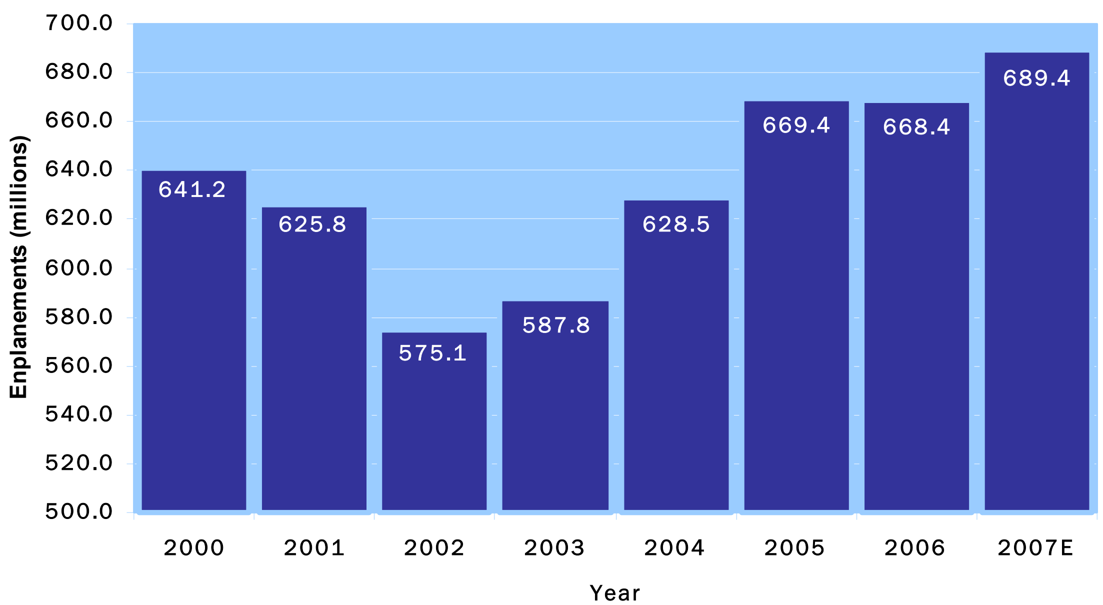
This section reviews some of the most important national trends in aviation that have and will continue to impact aviation in Arizona. Among the most important factors influencing aviation demand in Arizona today, and in the near future, are the following:

- Increased competition for market share between network and low cost carriers
- On-going financial difficulties of the legacy carriers, especially those that operate hub and spoke networks
- A restructuring of regional jet service and regional airlines precipitated by legacy carrier bankruptcies and reorganization
- Higher operating requirements of regional jet aircraft on smaller communities that can currently only accommodate turboprop aircraft
- Further declines in air service to the smallest communities as the carriers focus on the highest density point-to-point markets
- Replacement of aircraft in favor of more fuel efficient models both on the commercial side and in general aviation
- Introduction of twin engine micro jets or very light jets and increased national capability to provide on-demand business travel
- Reductions in recreational (discretionary) flying of general aviation aircraft because of high fuel costs

National Scheduled Commercial Service Trends

Fourteen of the 83 SASP airports offer commercial service. Commercial service includes all scheduled passenger flights, including air tours. Following September 11, 2001, aviation forecasters anticipated that it would take some time for commercial demand to return to levels seen in 2000. By 2005, most commercial airports exceeded 2000 activity levels. **Figure 4-1** shows the trend in total domestic enplanements since 2000. In 2007, approximately 689 million passengers enplaned commercial service flights in the U.S.

Figure 4-1: Domestic Enplanements, 2000-2007

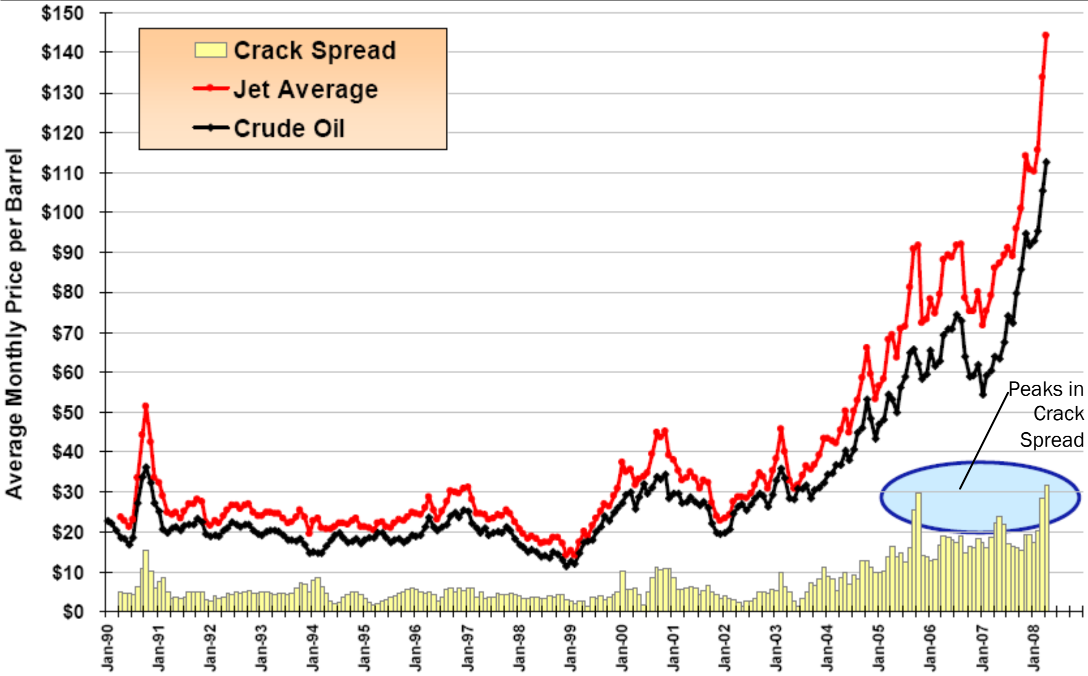


Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

Jet Fuel Prices

Despite a continuing increase in passenger demand, the escalating cost of fuel continues to disrupt the financial recovery of the commercial airlines. **Figure 4-2** shows the pricing trends of spot crude oil and jet fuel since 1990. In the last 30 years, there have been three pricing spikes. In 1973-74, the Oil Embargo caused the price of oil to spike from $3 per barrel to over $11 per barrel. In the 1980s, the price of crude oil moved into the $20 range. In the 1990s, the price fluctuated between $20 and $30 per barrel until mid-2003. In the last four years, the price of crude oil has more than quadrupled; and in 2008, crude oil has increased to $140 per barrel (as of early July 2008). In addition, the difference between crude and jet fuel cost per barrel, known as the "crack spread" has increased as well, from a historical average of $5 to over $20 since Hurricane Katrina.

Figure 4-2: Average Prices ($/Barrel): Crude Oil vs. Jet Fuel, 1990-2008

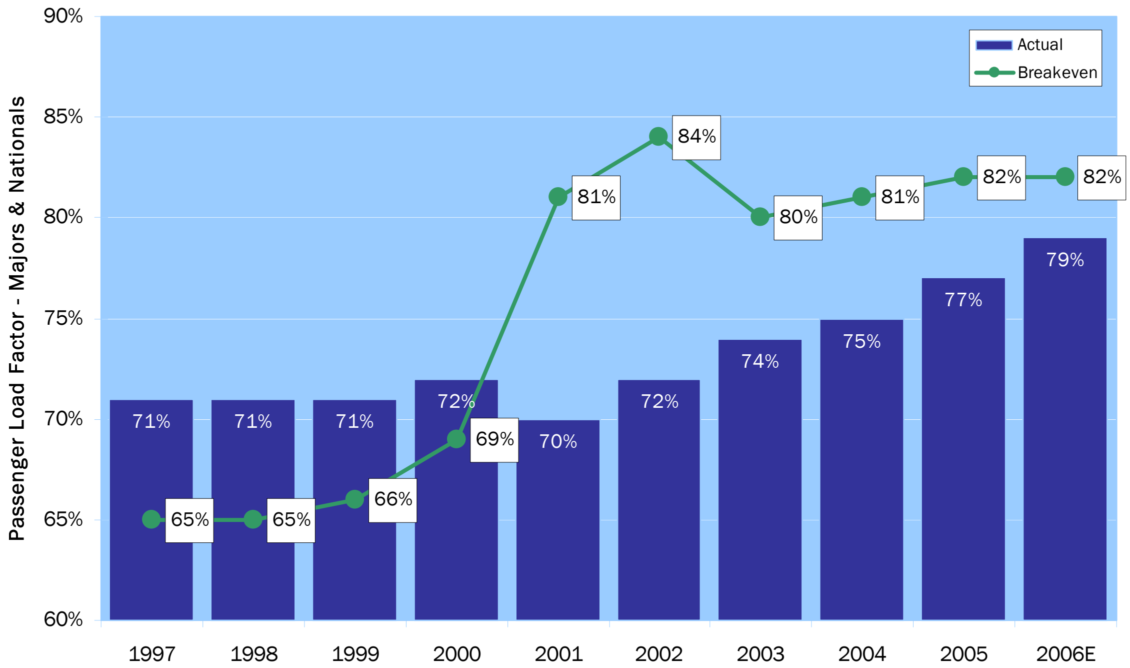


Sources: U.S. Energy Information Administration and Air Transport Association

High Breakeven Load Factors Reflect Low Fares and High Costs

A way to look at the cost and revenue components of commercial air service is to compare actual passenger load factors with breakeven load factors. Figure 4-3 compares passenger load factors and breakeven load factors for the major carriers. This figure clearly demonstrates how the airlines are challenged to stay profitable when fares remain low, demand is high, and costs continue to escalate. Starting back in 1995 through 2000, carrier load factors exceeded breakeven points. Breakeven points hovered in the mid-60 percent range while actual load factors averaged 70 percent. However, in the last six years, breakeven points averaged in the mid-80 percent range, well above actual load factors. Typically when airlines are operating at 80 percent or higher load factors, they must either turn away passengers or schedule additional flights. This is why the airlines are eager to reduce operating costs, raise airfares, and lower the number of passengers needed to break even.

Figure 4-3: Passenger Load Factors and Breakeven Points - Legacy Carriers (Majors & Nationals), 1997-2007



Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

Airline Mergers & Acquisitions

At the time this chapter was written in 2008, five of the country's six major airlines were engaged in merger talks and Delta Air Lines and Northwest Airlines have agreed to merge and await a ruling from the U.S. Justice Department. United Airlines was in talks with Continental and then US Airways regarding a merger, but has recently called off talks. Airline mergers are being considered again due to high fuel costs and the weak domestic economy. Several airlines have shutdown in the past six months and one filed for bankruptcy:

Shut Down U.S. Airline	Last Day
MAXjet	Dec. 25, 2007
Big Sky	Jan. 7, 2008
Aloha	Mar. 31, 2008
ATA	April 2, 2008
Skybus	April 5, 2008
EOS	April 27, 2008
Champion Air	May 31, 2008

Bankrupted Airline	Ch. 11 Filing
Frontier	April 11, 2008

To survive, some airlines are considering merging in the hope that by joining forces, they can save money on rising fuel costs and gain cost savings from combining international and domestic routes. Airlines hope to create efficient carriers that can effectively compete and win in the global marketplace. If the Delta-Northwest merger is approved it could spark further consolidation according to equity analysts. The worry is that consolidation increases the likelihood for service cuts to small communities and higher fares. Consumer advocates believe that airlines are attempting to become "mega-airlines" and that consumers have become reliant on air travel since it is the only rapid form of transportation for an over 400-mile trip in the U.S.

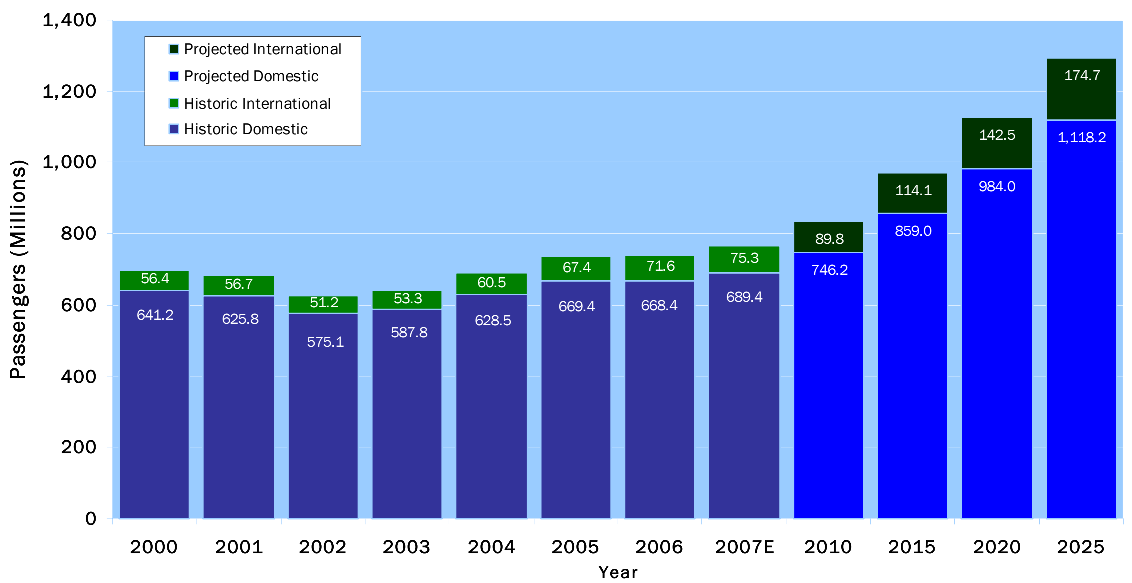
FAA Commercial Aviation Forecasts

Each year the FAA prepares a 12-year forecast for commercial aviation as part of the *FAA Aerospace Forecasts*. The forecasts are presented in March each year. The most recent forecasts reflect the following average annual growth rates for 2008-2025:

- Domestic enplanements – 2.72 percent per year
- International enplanements – 4.79 percent per year
- Load factors up to 82 percent
- Available Seat Miles (ASMs) – 4.1 percent per year
- Revenue Passenger Miles (RPMs) – 4.2 percent per year

The FAA anticipates that international travel will be the fastest growing segment of scheduled air service. In 2007, international ASMs represented approximately 27 percent of the system. By 2025, international ASMs are expected to represent 34 percent of total ASMs. Regional carrier growth will slow to 1.3 percent per year after annual increases in the 12 percent range between 2000 and 2006. Passenger yields are projected to improve at an average annual growth rate of 1.7 percent. **Figure 4-4** shows the most recent FAA forecasts for both domestic and international passengers.

Figure 4-4: U.S. Commercial Air Carriers, Historical and Forecast Domestic and International Passengers (2000-2025)



Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

It is worth noting that the FAA projections do not take into account the recent surge in fuel costs and ongoing difficulties experienced by U.S. carriers. Based on recent events, it appears that the FAA's near-term domestic projections may be overstated.

Air Cargo Trends

This section will provide an overview of the air cargo industry, a summary of world and U.S. cargo trends. Six of the 83 airports included in the SASP have regularly scheduled air cargo operations.

Overview & Demand for Air Cargo Services

Air cargo demand is generated when there is a need for transportation of material or goods between two points in an expeditious manner. In the business world, logistics managers must justify the use of air cargo as their preferred mode of transport. Shipping by air is greater in cost than shipping via truck, rail, or water. Several factors are involved in the logistics process when it comes to deciding if it is appropriate to move material via air cargo. These factors include:

- Cost of transporting the material
- Level of service commitment to the customer or end user
- Value of the material
- Magnitude of the time-sensitivity of the material

Products that benefit from increased speed of distribution or better stock availability that can be gained through air cargo shipping include those such as automotive; computers; and perishable items such as flowers, vegetables, and fish. All of these are high value, relatively light weight, and time critical. The types of commodities that typically rely on air cargo are as follows:

- Aerospace - Equipment & Parts
- Automotive - Equipment & Parts
- Pharmaceuticals
- Computers & Computer Components
- Diagnostic Equipment
- Medical Devices and Equipment
- Software
- Textiles - Garments
- Consumer Electronics
- Perishables - Flowers, Fruit, Vegetable & Seafood
- Economically Perishable Materials - Printed Material
- Telecommunications Equipment - Cell Phones, Blackberries, etc.
- Photographic Film

Air Cargo Service Options

There are five primary distribution channels for air freight: all cargo carriers, integrated express operators, commercial airlines, freight forwarders, and ad-hoc carriers. A brief description of each is provided in the following subsections.

All Cargo Carriers

All cargo carriers operate airport-to-airport air cargo and freight services for their customers but do not offer passenger service. All cargo carriers include Polar Air Cargo, Atlas Air, and Kalitta Air Cargo, to name a few. Northwest Airlines operates a dozen or so cargo-only Boeing 747s. Northwest is the only U.S. based passenger carrier to provide this type of all air cargo service. Japan Airlines and Korean are also passenger airlines with their own fleet of freighter aircraft. All cargo carriers offer scheduled service to major markets throughout the world using wide body and/or containerized cargo aircraft.

Integrated Express Operators

Integrated express operators move the customer's goods door-to-door, providing shipment collection, transport via air or truck, and delivery. Integrated express operators include FedEx Express[1], UPS, and DHL. Express companies provide next day and deferred, time-definite delivery of documents and small packages (two to 70 pounds). Increasingly, however, express operators are transporting "heavy" freight, identified as more than 70 pounds.

Integrated express carriers operate using hub and spoke systems similar to the passenger airline systems. The hub is the backbone of integrated express carrier since it provides connections to each market in the integrator's system. Each day of operation, flights from around the U.S. arrive at the hub. Once at the hub, packages are unloaded, sorted to the appropriate destination market, and then loaded back onto the appropriate outbound aircraft.

Scheduled Commercial Airlines

Air cargo services provided by commercial airlines vary in scope and size from airline to airline. This is true because of differences in aircraft operating fleets. A regional airline, with a fleet of turboprop and regional jets, cannot accommodate large, bulky cargo or freight shipments. Airlines operating wide-body aircraft have containerized lower decks (which allow speed in loading and offloading) and generally are capable of handling large, bulky shipments.

Commercial airlines generally provide airport-to-airport service. Freight must be dropped off at the airport by the shipper or the shipper's freight forwarder. Air cargo/freight must be picked up at the destination airport by the customer or the customer's freight forwarder. While there is likely to be a continued market for commercial airline "belly" cargo, the integrated carriers have been very successful in expanding their market to capture freight that formerly was the exclusive domain of the heavy or all cargo carriers.

Freight Forwarders

An air freight forwarder is a company that accepts small packages from shippers and consolidates them into container loads. These loads are then transferred to the non-integrated carrier or a passenger airline to deliver to an agent or subsidiary at another airport. BAX Global operates as a multi-modal forwarder, but utilizes its own aircraft fleet and a hub and spoke system to support its air freight operations. Freight forwarders also rely heavily on lift provided by commercial passenger carriers. Freight forwarders have their leading gateways near major hub airports such as Los Angeles International and New York's John F. Kennedy International.

Ad-Hoc/On-Demand Carriers

Ad hoc air cargo operations are unscheduled charter flights carrying freight or mail.

[1] FedEx has several product types that utilize the FedEx brand name in some form. FedEx Express is the integrated express arm of the company. They provide the "overnight service" synonymous with the brand while FedEx Ground is the trucking division; they operate similar to UPS trucking. FedEx LTL is the Less Than Truckload branch, and FedEx Custom Critical is a truck charter service.

Air Cargo Industry Trends

This discussion provides insight into global air cargo trends and the air cargo industry in the United States. This discussion is useful to set a context for future air cargo potential for Arizona. This overview also provides a brief description of the type of services carriers and airports utilize. The following specific topics are discussed:

- Global Air Cargo Trends
- U.S. Air Cargo Trends

Global Air Cargo Trends

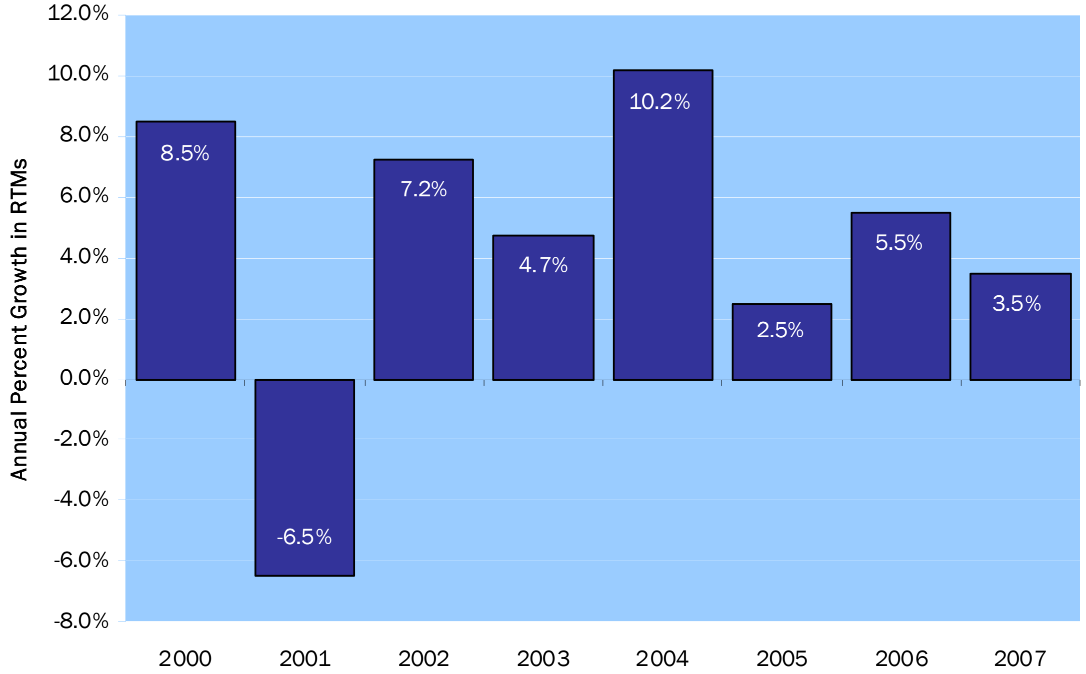
Air cargo is big business from the standpoint of the economic value it helps to support. It is estimated by the International Air Cargo Association that the air cargo industry transports 40 percent of world trade by value, but a mere two percent by weight. In 2007, the U.S. domestic air freight and express market activity was valued at $34 billion, whereas the international air freight/express market was valued at $69 billion. When combined, the worldwide air cargo industry was valued at $103 billion in 2007. Cargo's share of total passenger airline revenue varies widely, but it is estimated that:

- Five percent of revenue for U.S. major carriers comes from cargo
- 15 percent of revenue for European major commercial carriers comes from cargo
- More than 20 percent of revenue for Asian major commercial carriers comes from cargo

Boeing indicates in their biannual air cargo forecast that freight traffic worldwide will grow six to seven percent per year; this indicates the air cargo market will double in size approximately every 12 years. Approximately 50 percent of all air cargo shipped worldwide is carried in the lower deck of passenger aircraft, with the remaining 50 percent being shipped by freighter aircraft operators such as Atlas and Polar Air Cargo or by integrated express carriers such as DHL, FedEx Express, and UPS.

The *FAA Aerospace Forecasts, Fiscal Years 2008-2025* indicates worldwide air cargo demand growth rebounded in 2006 after slow growth in 2005 as shown in Figure 4-5. Worldwide cargo growth for 2007 was estimated at 3.5 percent.

Figure 4-5: World Air Cargo Demand Changes, 2000-2007



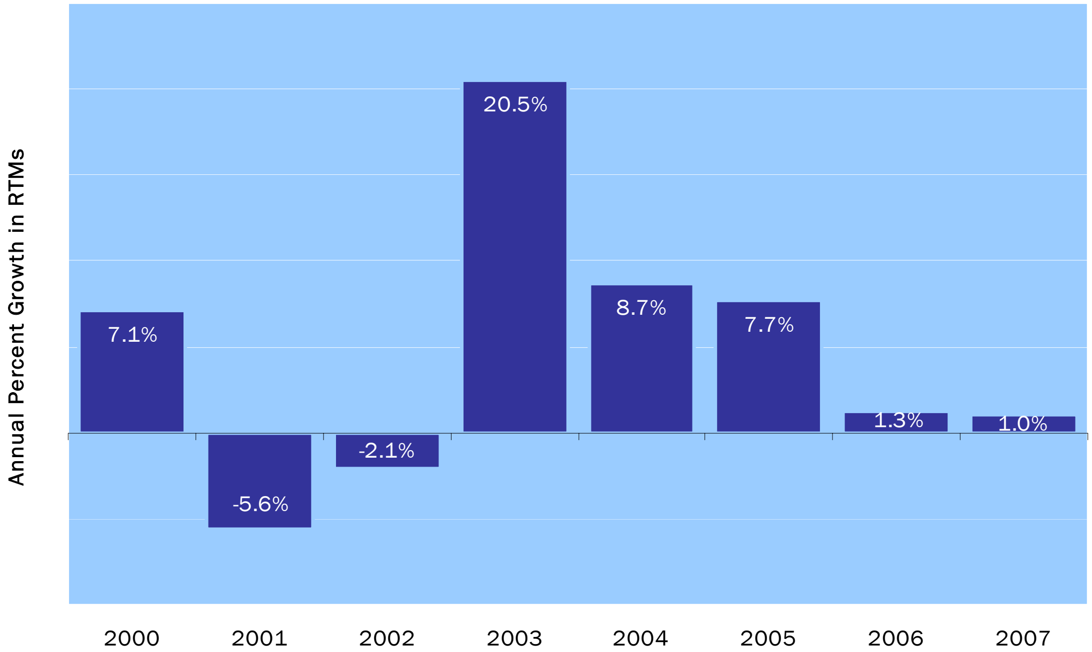
Source: *FAA Aerospace Forecast, Fiscal Years 2008-2025*

U.S. Air Cargo Trends

Over the last 10 years, air freight has been the fastest growing segment of the U.S. cargo industry according to a report by the U.S. Department of Transportation's Bureau of Transportation Statistics. Air freight has grown rapidly as U.S. businesses sought timely delivery of valuable goods. This growth has also created greater demand for truck and inter-modal services, since most air shipments begin and end their journeys by truck.

The *FAA Aerospace Forecasts, Fiscal Years 2008-2025* provides insight into recent U.S. trends in the air cargo sector of aviation. Growth in the U.S. cargo market continues, but not nearly at the rates seen in the past few years. This slower growth is a result of a maturing U.S. market. Figure 4-6 shows the degree to which growth in the U.S. air cargo market has slowed since 2003.

Figure 4-6: U.S. Commercial Air Carriers Cargo Demand Changes, 2000-2007



Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

The *FAA Aerospace Forecasts, Fiscal Years 2008-2025* also provides forecasts of revenue ton miles of air cargo activity. Figure 4-7 summarizes the FAA forecasts from 2007 to 2025. These forecasts project revenue ton miles (RTMs) for all-cargo carriers to increase at an annual rate of 3.2 percent though 2025, to a future value of over 22 million RTMs. Passenger carrier ton miles are projected to increase at an annual rate of 1.8 percent through 2025, from three million in 2007 to over four million in 2025. Total domestic cargo revenue ton miles are projected by the FAA to increase at an annual rate of three percent, from a 2007 number of nearly 16 million to over 26 million in 2025.

Figure 4-7: Forecasts of U.S. Commercial Air Carriers Cargo Revenue Ton Miles, 2007-2025

Year	*All-Cargo Carriers*	*Passenger Carriers*	*Total*
2007	12,792,718,000	3,028,643,000	15,821,361,000
2010	14,357,340,102	3,280,669,851	17,638,009,953
2015	16,972,232,042	3,625,136,941	20,597,368,983
2025	22,556,598,907	4,169,229,182	26,725,828,089
CAGR 2007-2025	3.2%	1.8%	3.0%

Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR=Compound Average Annual Growth Rate

The increase in fuel prices has slowed demand for air cargo somewhat. In addition, other factors in the U.S. air cargo industry have resulted in a more mature market that is not expected to sustain the high growth rates seen in previous years. A mature air cargo market implies that air cargo facilities such as hub-and-spoke air networks are not expanding and that integrated express carriers are not expanding their fleets significantly for domestic operations. For example, when UPS air cargo network needed to increase capacity in the US in 2005 they chose to expand existing facilities and not build new hubs and facilities. Three primary factors contributing to industry maturity are discussed below.

Vertical Integration

As the air cargo industry has matured, the double digit growth of the 1980s and 1990s has moderated; many companies are looking at vertical integration for opportunities. UPS started as a trucking company and expanded into air cargo, while FedEx began as an integrated express company that is now expanding into trucking through the acquisition of several companies, including RPS and American Freightways. In response to the needs of supply-chain managers, many suppliers of overnight package delivery now offer time-definite cargo services in the form of two- or three-day delivery.

Modal Shift

The shift in focus from integrated express to time-definite service, coupled with financial and cost-saving measures, has led to the increasing use of trucks on longer routes that were traditionally served by aircraft. This modal shift is particularly pronounced within the integrated express carrier community. Less-than-truckload (LTL) companies have become major competitors to air freight. These companies enjoy a significant cost advantage over air cargo carriers because of lower capital costs for equipment and lower wage scales. To compete effectively in this segment, FedEx Express has recently formed its own LTL subsidiary, FedEx LTL. Other larger LTL companies competing for time-definite shipments include ABF Freight System, Inc, Yellow Freight System, and Con-Way. The United States Postal Service (USPS) has also increased the use of trucks to transport mail, finding that mail can be transported by truck for 20 percent less than air transportation costs.

Declining Availability of Belly Space on Domestic Carriers

While 50 percent of international air cargo is transported on passenger aircraft, a small percentage of air cargo is carried on domestic passenger aircraft in the U.S. This is because fewer wide-body aircraft are in use on domestic routes in North America. The increased use of regional jets offers limited cargo capacity. Higher load factors, which mean more passenger baggage, further reduce belly cargo capacity. New security rules are anticipated to impact air cargo carried on domestic air carriers when 100 percent screening takes effect in 2010.

U.S. Postal Service (USPS) Mail Volume Continues to Decline

A number of factors have resulted in changes to the way mail is transported. First, reduced capacity offered by regional jets has resulted in the USPS relying more heavily on trucks than aircraft. Historically, mail traveling more than 500 miles made use of aircraft, but with the proliferation of regional jets reducing air cargo capacity, the threshold for the use of trucking for mail has shifted to up to 800 miles. Second, in the 1990's, the USPS realized the efficiencies that could be gained by contracting the air portion of the mail transport instead of flying it themselves. USPS formed several business alliances and capacity agreements with multiple all-cargo carriers, blurring the distinction between postal and private delivery. However, in August 2001, FedEx Express and the USPS initiated an exclusive strategic alliance. Through a business agreement, the USPS allows FedEx Express to locate FedEx overnight service collection boxes at post offices nationwide. FedEx Express, in return, provides space on FedEx Express airplanes for the transportation of USPS Express Mail, Priority Mail, First-Class Mail, and some International Mail. This deal yielded FedEx Express approximately 3.5 million pounds of additional mail each day, enough to fill 30 DC-10-30 freighters. Lastly, the increased use of email and overnight delivery services like DHL has decreased the amount of mail carried on passenger aircraft by the USPS.

National General Aviation Trends

General aviation includes all aviation except scheduled passenger or air cargo operations. It includes personal transportation, business and corporate flights, air taxi, and helicopter operations. In Arizona, general aviation aircraft are flown for a wide variety of uses including: business travel, agricultural spraying, flight instruction, emergency airlift, fire fighting, and recreation. In 2007, more than 6,500 registered aircraft were based in Arizona with 17,986 licensed pilots. These aircraft included home built/experimental, glider, agricultural, military surplus, antique and classic/warbirds, ultra-light airplanes, helicopters, single and multi-engine aircraft, and corporate and private jets.

Each year, the FAA and the General Aviation Manufacturers Association (GAMA) review the outlook for the general aviation industry. The FAA's particular areas of interest are the workload at airports with FAA air traffic control towers and contract towers, airspace congestion, and changes in the U.S. fleet mix. GAMA keeps track of aircraft billings and shipments.

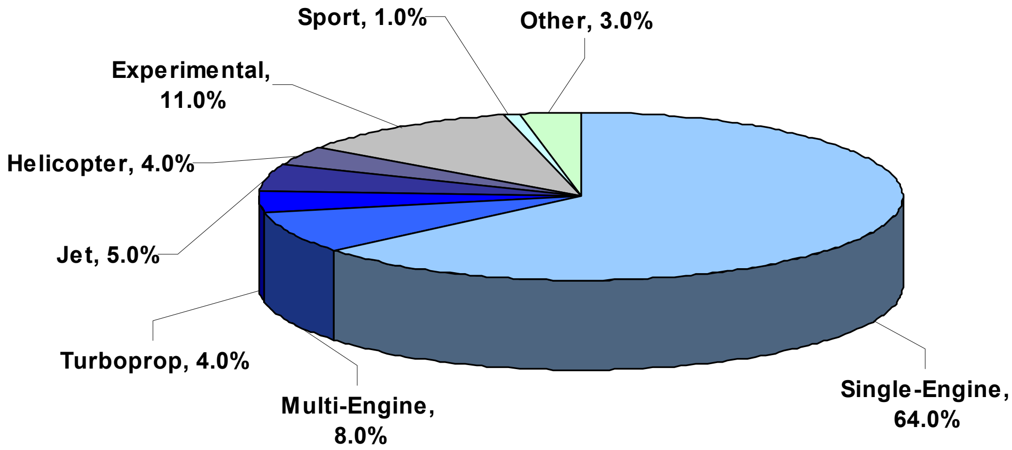
The following describes general aviation activity[2] in the U.S. in order to provide a comparison for based aircraft and general aviation activity in Arizona:

- There are 224,000 general aviation aircraft based in the U.S.; approximately 6,500 are registered in Arizona.
- General aviation aircraft fly over 27 million hours in the U.S. and carry 166 million passengers each year.
- Nearly two-thirds of the hours flown on general aviation aircraft are for business purposes. In Arizona, agricultural spraying also accounts for a large number of aircraft operations and hours flown.
- Fractional ownership of aircraft is on the rise. In 2006, 984 aircraft were operated in fractional ownership programs. This is a growing, but relatively small portion of the U.S. fleet.
- Single-engine aircraft are the most popular and numerous aircraft in the United States. In 2007, 2,174 single-engine aircraft were manufactured and shipped worldwide.
- Turboprop airplanes are a much smaller segment of the market. In 2007, 459 units were manufactured and shipped worldwide.
- Business jets are a growing segment of the market in terms of units shipped. In 2007, 1,138 units were manufactured and shipped worldwide. The FAA now identifies twin engine micro jets as part of their annual forecasts. These aircraft have the highest potential for growth.
- Domestic shipments of new aircraft reached a near-term high of 3,279 in 2007, representing a 53 percent change since 2003.

[2] GAMA *Annual Industry Review & 2008 Market Outlook Briefing*

Figure 4-8 shows the most recent fleet mix of general aviation aircraft in the U.S.

Figure 4-8: U.S. General Aviation Fleet Mix, 2007



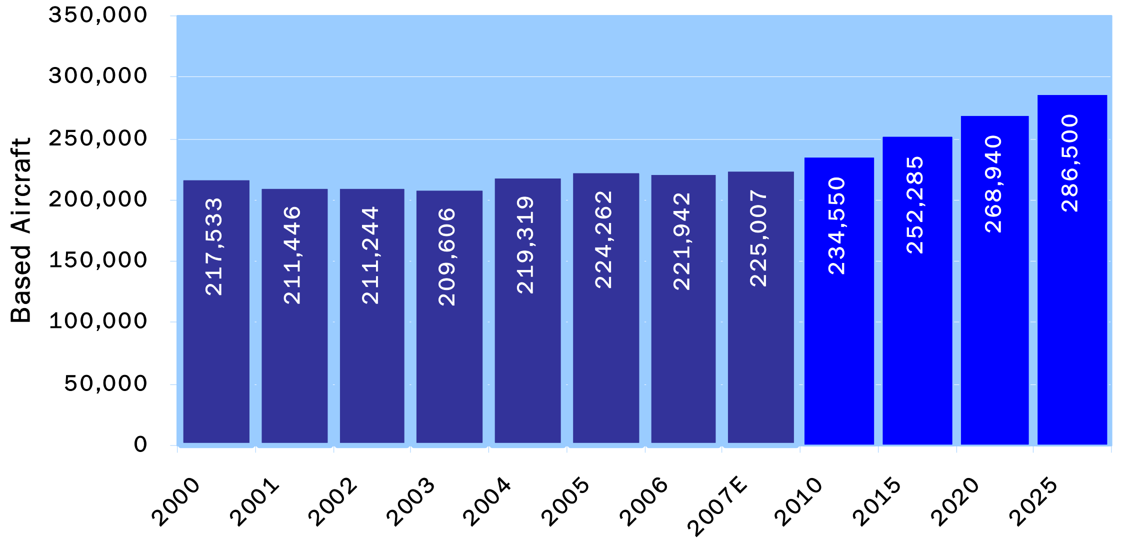
Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

FAA General Aviation Forecasts

As part of its forecasting effort, the FAA prepares national forecasts of active general aviation aircraft, fleet mix, and general aircraft operations. The active aircraft forecast is presented in Figure 4-9, and the fleet mix forecast is presented in Figure 4-10.

Overall, general aviation aircraft are projected to grow at an average annual rate of 1.4 percent for the next 13 years. However, there is variation both with respect to the mix of aircraft and the growth rate within each category. Starting in 2005, the FAA added "light sport" aircraft as a registration category. FAA is expecting registration of over 9,000 aircraft in this category in the next 10 years. Other growth areas are the twin-engine micro jets and piston helicopters. Single-engine piston aircraft are expected to grow relatively slowly at an average annual rate of 0.5 percent while twin engine piston aircraft are expected to decline at 0.9 percent annually.

Figure 4- 9: Active General Aviation and Air Taxi Aircraft



Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

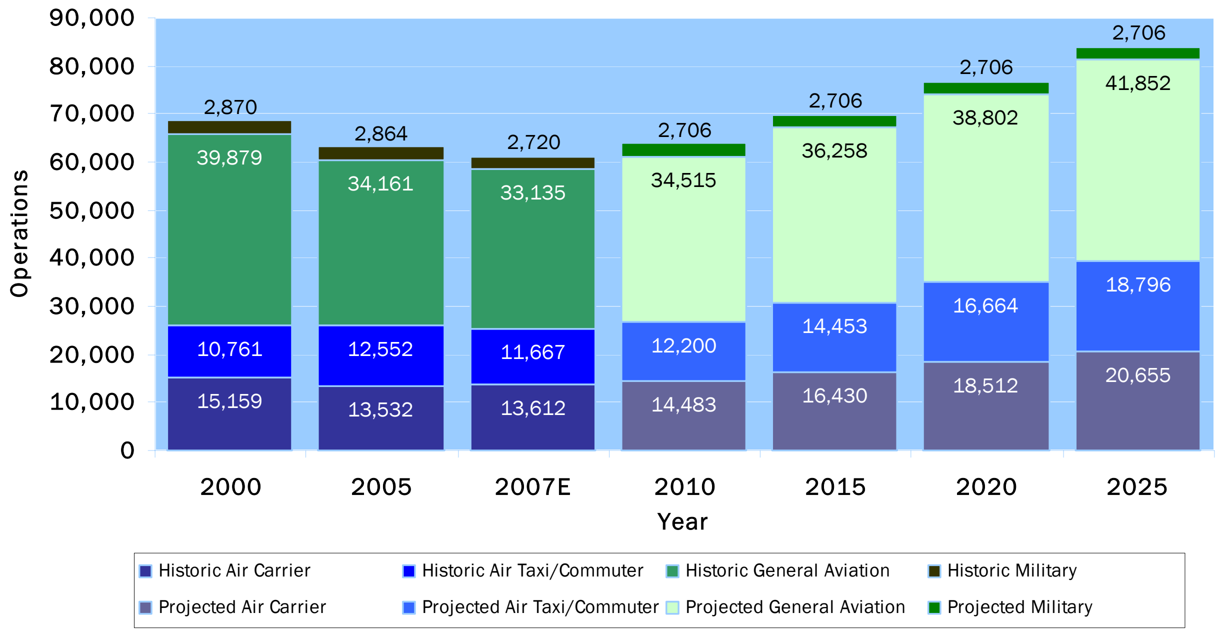
Figure 4-10: U.S. Active General Aviation Aircraft, Actual and Forecast

	Fixed Wing									
	Piston		*Turbine*		*Rotorcraft*					
Year	*Single-Engine*	*Multi-Engine*	*Turbo Prop*	*Turbo Jet*	*Piston*	*Turbine*	*Experimental*	*Sport*	*Other*	*Total Fleet*
2000	149,422	21,091	5,762	7,001	2,680	4,470	20,407	NA	6,700	217,533
2005	148,101	19,412	7,942	9,823	3,039	5,689	23,627	170	6,459	224,262
2007E	144,580	18,555	8,190	10,997	3,610	6,075	23,920	2,700	6,380	225,007
2010	144,015	18,055	8,565	14,220	4,725	6,575	26,285	5,600	6,510	234,550
2015	145,620	17,245	9,310	19,845	6,255	7,290	29,760	10,500	6,460	252,285
2020	150,035	16,455	10,110	24,900	7,295	7,915	32,625	13,200	6,405	268,940
2025	157,400	15,650	10,820	29,515	8,295	8,560	35,200	14,700	6,360	286,500
CAGR	0.5%	-0.9%	1.6%	5.6%	4.7%	1.9%	2.2%	9.9%	0.0%	1.4%

Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Notes: E=estimate, CAGR=Compound Average Growth Rate

Figure 4-11 shows forecasted operations at airports with either an FAA or contract air traffic control tower. Commercial and air taxi/commuter operations are projected to grow 2.3 and 2.7 percent annually, respectively. General aviation operations are projected to grow 1.3 percent per year and military operations are expected to stay flat.

Figure 4-11: Commercial and General Aviation Operations at Airports with FAA or Contract Towers, 2000-2007



Source: *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

Technology Trends

This section discusses the trends in new technology that have the largest potential to impact the future of aviation.

Very Light Jets

Other new, growing segments of the business aircraft fleet mix include business liners and very light jets (VLJ). Business liners are large business jets, such as the Boeing Business Jet and Airbus ACJ that are reconfigured versions of passenger aircraft flown by large commercial airlines. VLJs are a relatively new category of aircraft that includes aircraft like the Eclipse 500, HondaJet, and Cessna Mustang. These are small, single pilot, six-seat jets that cost substantially less than typical business jet aircraft and have been labeled as "personal jets."

VLJs represent a significant departure from the cost of previously available jet aircraft. The basic Cessna Citation Mustang is estimated to cost around $2.4 million. Figure 4-12 depicts some examples of VLJ aircraft and their general design concept.

As of October 2006, the Eclipse 500, Citation Mustang and Adam A-500 became the first VLJs to receive full Type Certification by the FAA. The first Eclipse 500 was delivered in January 2007 and Cessna Mustang deliveries are expected to begin in mid-2008. In addition to being one of the world's first certified VLJ, the Eclipse 500 was qualified by the FAA to noise levels below Stage 4 limits. Stage 4 noise limits are the most stringent in the industry, making the Eclipse 500 the quietest of the jets.

Figure 4-12: Examples of VLJ Aircraft

Sources: Cessna Aircraft Company, Eclipse Aviation, Embraer Press Room, and Honda

Business aviation is projected to experience substantial additional growth in the future. The *Honeywell Aerospace 2007 Business Aviation Outlook* projects that more than 7,600 new business aircraft will be delivered by 2012, excluding business liners and VLJs. It is important to note that, since the writing of this chapter (July 2008) and the publishing of this report (July 2009), Eclipse Aviation went out of business in February 2009 due to lack of funding and was only able to deliver 260 Eclipse 500 aircraft.

Several companies have tried on-demand jet service using VLJs to serve business travelers that are tired of the air carrier “hassle factor” at a reasonable cost. According to several on-demand operators of VLJ aircraft, four key features make airports attractive to on-demand operators and their clients:

- Fixed base operators that provide fuel and other supplies to aircraft operators.
- Availability of ground transportation such as taxi cab operators and rental cars.
- Close proximity to customer populations.
- Runways at least 4,000 feet long (with some exceptions based on airport elevation) with precise navigation and landing guidance.

With the demise of Eclipse, one of the largest VLJ on-demand operators, DayJet, also went out of business in early 2009. DayJet provided on-demand service to cities throughout Florida. Other on-demand operators have plans to initiate VLJ service in the future.

Although there have been several missteps, the future of the VLJ segment of the business aircraft market appears extremely promising. More than 13 percent of the traditional corporate flight departments knowledgeable about VLJs expressed a strong probability of purchasing these aircraft for their corporate fleets. The respondents indicated that VLJ purchases would be used by approximately 40 percent of the flight departments to replace turboprops, 20 percent to replace very light and light jets, and the remainder would represent additions to the corporate fleet.

Wide Area Augmentation System

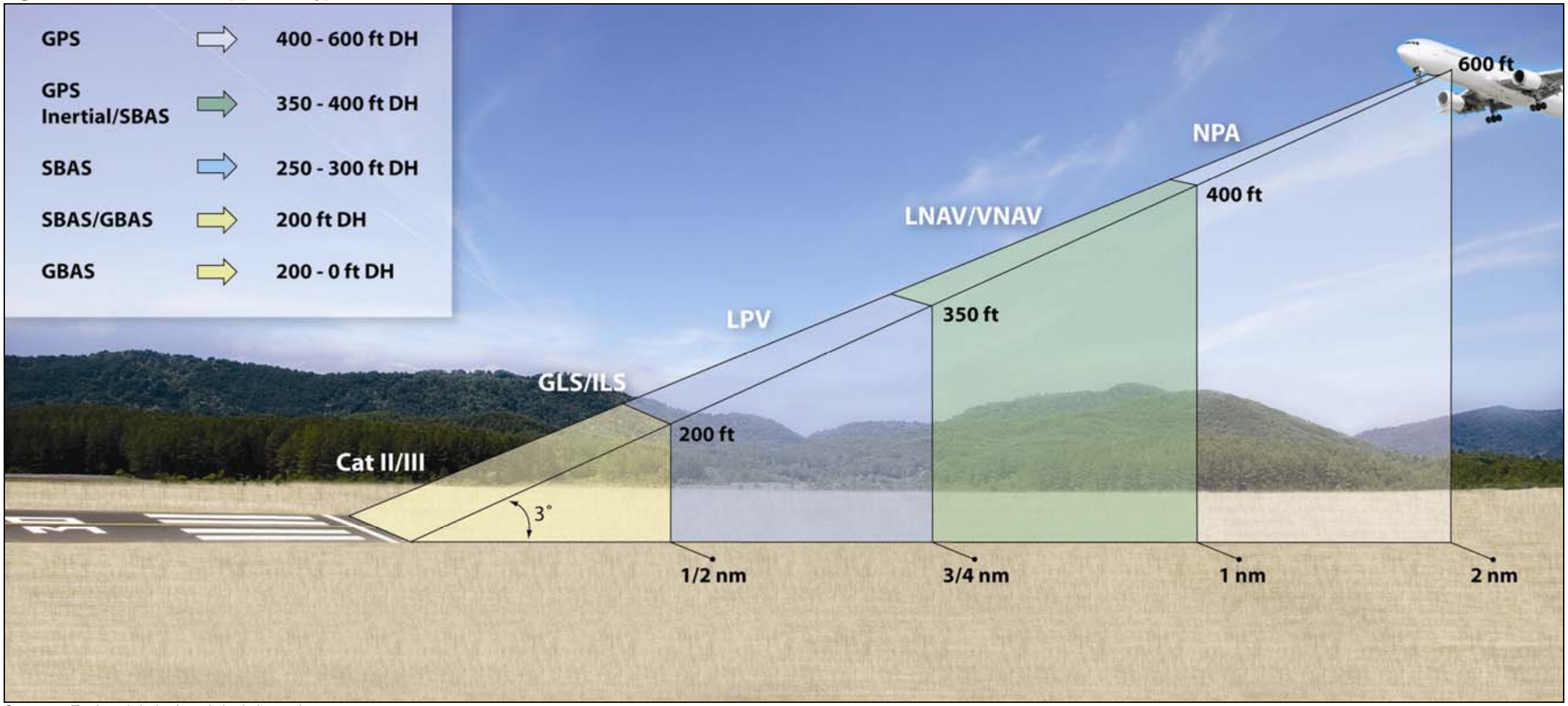
The Department of Transportation (DOT) and the Federal Aviation Administration (FAA) are developing the Wide Area Augmentation System (WAAS) for use in precision flight approaches. Currently, the Global Positioning System (GPS) alone does not meet the FAA's navigation requirements for accuracy, integrity, and availability. WAAS corrects for GPS signal errors caused by ionospheric disturbances, timing, and satellite orbit errors, and it provides vital integrity information regarding the health of each GPS satellite.

WAAS consists of approximately 25 ground reference stations positioned across the United States that monitor GPS satellite data. Two master stations, located on either coast, collect data from the reference stations and create a GPS correction message. This correction accounts for GPS satellite orbit and clock drift plus signal delays caused by the atmosphere and ionosphere. The corrected differential message is then broadcast through one of two geostationary satellites, or satellites with a fixed position over the equator. The information is compatible with the basic GPS signal structure, which means any WAAS-enabled GPS receiver can read the signal.

GPS NPA (LNAV) refers to a Non-Precision Approach (NPA) procedure which uses GPS and/or WAAS for Lateral Navigation (LNAV). On an LNAV approach, the pilot flies the final approach lateral course, but does not receive vertical guidance for a controlled descent to the runway. Instead, when the aircraft reaches the final approach fix, the pilot descends to a minimum descent altitude using the barometric altimeter. LNAV approaches are less precise and therefore usually do not allow the pilot to descend to as low an altitude above the runway. Typically, LNAV procedures achieve a minimum descent altitude (MDA) of 400 feet height above the runway. LNAV/VNAV (Lateral Navigation/Vertical Navigation) approaches use lateral guidance from GPS and/or WAAS and vertical guidance provided by either the barometric altimeter or WAAS. Aircraft that don't use WAAS for the vertical guidance portion must have VNAV-capable altimeters, which are typically part of a flight management system (FMS). FMS avionics are more expensive than WAAS receivers. When the pilot flies an LNAV/VNAV approach lateral and vertical guidance is provided to fly a controlled descent, a safer maneuver, to the runway. The decision altitudes on these approaches are usually 350 feet above the runway.

LPV (Localizer Performance with Vertical guidance) is similar to LNAV/VNAV except it is much more precise, enables descent to 200-250 feet above the runway, and can only be flown with a WAAS receiver. LPV approaches are operationally equivalent to the legacy instrument landing systems (ILS) but are more economical because no navigation infrastructure has to be installed at the runway. Figure 4-13 summaries the various approaches and their associated minimums.

Figure 4-13: Instrument Approach Types



Source: Federal Aviation Administration
Notes: *GPS (Global Position Satellites), SBAS (Satellite Based Approach Systems), GBAS (Ground Based Approach Systems)

These WAAS approaches should be considered the same as conventional precision approaches from an airport infrastructure perspective. There were over 675 LPV approaches in use as of May 2007 and the FAA is publishing 300 new LPV approaches per year.

It is the intent of the FAA to put LPV approaches with 200-foot decision altitudes and as low as ½ statute miles visibility where the airport infrastructure and environment can accommodate it. The next steps in the LPV evolution are summarized below:

- Current:
  - CAT I ILS is limited to 200' HAT (height above threshold) and ½ mile visibility
  - LPV is limited to 250' HAT and ¾ mile visibility
- Next Steps:
  - If airport's ILS has 200' and ½ mile minimums, and
  - Has RNAV (GPS) of 250' and ¾ mile visibility, then
  - The airport is a candidate for LPV to 200' and ½ miles minimums.

STATE TRENDS IMPACTING AVIATION

Arizona's Historic and Current Scheduled Commercial Service

The FAA classifies 12 airports in Arizona as Primary Commercial Service or Commercial Service airports. As noted in Chapter Three, "Primary Commercial Service Airports" enplane over 10,000 passengers per year while "Commercial Service Airports" enplane at least 2,500 passengers per year. The airports in Arizona support a variety of commercial service passengers and offer different levels and types of commercial service beyond the FAA classifications. In the *Arizona Rural Air Service Study Update 2005*, the airports in Arizona were classified into the categories based on the size of the community they serve. **Figure 4-14** presents the commercial service airports in Arizona by FAA and System Plan category.

Figure 4-14: Arizona's Commercial Service Airports by Category, 2008

Category / *Airport*	*FAA Primary Commercial Service*	*FAA Commercial Service*
Large Community Airports (3)		
Phoenix Sky Harbor International	X	
Phoenix-Mesa Gateway Airport	X	
Tucson International Airport	X	
Small Community Airports (3)		
Flagstaff Pulliam Airport	X	
Laughlin/Bullhead City International Airport	X	
Yuma International Airport	X	
Rural/Essential Air Service Airports (4)		
Ernest A. Love Field		X
Kingman Airport		X
Page Municipal Airport	X	
Show Low Regional Airport		X
Air Tour-Only Airports (2)		
Grand Canyon National Park Airport	X	
Grand Canyon West Airport	X	

Sources: FAA National Plan of Integrated Airport System, 2005 *Arizona Rural Air Service Study Update*, Wilbur Smith Associates

Air Tours

Grand Canyon National Park and Grand Canyon West airports serve an important role in supporting tourism in the state. There are several tour operators that fly both fixed wing aircraft and rotorcraft out of these airports, as well as Page Municipal Airport. Only Scenic Airlines, which serves Grand Canyon National Park and Grand Canyon West airports, reports a limited number of its flights to the *Official Airline Guide* that are considered "scheduled operations." Figure 4-15 summarizes air tour operators that serve Grand Canyon National Park, Grand Canyon West, and Page Municipal airports. It was also noted in the inventory effort that Grand Canyon Commercial Outfitters uses Grand Canyon Bar Ten Airport as a drop for Colorado River rafting expeditions on a limited basis.

Figure 4-15: Unscheduled Airlines Providing Northern Arizona Air Tours, 2007

Grand Canyon National Park	*Grand Canyon West*	*Page Municipal*
Air Grand Canyon	Scenic/Grand Canyon Airlines	American
Allegiant Air	Vision	Grand Canyon Airlines
Grand Canyon Airlines	Sundance	Westwind
Grand Canyon Helicopters	Papillon Helicopters	
Maverick Air Star		
Papillon Helicopters		
Scenic		
Vision		
Westwind		

Source: Airport Management Records

Scheduled Historic Service Trends

Figure 4-16 details the level of scheduled commercial airline service provided at airports in Arizona. Between the summers of 2003 and 2008, four airports in Arizona lost scheduled commercial service. Service between Sierra Vista and Phoenix Sky Harbor ended February 2007 and America West Express carrier, Air Midwest, pulled service at Lake Havasu City to Phoenix Sky Harbor in May 2007. In May 2008, Air Midwest also ceased operations at Prescott and Kingman. However, these two airports are guaranteed scheduled commercial service as part of the U.S. DOT's Essential Air Service program. Great Lakes Airlines has been chosen to replace Air Midwest and has announced that service will begin at Prescott in September 2008. Horizon Air also plans to begin service at Prescott in September 2008 with daily service to Los Angeles. Great Lakes service to Kingman has not been announced, as of the writing of this chapter.

New scheduled commercial service began at Phoenix Mesa Gateway in 2007. Allegiant Airlines announced that the airport would be a new focus city. Allegiant provides several weekly flights to destinations in the Midwest U.S.

Figure 4-16: Summary of Scheduled Commercial Aviation Activity at Arizona Airports Summer 2003 vs. Summer 2008

Category	*No. of Carriers*		*Destin. Served Nonstop*		*Weekly Scheduled Departures*		*Weekly Scheduled Seats*		*Avg. Seats Per Flight*	
Airport	*2003*	*2008*	*2003*	*2008*	*2003*	*2008*	*2003*	*2008*	*2003*	*2008*
Large Community										
Phoenix-Sky Harbor	23	25	105	103	4,816	4,193	574,061	525,606	119	125
Phoenix-Mesa Gateway	0	1	0	8**	0	16**	0	2,400	NA	150
Tucson International	12	15	17	26	484	551	47,871	54,558	99	99
Small Community										
Flagstaff-Pulliam	1	2	1	2	32	53	1,184	2,440	37	46
Laughlin/Bullhead City	1	1	4	4	4	4	720	648	180	162
Yuma International	2	3	2	3	54	77	1,851	2,814	34	37
Rural/EAS										
Ernest A. Love Field	1	0	2	0	36	0	684	0	19	NA
Kingman	1	0	1	0	18	0	342	0	19	NA
Page Municipal	1	1	2	1	26	21	494	399	19	19
Show Low Regional	1	1	1	2	14	26	126	494	9	19
Lake Havasu City	1	0	1	0	24	0	456	0	19	NA
Sierra Vista Municipal/LAA	1	0	1	0	11	0	99	0	9	NA
Air Tour Only Airports										
Grand Canyon National Park	1	1	1	1	5	5	45	45	9	9
Grand Canyon West*	0	0	0	0	0	0	0	0	0	0
TOTAL	**25**	**30**	**112**	**120**	**5,524**	**4,946**	**627,933**	**589,404**	**114**	**119**

Source: *Official Airline Guide*
Notes: *Scenic Airlines only provided scheduled service at Grand Canyon West between October 2007 and June 2008; **In November 2008, Phoenix-Mesa Gateway had nonstop service to 15 destinations and an average of 34 to 42 weekly scheduled departures; Non-scheduled carrier service at Grand Canyon National Park, Grand Canyon West, and Page Municipal is not included in table.

Between 2003 and 2008, airports in Arizona gained service from five new air carriers, to a total of 30. Phoenix Sky Harbor offers service from 25 of these carriers, and Tucson offers service from 15. As of 2008, airports in Arizona offered nonstop service to 120 destinations in the United States, Canada, Central America, and Europe, an increase from 112 in 2003. Phoenix Sky Harbor offers nonstop service to 103 of these destinations.

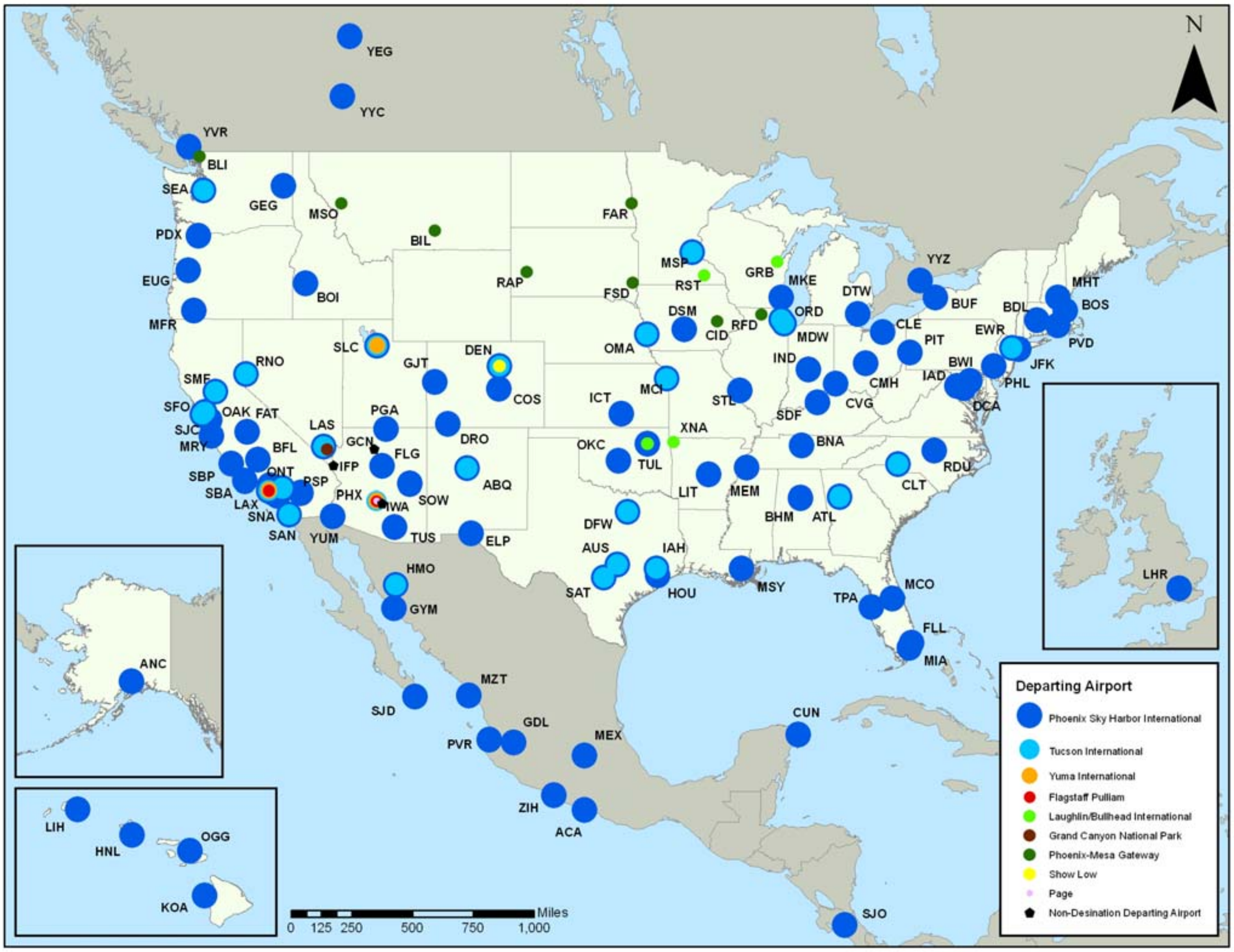
Both weekly scheduled departures and weekly scheduled seats have decreased for the state as a whole. From 2003 to 2008, scheduled departures decreased from 5,524 to 4,946, a loss of 10.5 percent. Weekly scheduled seats decreased from 627,933 to 589,404, a loss of 6.1 percent over the five-year period. Most of this loss in departures and capacity occurred between 2007 and 2008.

Phoenix Sky Harbor and Tucson International account for the vast majority of scheduled departures and seats in the state, with Sky Harbor accounting for 87 percent of departures and 91 percent of seats, and Tucson accounting for an additional nine percent of departures and eight percent of seats. Average seats per flight increased slightly from 114 to 119, as service was discontinued at several markets utilizing smaller turboprop aircraft and airlines overall shifting from smaller regional jets to larger ones.

Scheduled Commercial Service Destinations

Figure 4-17 displays nonstop scheduled commercial service destinations departing from airports in Arizona as of summer 2008. In total, there are 110 out-of-state destinations available to passengers departing from Arizona. Sixteen of these destinations are international, including four destinations in Canada, 10 in Mexico, and one each in Costa Rica and Great Britain. The vast majority of nonstop destinations are from Phoenix Sky Harbor and Tucson International. Yuma International, Flagstaff Pulliam, Show Low Regional, and Page Municipal airports all connect directly to Phoenix, making these further destinations readily accessible to these passengers.

Figure 4-17: Scheduled Nonstop Destinations from Arizona Airports



Source: *Official Airline Guide*

Figure 4-18 lists these scheduled nonstop destinations in detail.

Figure 4-18: Scheduled Nonstop Commercial Service Destinations from Arizona Airports, Summer 2008

Code	Airport Name	St/Ctry	Code	Airport Name	St/Ctry	Code	Airport Name	St/Ctry
PHOENIX SKY HARBOR INTERNATIONAL AIRPORT								
ABQ	Albuquerque	NM	GYM	Guymas	Mexico	ORD	Chicago-O'Hare	IL
ACA	Acapulco	Mexico	HMO	Hermosillo	Mexico	PDX	Portland	OR
ANC	Anchorage	AK	HNL	Honolulu	HI	PGA	Page	AZ
ATL	Atlanta	GA	HOU	Houston- Hobby	TX	PHL	Philadelphia	PA
AUS	Austin	TX	IAD	Washington- Dulles	DC	PIT	Pittsburgh	PA
BDL	Hartford- Bradley	CT	IAH	Houston- Bush	TX	PSP	Palm Springs	CA
BFL	Bakersfield	CA	ICT	Wichita	KS	PVD	Providence	RI
BHM	Birmingham	AL	IND	Indianapolis	IN	PVR	Puerto Vallarta	Mexico
BNA	Nashville	TN	JFK	New York- JFK	NY	RDU	Raleigh- Durham	NC
BOI	Boise	ID	KOA	Kona	HI	RNO	Reno	NV
BOS	Boston	MA	LAS	Las Vegas	NV	SAN	San Diego	CA
BUF	Buffalo	NY	LAX	Los Angeles	CA	SAT	San Antonio	TX
BUR	Burbank	CA	LGB	Long Beach	CA	SBA	Santa Barbara	CA
BWI	Baltimore	MD	LHR	London-Heathrow	England	SBP	San Luis Obispo	CA
CLE	Cleveland	OH	LIH	Lihue	HI	SDF	Louisville	KY
CLT	Charlotte	NC	LIT	Little Rock	AR	SEA	Seattle	WA
CMH	Columbus	OH	MCI	Kansas City	MO	SFO	San Francisco	CA
COS	Colorado Springs	CO	MCO	Orlando	FL	SJC	San Jose	CA
CUN	Cancun	Mexico	MDW	Chicago- Midway	IL	SJD	Los Cabos	Mexico
CVG	Cincinnati	OH	MEM	Memphis	TN	SJO	San Jose	Costa Rica
DCA	Washington-Reagan	DC	MEX	Mexico City	Mexico	SLC	Salt Lake City	UT
DEN	Denver	CO	MFR	Medford	OR	SMF	Sacramento	CA
DFW	Dallas/Ft. Worth	TX	MHT	Manchester, NH	NH	SNA	Orange County	CA
DRO	Durango	CO	MIA	Miami	FL	SOW	Show Low	AZ
DSM	Des Moines	IA	MKE	Milwaukee	WI	STL	St. Louis	MO
DTW	Detroit	MI	MRY	Monterey	CA	TPA	Tampa	FL
ELP	El Paso	TX	MSP	Minneapolis/St. Paul	MN	TUL	Tulsa	OK
EUG	Eugene	OR	MSY	New Orleans	LA	TUS	Tucson	AZ
EWR	Newark	NY	MZT	Mazatlan	Mexico	YEG	Edmonton	Canada
FAT	Fresno	CA	OAK	Oakland	CA	NYL	Yuma	AZ
FLG	Flagstaff	AZ	OGG	Kahului	HI	YVR	Vancouver	Canada
FLL	Ft. Lauderdale	FL	OKC	Oklahoma City	OK	YYC	Calgary	Canada
GDL	Guadalajara	Mexico	OMA	Omaha	NE	YYZ	Toronto	Canada
GEG	Spokane	WA	ONT	Ontario	CA	ZIH	Ixtapa/Zihuatanejo	Mexico
GJT	Grand Junction	CO						
TUCSON INTERNATIONAL AIRPORT								
SAT	San Antonio	TX	IAH	Houston- Bush	TX	ORD	Chicago-O'Hare	IL
ABQ	Albuquerque	NM	LAS	Las Vegas	NV	PHX	Phoenix	AZ
ATL	Atlanta	GA	LAX	Los Angeles	CA	RNO	Reno	NV
AUS	Austin	TX	MCI	Kansas City	MO	SAN	San Diego	CA
CLT	Charlotte	NC	MDW	Chicago- Midway	IL	SEA	Seattle	WA
DEN	Denver	CO	MSP	Minneapolis/St. Paul	MN	SFO	San Francisco	CA
DFW	Dallas/Ft. Worth	TX	OAK	Oakland	CA	SLC	Salt Lake City	UT
EWR	Newark	NY	OMA	Omaha	NE	SMF	Sacramento	CA
HMO	Hermosillo	Mexico	ONT	Ontario	CA			
PHOENIX MESA GATEWAY								
BIL	Billings	MT	FAR	Fargo	ND	RAP	Rapid City	SD
BLI	Bellingham	WA	FSD	Sioux Falls	SD	RFD	Rockford	IL
CID	Cedar Rapids	IA	MSO	Missoula	MT			

Figure 4-18: Scheduled Nonstop Commercial Service Destinations from Arizona Airports, Summer 2008 (Continued)

Code	Airport Name	St/Ctry	Code	Airport Name	St/Ctry	Code	Airport Name	St/Ctry
LAUGHLIN-BULLHEAD CITY			YUMA INTERNATIONAL			FLAGSTAFF-PULLIAM		
GRB	Green Bay	WI	LAX	Los Angeles	CA	LAX	Los Angeles	CA
RST	Rochester	MN	PHX	Phoenix	AZ	PHX	Phoenix	AZ
TUL	Tulsa	OK	SLC	Salt Lake City	UT			
XNA	Fayetteville	AR						
SHOW LOW REGIONAL			ERNEST A. LOVE FIELD*			KINGMAN*		
PHX	Phoenix	AZ	LAX	Los Angeles	CA	ONT	Ontario	CA
DEN	Denver	CO	PHX	Phoenix	AZ			
PAGE MUNICIPAL			GRAND CANYON NATIONAL PARK					
PHX	Phoenix	PHX	BLD	Boulder City	NV			

Source: *Official Airline Guide*
Note: *Ernest A. Love Field and Kingman did not have scheduled air service in Summer 2008. Horizon introduced service Prescott and Los Angeles and Great Lakes began service to Ontario and Phoenix in September 2008. Great Lakes reintroduced service to Kingman in April 2009.

Enplanement Trends at Arizona Airports

The 2005 *Arizona Rural Air Service Study Update* provides historic enplanements at Arizona airports for years 1997 and 2002. Enplanements for 2007 and monthly data for 2008 were collected from the airports as part of this study. As shown in **Figure 4-19**, over the 10- year period, scheduled commercial service enplanements in Arizona grew at an average annual rate of 2.1 percent. Phoenix Sky Harbor, with a growth rate of 2.4 percent per year, gained nearly four million additional enplanements from 1997 to 2007. Enplanements at Tucson International grew at an average annual rate of 0.7 percent and gained over 100,000 enplanements over the 10-year period. In 1997, Phoenix Sky Harbor accounted for 85 percent of the total statewide enplanements. That share grew over the 10-year period to 90 percent of the statewide total. The enplanement share of Tucson International dropped from 10 percent to nearly nine percent. The statewide growth rate over the 10-year period was below the national growth rate of 2.5 percent annually.

Figure 4-19: Historic Commercial Service Enplanements at Arizona Airports, 1997-2007

Category *Airport*	*1997*	*2002*	*2007*	*CAGR* *1997-2007*
Large Community				
Phoenix Sky Harbor International	15,404,953	17,613,420	19,551,148	2.4%
Phoenix-Mesa Gateway	0	0	2,817	NA
Tucson International	1,769,476	1,761,058	1,890,195	0.7%
Small Community				
Laughlin/Bullhead International	64,064	90,510	106,347	5.2%
Flagstaff Pulliam	47,059	38,455	38,600	-2.0%
Yuma International Airport	76,969	52,680	63,426	-1.9%
Rural/EAS				
Sierra Vista Municipal/LAA	11,836	2,087	2,400	-14.8%
Kingman	1,559	2,432	2,602	5.3%
Lake Havasu City	11,854	7,361	9,234	-2.5%
Page*	3,801	3,758	5,298	3.4%
Ernest A. Love Field	10,043	6,377	7,889	-2.4%
Show Low Regional	1,300	2,418	6,433	17.3%
SCHEDULED SERVICE TOTAL	17,402,914	19,580,556	21,686,389	2.2%
Air Tour Only				
Grand Canyon National Park	533,567	330,980	240,651	-7.7%
Grand Canyon West	0	16,570	21,337	NA
Page Municipal	7,897	9,748	24,378	11.9%
AIR TOUR TOTAL	541,464	357,298	286,366	-6.2%
ARIZONA GRAND TOTAL	17,944,378	19,937,854	21,972,755	2.1%
UNITED STATES TOTAL	595,300,000	626,300,000	764,700,000	2.5%

Source: *Arizona Rural Air Service Study Update 2005*, *Airport Inventory & Data Survey 2008*
Notes: *Includes enplanements on scheduled flights only; Airports with 1997 and 2002 enplanements noted as "NA" are new service since 2002; CAGR=Compound Annual Growth Rate

Domestic Origin and Destination (O&D) Trends

Domestic Origin and Destination (O&D) activity refers to passenger enplanements originating from an airport, and does include connecting passengers. Figure 4-20 displays Arizona's share of national passenger traffic. Arizona's share has fluctuated around 3 percent of the national total. During the last 10 years, O&D passengers at Arizona airports grew 2.04 percent per year on average, while all passengers at airports nationwide grew at a slightly higher average annual rate of 2.32 percent. Most of this growth occurred from 2002 to 2007, nearly five percent annually both in Arizona and nationally, while Arizona and national O&D traffic experienced a decline in passengers from 1997 to 2002 following the economic downturn and events of September 11, 2001. In 2007, O&D passenger traffic was the highest in both Arizona and the U.S. than it had been from 1997 to 2007.

Figure 4-20: Domestic Outbound O&D Passengers, All Arizona Airports and All U.S. Airports, 1997-2007

Year	*Arizona Total*	*U.S. Total*	*AZ as % of U.S. Total*
1997	11,707,680	378,470,830	3.09%
1998	11,569,950	380,740,210	3.04%
1999	11,998,390	397,030,970	3.02%
2000	12,455,660	413,064,780	3.02%
2001	11,695,380	384,670,650	3.04%
2002	11,397,190	373,840,910	3.05%
2003	12,122,180	398,742,200	3.04%
2004	13,068,690	434,868,840	3.01%
2005	13,717,970	458,524,610	2.99%
2006	14,148,530	461,580,390	3.07%
2007	14,333,770	475,869,320	3.01%
Compound Annual Growth Rate			
1997-2002	-0.54%	-0.25%	
2002-2007	4.69%	4.94%	
1997-2007	2.04%	2.32%	

Source: U.S. DOT, *O&D Survey*

The Essential Air Service (EAS) Program in Arizona

Several Arizona airports participate in the federal government's Essential Air Service (EAS) program which supports air service in smaller markets. In an effort to ensure that small communities would not bear an unfair burden from the Airline Deregulation Act, the U.S. government established the EAS program. The program was established to keep small communities connected to the nationwide air transportation network.

The US DOT, which oversees the EAS program, determines the level of air service required in terms of a minimum number of round trips and available seats that must be provided to that hub, characteristics of the aircraft to be used, and the maximum permissible number of intermediate stops to the hub. Market dynamics for small communities are such that extra financial incentives are sometimes required in order to secure scheduled air service. The US DOT provides this incentive in the form of subsidy funding to commercial air carriers through the EAS program. Once selected, carriers serving an EAS community are typically authorized to receive subsidy funding for two years.

The EAS eligibility requirements are as follows:

- Airports must have received scheduled commercial passenger service as of October 1978
- Airports may not be closer than 70 miles to a medium- or large-hub airport (Phoenix Sky Harbor, Las Vegas McCarran).
- Subsidy requirements per passenger enplaned must be less than $200 unless the airport is more than 210 highway miles from the nearest medium- or large-hub airport.

Carriers serving Kingman, Page Municipal, Prescott- Ernest A. Love, and Show Low Regional currently receive EAS subsidies. It is important to note that Show Low Regional did not have air service prior to 1978 and was granted special permission to enter the program in 1990s when the community agreed to pay 50 percent compensation for service. The compensation requirement was lifted in 1999 and the US DOT now pays the entire subsidy amount. Great Lakes Airlines serves all four Arizona communities under the EAS program using the 19-seat Beechcraft 1900D aircraft. Total annual subsidy for all four communities is $4.28 million.

Air Cargo in Arizona

Overview of Air Cargo in Arizona

This section presents an overview of air cargo activity at Arizona airports. As discussed previously in this chapter, air cargo services are provided by several types of carriers that are differentiated by the services they offer for a wide range of customer demands. Airports in Arizona provide the five segments of the air cargo industry discussed previously:

- Integrated express operators
- All-cargo carriers
- Commercial service passenger airlines
- Freight forwarders
- On-demand/Ad-hoc cargo charter carriers

Facilities Supporting Scheduled and Unscheduled Air Cargo Operations

Eight Arizona airports supported scheduled air cargo operations for integrated express and all-cargo carriers in 2007. These airports act as local market stations, serving their respective surrounding market areas, or as consolidation points for feeder aircraft and trucks. Arizona's scheduled service air cargo airports include:

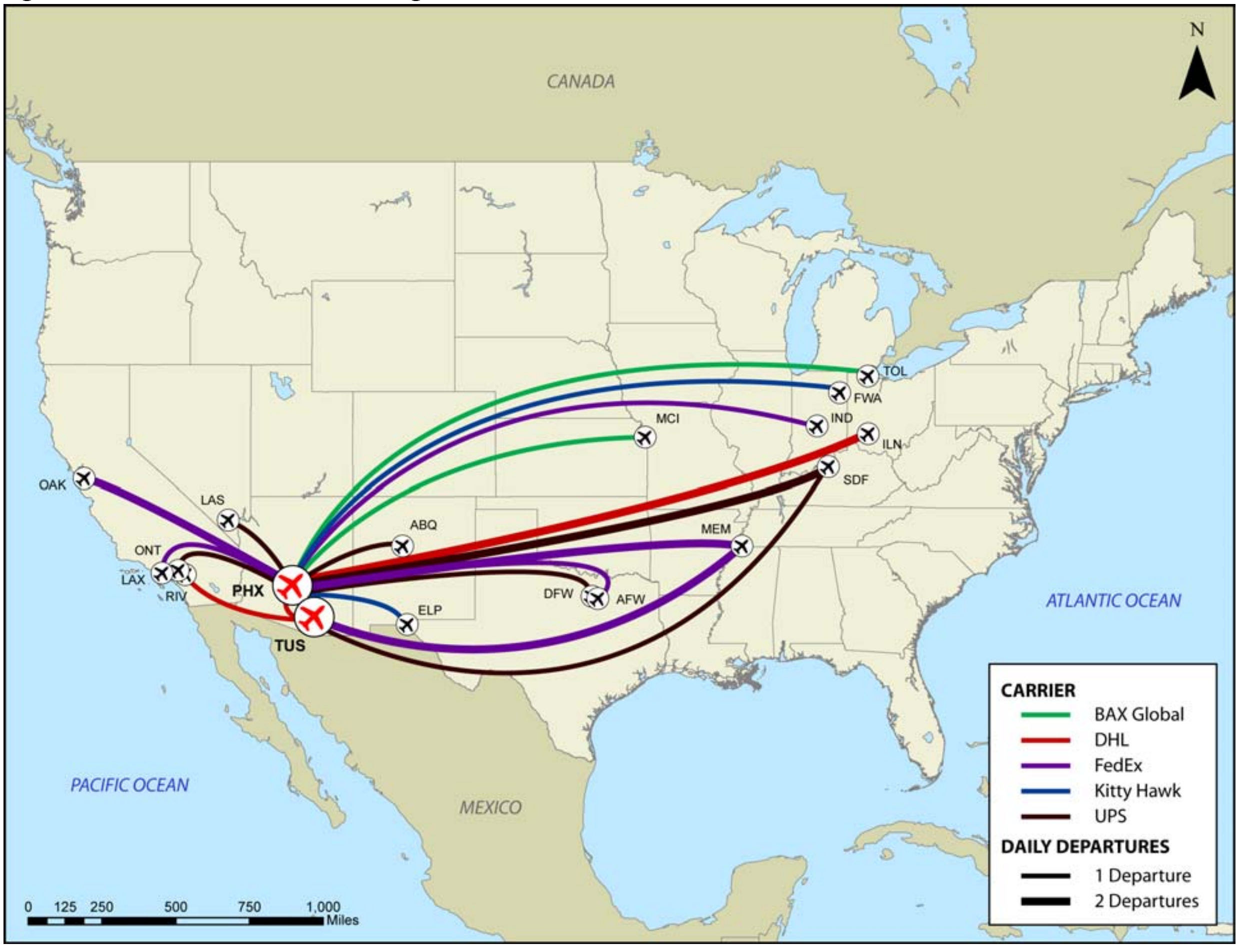
- Ernest A. Love Field (PRC)
- Flagstaff Pulliam Airport (FLG)
- Lake Havasu City Municipal Airport (HII)
- Sierra Vista Municipal Airport/Libby Army Airfield (FHU)
- Phoenix Sky Harbor International Airport (PHX)
- Tucson International Airport (TUS)
- Show Low Regional (SOW)
- Yuma International Airport (NYL)

Two Arizona airports support air cargo activity via scheduled commercial passenger service only. Page Municipal Airport (PGA) and Bullhead City Airport (IFP) do not have scheduled integrated express, all-cargo, or ad-hoc cargo activity. The 10 Arizona commercial service airports supporting air cargo activity via scheduled passenger operations are:

- Ernest A. Love Field (PRC)
- Flagstaff Pulliam Airport (FLG)
- Kingman Airport (IGM)
- Lake Havasu City Municipal Airport (HII)
- Bullhead City Airport (IFP)
- Page Municipal Airport (PGA)
- Phoenix Sky Harbor International Airport (PHX)
- Tucson International Airport (TUS)
- Show Low Regional (SOW)
- Yuma International Airport (NYL)

Figure 4-21 details the scheduled mainline or hub routes serving Phoenix Sky Harbor International and Tucson International for both the integrated express carriers and scheduled all-cargo carriers.

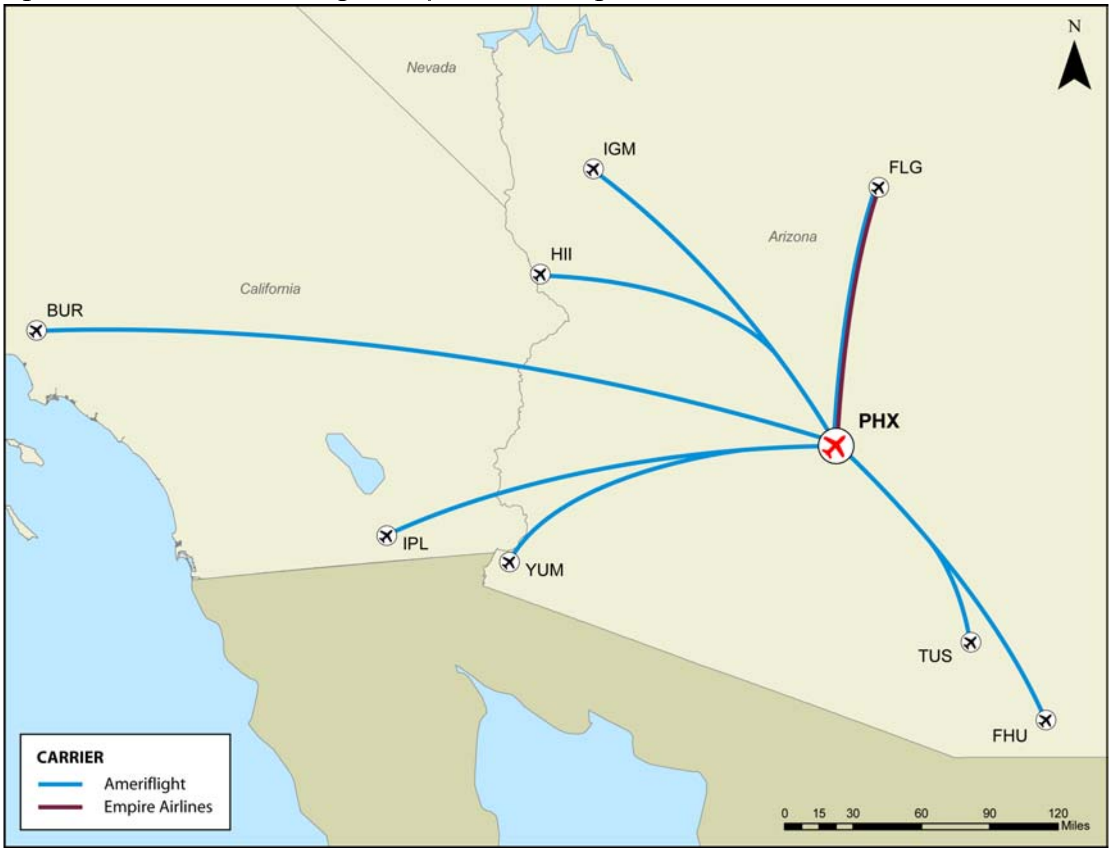
Figure 4-21: Mainline Hub Network Serving PHX and TUS, 2007



Source: *Arizona Multimodal Freight Analysis Study*, 2007

Figure 4-22 details the Arizona feeder routes serving both intrastate and interstate markets. Note that all of the feeder aircraft flying for the integrated express carriers are contract carriers. Though they fly scheduled routes for FedEx, UPS, and DHL, they are often listed as charter flights because they are not owned or operated by the respective integrated express carrier for which they are flying.

Figure 4-22: Feeder Network - Integrated Express and All-Cargo Carriers, 2007



Source: *Arizona Multimodal Freight Analysis Study*, 2007

General Aviation in Arizona

Information on current and historic general aviation based aircraft/registered aircraft and general aviation operations in Arizona are presented in the following section. Airport activity data provides a good indication of not only the total amounts of activity occurring, but also recent increases or declines in activity levels.

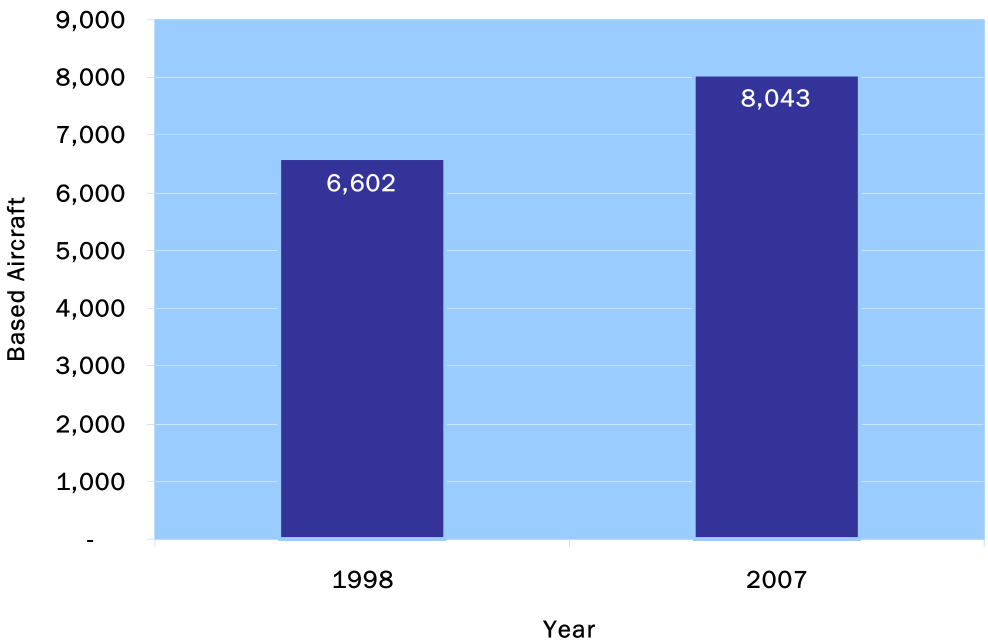
General aviation is not subject to as stringent federal reporting requirements as is commercial aviation. General aviation data and statistics are therefore not as widely available as commercial service data. Airports with air traffic control towers keep constant counts on all general aviation activity. For Arizona's system of airports, historic based aircraft and general aviation operations levels were obtained from the Arizona State Aviation Needs Study 2000 conducted by the Arizona Department of Transportation. Current based aircraft and operations were obtained through the 2008 Airport Inventory and Data Survey conducted as part of this plan. Airport managers were provided with inventory surveys and were asked to fill them out prior to on-site visits. For the fourteen Arizona airports with air traffic control towers, operations levels were obtained through FAA records. The FAA also tracks registered aircraft and these data were used as a resource for the analysis.

Based Aircraft

Figure 4-23 presents historic and current based aircraft for Arizona's airport system. Based aircraft are general aviation aircraft that are permanently stored at an airport either in hangars or on tie-down spaces. Based aircraft numbers frequently fluctuate based on a number of factors including seasonality, pilot preferences, on-airport aviation services, and the availability of storage units.

Total based aircraft in Arizona's airport system were recorded as 6,602 in 1998 *Arizona State Aviation Needs Study 2000*. From 1998 to 2007, this number grew to 8,043, as reported by the airports in the inventory effort of this study. This represents a total increase of 22 percent. The compound annual growth rate of this growth is 1.99 percent.

Figure 4-23: Based Aircraft in Arizona, 1998 & 2007

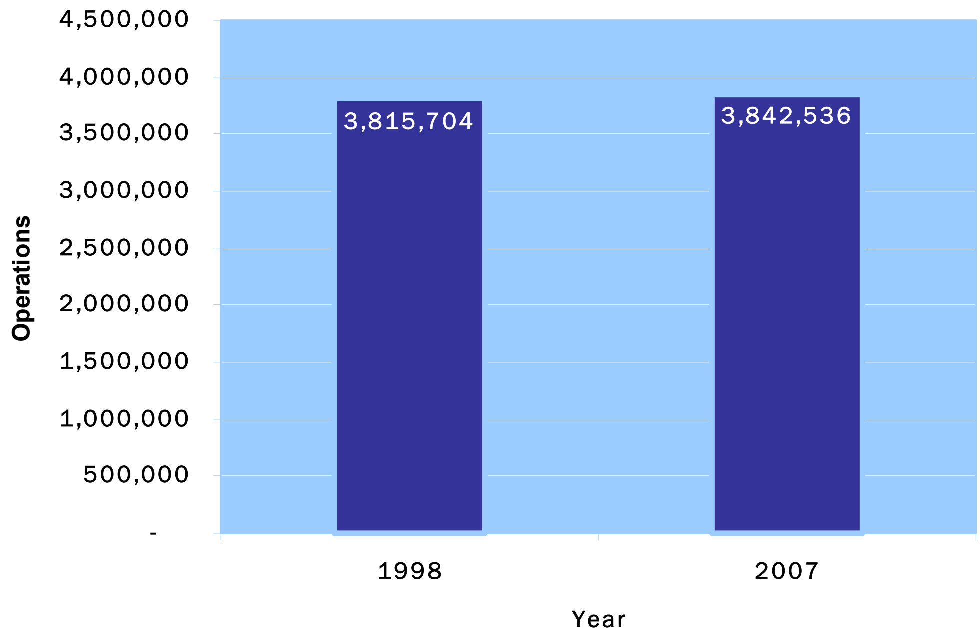


Source: *Airport Inventory & Data Survey* 2008, *Arizona State Aviation Needs Study 2000*
Note: Does not include military aircraft

General Aviation Operations

Aircraft operations represent landings and takeoffs at individual airports. Historic general aviation operations data for Arizona's system airports are shown in Figure 4-24. Total general aircraft operations at system airports in 1998 were approximately 3.81 million. From 1998 to 2007 this increased to over 3.84 million, a total gain of 0.7 percent, and a compound annual growth rate of 0.08 percent. By comparison, from 2000 to 2007, total general aviation operations nationwide declined by a total of 11.2 percent, an annual average of -1.7 percent. This emphasizes how general aviation in Arizona has shown more growth than the country as a whole. Cargo operations and air taxi operations (non-air tours) are included in the general aviation category for the purpose of this system plan.

Figure 4-24: General Aviation Operations in Arizona, 1998 & 2007



Source: *Airport Inventory & Data Survey* 2008, *Arizona State Aviation Needs Study 2000*, ATADS 2008

Registered Aircraft in Arizona

For the Arizona State Airports System Plan, 2007 based aircraft figures were derived from the airports during the inventory effort. This data differs from the active registered aircraft data compiled by the Arizona DOT Aeronautics Division as well as that compiled by the FAA. These differences may be due to a variety of reasons, including the definition of “active aircraft,” the address of the registered aircraft owner versus where aircraft is based, as well as other reasons. FAA and ADOT data is presented here for comparison purposes only. Figure 4-25 presents a compilation of System Plan, ADOT, and FAA data by county for the based aircraft data.

Figure 4-25: Registered Aircraft in Arizona by County, 2007

	SASP		ADOT		FAA	
Base County	*Based Aircraft*	*% of Total*	*Active Aircraft*	*% of Total*	*Registered Aircraft*	*% of Total*
Maricopa	4,499	56.2%	3,619	51.8%	5,314	53.8%
Pima	1,024	12.8%	946	13.6%	1,391	14.1%
Yavapai	530	6.6%	548	7.9%	738	7.5%
Mohave	578	7.2%	366	5.2%	569	5.8%
Pinal	267	3.3%	280	4.0%	377	3.8%
Cochise	247	3.1%	235	3.4%	307	3.1%
Yuma	178	2.2%	195	2.8%	276	2.8%
Coconino	280	3.5%	191	2.7%	271	2.7%
Navajo	109	1.4%	130	1.9%	187	1.9%
Gila	133	1.7%	89	1.3%	130	1.3%
La Paz	42	0.5%	87	1.2%	139	1.4%
Apache	42	0.5%	37	0.5%	57	0.6%
Graham	41	0.5%	36	0.5%	61	0.6%
Santa Cruz	35	0.4%	21	0.3%	45	0.5%
Greenlee	2	0.0%	2	0.0%	7	0.1%
Unknown	-	0.0%	198	2.8%	-	0.0%
TOTAL	8,043	100.0%	6,980	100.0%	9,869	100.0%

Sources: FAA AIRPAC, ADOT ASM database
Note: Does not include military aircraft

Figure 4-26 presents registered aircraft by type in Arizona and the U.S. as a whole according to FAA records. In the U.S., there were 353,232 total registered aircraft in 2007. Arizona had a total of 9,869 registered aircraft, representing 2.8 percent of total U.S. registered aircraft. Each aircraft type represents a similar share of the fleet in Arizona as it does in the U.S. as a whole. Some, such as piston twin aircraft or balloons, are a slightly higher percentage in Arizona, and turboprop aircraft are a smaller percentage in Arizona than nationally, but the fleet mix is overall very comparable.

Figure 4-26: Registered Aircraft in the United States and Arizona by Type, 2007

Aircraft Type	*United States*	*Arizona*	*% of U.S. Total*
Single Engine	224,040	6,408	2.86%
Other	48,980	1,404	2.87%
Piston Twin	17,856	687	3.85%
Balloon	9,203	380	4.13%
Business Jet	12,209	194	1.59%
Piston Helicopter	6,150	200	3.25%
Glider	6,293	213	3.38%
Turbo Prop	15,321	163	1.06%
Turbine Helicopter	6,361	123	1.93%
Commercial	6,819	97	1.42%
TOTAL	353,232	9,869	2.79%

Source: FAA AIRPAC

Regional Demographics

Aviation activity is directly related to the size and economics of an area. On a county, state, or national level, there is a positive relationship between factors such as population, personal income, and employment and aviation activity. As these socioeconomic factors increase, aviation activity generally increases as well. Likewise, if the same socioeconomic factors experience negative growth, it is probable that aviation activity will also decrease.

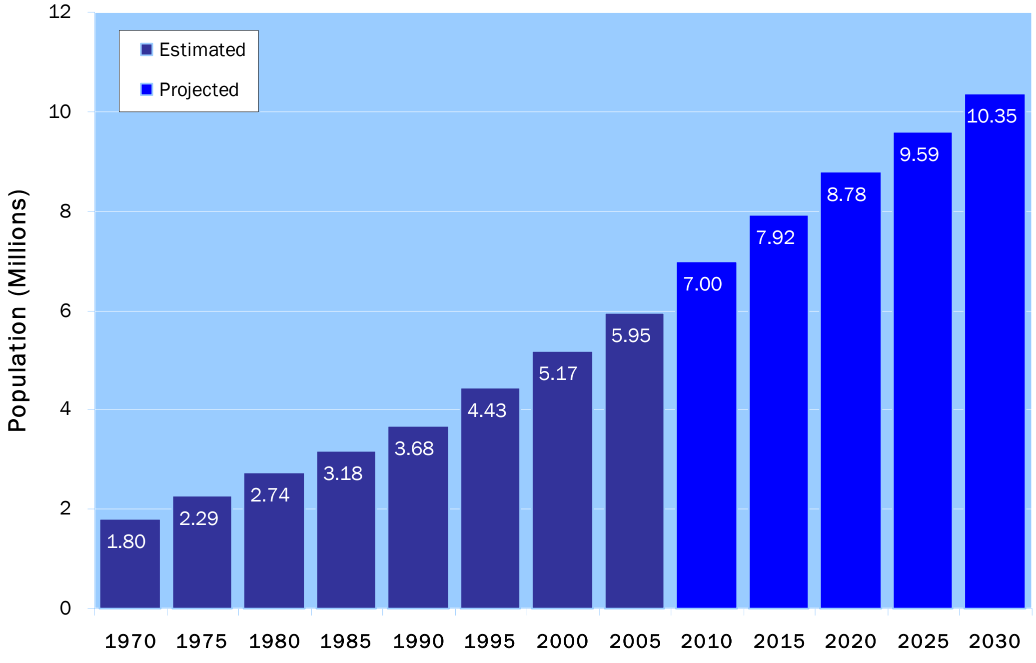
Aviation activity is not only dependant upon these economic factors, it also influences them. Making an area more accessible by air can boost tourism and promote new businesses which can lead to increased employment, population, and personal income. This demographic profile focuses on the state of Arizona, and its 15 counties, and identifies existing socioeconomic conditions, along with historical trends and future projections. The following section discusses the current socioeconomic conditions in Arizona and what is projected for the future in the following categories:

- Population
- Employment
- Mean Household Income

Population

The most recent estimate provided by the U.S. Census Bureau indicates Arizona had a population of 6,166,318 in 2006. Arizona has had continuous steady population growth since 1970. Population projections by Arizona Department of Commerce show that this population growth will continue, with the total population of Arizona reaching over 10 million by 2030. **Figure 4-27** presents historic and projected population for Arizona between the years 1970 and 2030.

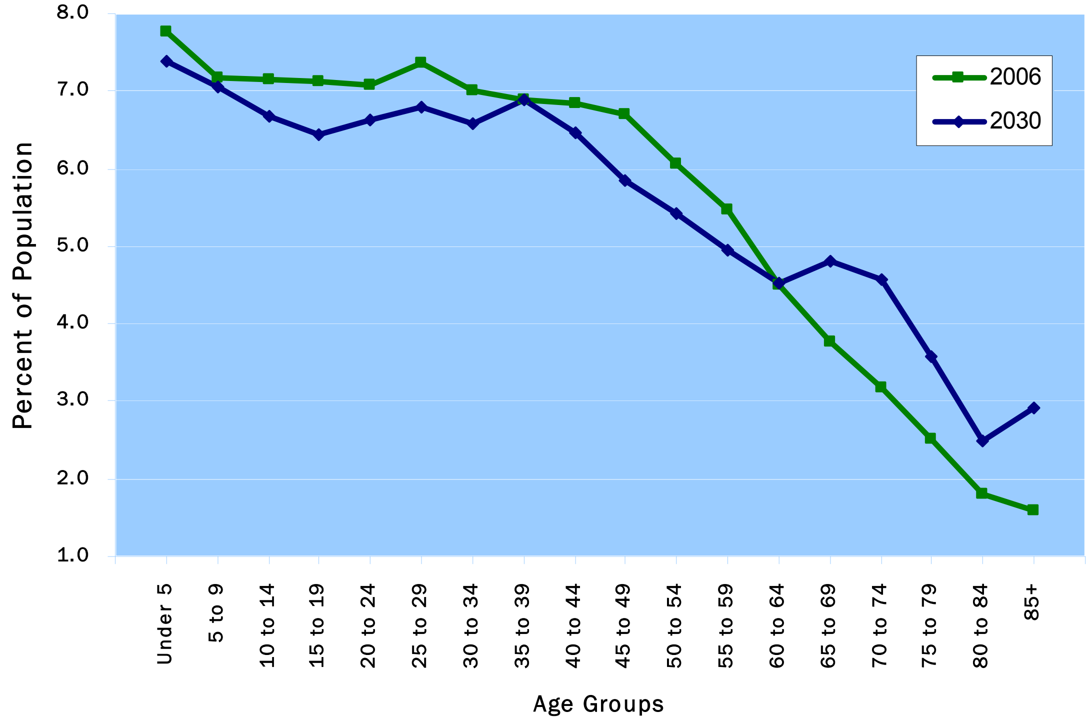
Figure 4-27: Historical and Projected Population, 1970 to 2030



Source: Woods and Pool Inc, 2008, 2006-2055 Arizona Department of Commerce Population Projections

The demographics of Arizona have changed drastically over the last few decades and will continue to change into the future. Because of its warm climate and relative low cost of living, Arizona is a popular retirement destination. This influx of retirees is swelling the populations of non-urban or semi-urban counties throughout Arizona, especially those near recreational opportunities. As a result, the percentage of the population made up of older residents is projected to increase. In 2030 the percentage of the total population age 65 to 69 is projected to be larger then the total population of residents age 60 to 64 as a result of in-migration by retirees. **Figure 4-28** shows the percentage of total population each age group made up in 2006 and projections for 2030.

Figure 4-28: Percent of the Population by Age Group, 2006 and 2030



Source: Woods and Poole Inc, 2008

Figure 4-29 shows population figures and related compound annual growth rates (CAGR) for each Arizona county for the years 2000 and 2030. For comparison purposes, data for the state of Arizona and the United States is also presented.

Figure 4-29: Population and Population Growth Rates by County, 2000-2030 (in thousands)

	Population (in thousands)			*Compound Annual Growth Rates*			
County	*Actual 2000*	*Actual 2006*	*Projected 2030*	*2000-2006*	*2006-2013*	*2006-2020*	*2006-2030*
Apache	69	75	93	1.3%	1.1%	1.1%	0.9%
Cochise	118	135	188	2.2%	1.9%	1.7%	1.4%
Coconino	117	133	174	2.2%	1.5%	1.3%	1.1%
Gila	51	55	70	1.2%	1.2%	1.1%	1.0%
Graham	33	36	45	1.1%	1.0%	1.0%	0.9%
Greenlee	9	8	8	-0.5%	-0.2%	-0.1%	0.0%
Maricopa	3,097	3,764	6,208	3.3%	2.7%	2.4%	2.1%
Mohave	156	195	331	3.8%	3.0%	2.7%	2.2%
Navajo	98	113	166	2.4%	2.2%	1.9%	1.6%
Pima	849	981	1,442	2.4%	2.1%	1.9%	1.6%
Pinal	181	270	852	6.9%	7.1%	6.0%	4.9%
Santa Cruz	39	45	71	2.7%	2.5%	2.2%	1.9%
Yavapai	169	213	355	3.9%	3.0%	2.6%	2.2%
Yuma & La Paz	180	217	344	3.1%	2.6%	2.3%	1.9%
ARIZONA	**5,167**	**6,239**	**10,348**	**3.2%**	**2.8%**	**2.5%**	**2.1%**
United States	**282,217**	**299,398**	**378,317**	**1.0%**	**1.0%**	**1.0%**	**1.0%**

Sources: U.S. Census Bureau, 2006-2055, Arizona Department of Commerce

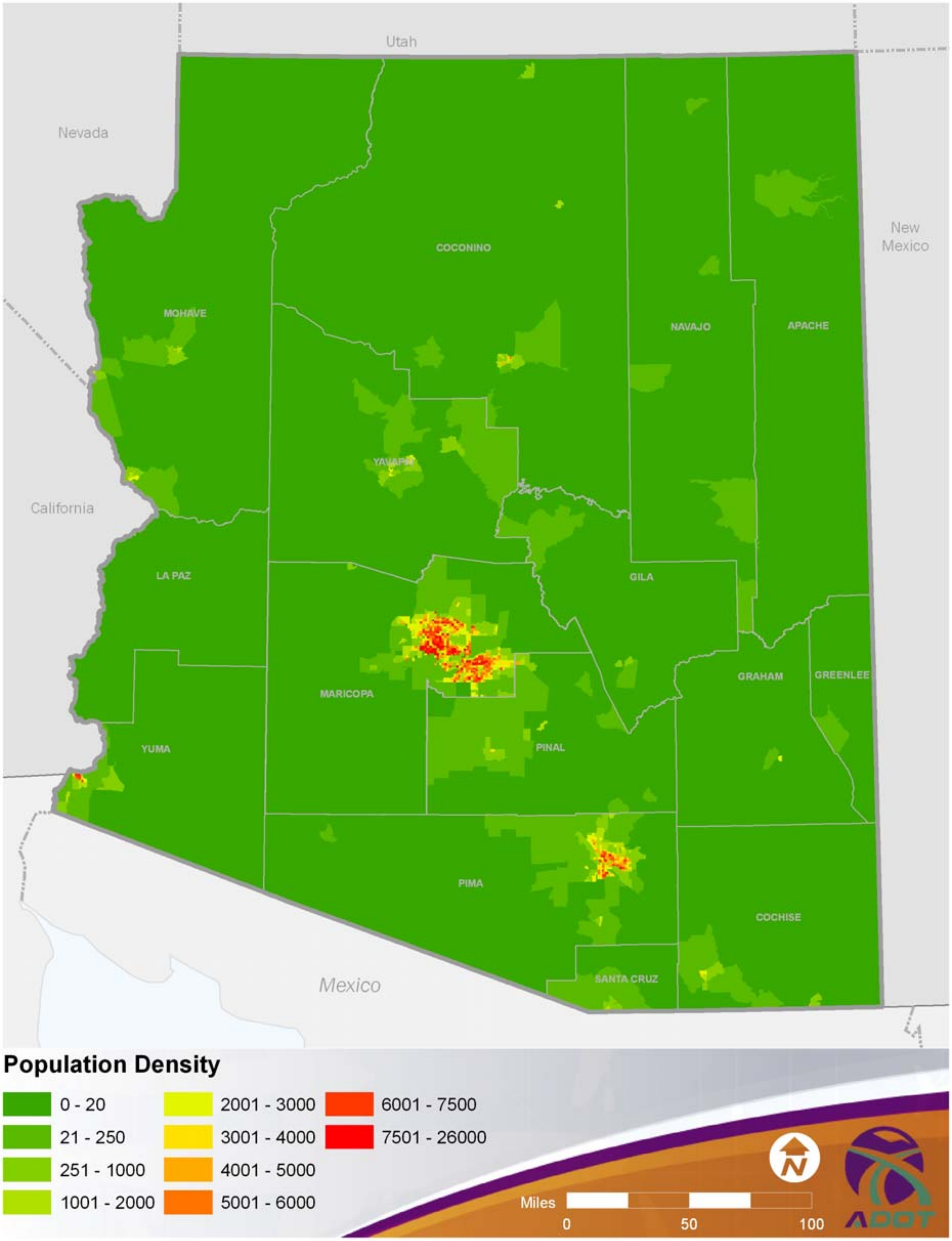
From 2000 to 2006, Pinal County was by far the fastest growing county in Arizona, growing at a compound average rate of 6.9 percent per year. This is over twice the statewide growth rate of 3.2 percent. Maricopa, Mohave, Yavapai, and Yuma counties also experienced strong population growth, adding over 3.0 percent to their populations annually. Greenlee County was the only county to experience a decline in population, down 0.5 percent annually.

Pinal County is expected to experience continued steady growth in the future, with a projected population growth rate of 7.1 percent between 2006 and 2013. Maricopa and Mohave counties, while still posting strong growth, are not projected to grow as fast as Pinal County. In general, all counties (with the noted exception of Pinal) are expected to grow at a slower rate between 2006 and 2013 than between 2000 and 2006. This lower population growth rate is expected to continue until 2030. Despite this, the population of Maricopa County (and the state as a whole) is estimated to roughly double by 2030.

Population Location

Historically, Arizona's population has been heavily concentrated, with the majority of the population living in a relatively limited area. In 2006, 61 percent of the state's total population lived in Maricopa County alone, with another 15 percent residing in Pima County. These two counties also contain Arizona's two largest metropolitan areas: Tucson (Pima), and Phoenix-Mesa-Scottsdale (Maricopa). As Figure 4-30 shows, much of Arizona's population is concentrated in limited areas around major cities.

Figure 4-30: Population Density by Census Tract



Source: Census 2000 SF-1

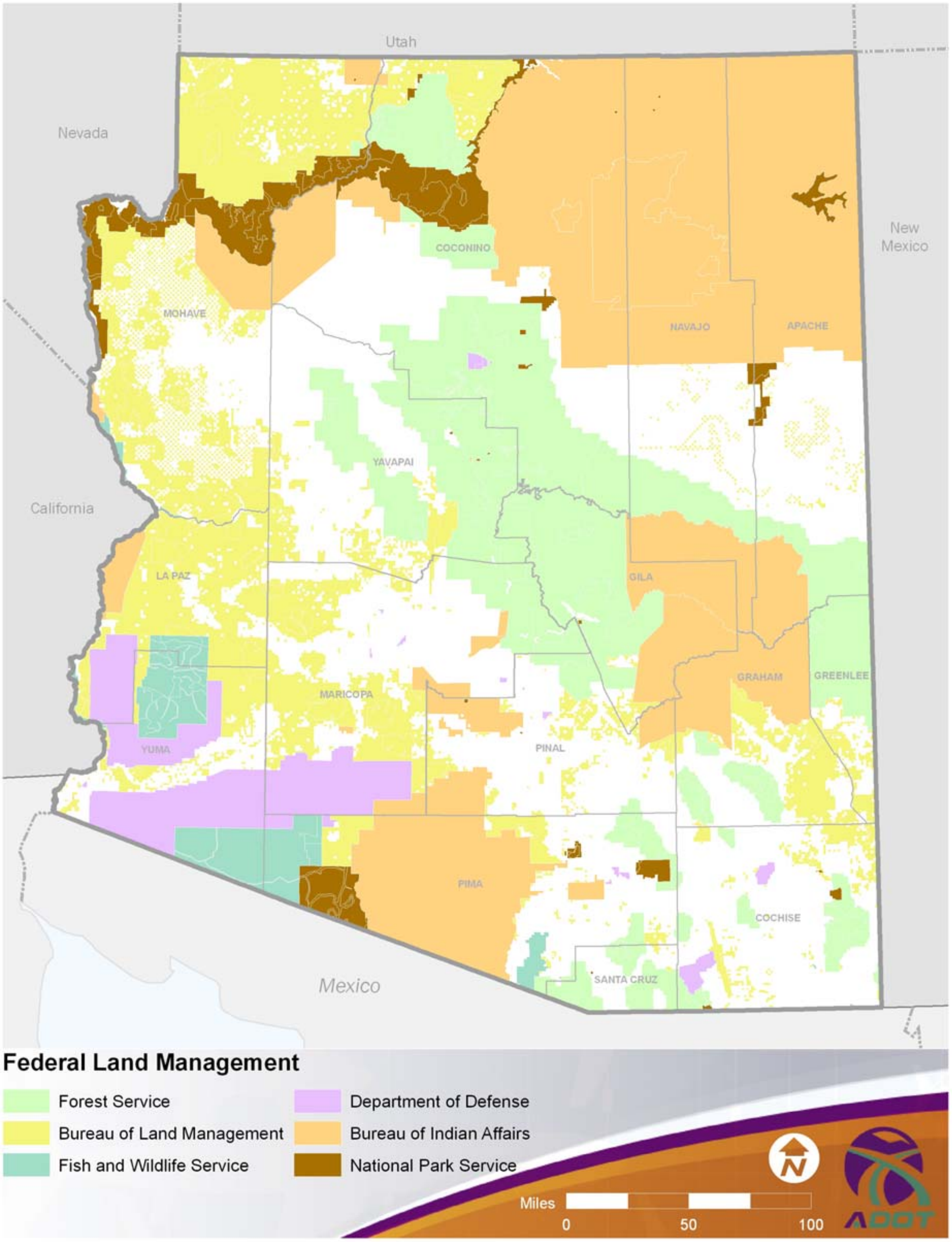
Arizona's concentration of population is partially due to the large amount of land controlled by the Federal government. Almost 70 percent of the land in Arizona is owned or managed by a Federal agency. Figure 4-31 identifies the percentage of land controlled by Federal agencies in Arizona. The Bureau of Indian Affairs controls the largest percentage of land with 27 percent, followed by the Bureau of Land Management with 17 percent. Figure 4-32 shows the location of Federal lands in Arizona and identifies the controlling Federal agency.

Figure 4-31: Percent of Land Area Controlled by Federal Agencies in Arizona

Federal Agency	*% of Total State Land Area*
Bureau of Indian Affairs	27.0%
Bureau of Land Management	17.0%
Forest Service	16.1%
Department of Defense	3.9%
National Park Service	3.5%
Fish and Wildlife Service	2.4%
Total	**69.9%**

Sources: Wilbur Smith Associates, ESRI Data, ArcGIS 9.2

Figure 4-32: Location of Federal Lands in Arizona

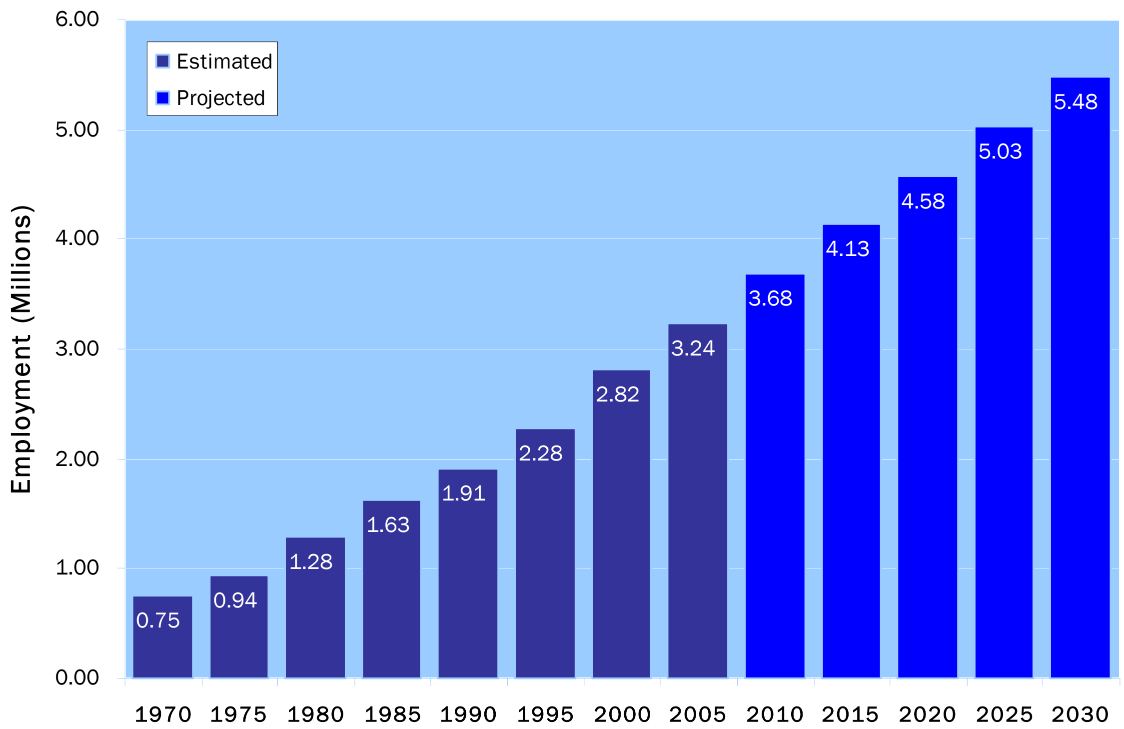


Source: Wilbur Smith Associates, ESRI Data, ArcGIS 9.2

Employment

Arizona was estimated to have 3,326,643 jobs in 2006, and is projected to have 5,482,594 jobs in 2030. Like population, Arizona's employment has shown steady growth since 1970. This steady growth is projected to continue in the future as shown in **Figure 4-33.**

Figure 4-33: Historical and Projected Employment, 1970-2030

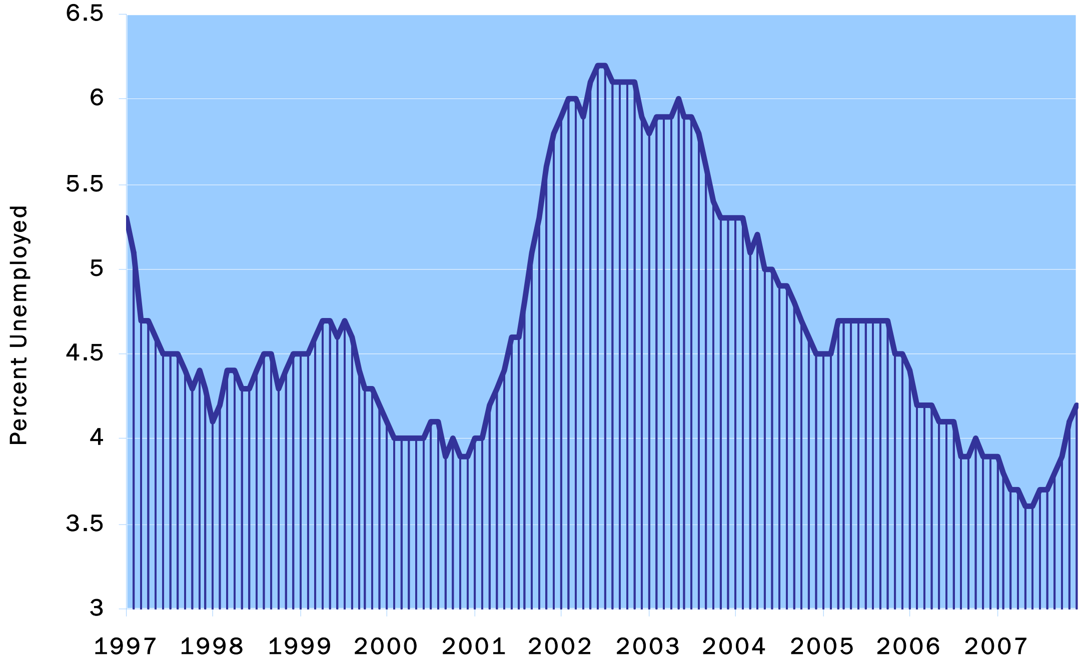


Source: Woods and Poole Inc, 2008

Unemployment

According to the United States Bureau of Labor Statistics, the Arizona unemployment rate has been trending downward over the last five years, after spiking during the 2001-2002 recession. Recently, it has spiked again, rising a full percentage point between summer 2007 and winter 2007. The recent increase in the state's unemployment rate is likely the result of declining employment in the construction and other related industries. These include real estate and mortgage brokers, title companies, architects, engineers, landscaping, and other home improvement trades. Industries providing building materials to the home construction industry such as lumber, crushed rock, and other aggregates are also likely to be affected. **Figure 4-34** displays Arizona's historical unemployment rate between 1997 and 2007.

Figure 4-34: Arizona Unemployment Rate, 1997-2007



Source: BLS, Series ID LASST04000003 for Arizona (Statewide)

Industries

Employment estimates by industry indicate that that the major growth industries for Arizona from 2000 to 2006 were construction, finance/insurance/real estate, services, and farm employment. Each grew by over 3 percent annually. In the near-term (2006 to 2013), no industry is predicted to grow as quickly as in recent years. The only industries expected to grow faster than the state average between 2006 and 2013 are services, transport/communications/public utilities and state and local government. The only industry expected to grow faster than the state average between 2006 and 2030 is the services sector. Figure 4-35 presents Arizona employment projections by industry.

Figure 4-35: Arizona Employment and Employment Growth Rates by Industry, 2000-2030 (in thousands)

	Employment (in thousands)			*Compound Annual Growth Rate*			
Industry	*2000*	*2006*	*2030*	*2000-2006*	*2006-2013*	*2006-2020*	*2006-2030*
Farm Employment	20	24	21	3.2%	-0.5%	-0.5%	-0.9%
Agri. Service, Others	47	42	69	-1.9%	2.5%	2.3%	3.6%
Mining	13	11	12	-2.7%	0.6%	0.5%	0.9%
Construction	200	250	345	3.8%	1.5%	1.4%	2.3%
Manufacturing	226	204	260	-1.7%	1.1%	1.1%	1.8%
Transport, Comm., Public Utilities	125	144	240	2.4%	2.6%	2.4%	3.7%
Wholesale Trade	123	133	217	1.5%	2.4%	2.2%	3.5%
Retail Trade	484	577	882	3.0%	2.1%	1.9%	3.1%
Finance, Insurance, Real Estate	282	372	588	4.7%	2.3%	2.1%	3.3%
Services	912	1,126	2,137	3.6%	3.4%	3.0%	4.7%
Federal Civilian Gov.	48	52	66	1.4%	1.0%	1.0%	1.6%
Federal Military Gov.	33	34	36	0.5%	0.2%	0.2%	0.3%
State and Local Gov.	308	357	610	2.5%	2.7%	2.5%	3.9%
TOTAL- All Industries	2,819	3,327	5,483	2.8%	2.5%	2.3%	3.6%

Source: Woods and Poole Inc, 2008

In 2000, the state of Arizona had almost three million jobs. Maricopa County had the largest share of jobs, with almost two-thirds of the state's total employment. The next largest county, Pima, had only a quarter as many jobs, with 444,000. With the exception of Maricopa and Pima counties, no other county in the state had over 100,000 jobs in 2000. This indicates a strong concentration of jobs within a limited portion of the state. Between 2000 and 2006 employment grew in all counties except Greenlee. Mohave County posted the strongest rate of job growth between 2000 and 2006, with 4.7 percent. Four other counties (Maricopa, Pinal, Yavapai, and Yuma/La Paz) grew by more than three percent. However the overall rate of growth in employment is projected to moderate on the statewide level, falling slowly over the next 20 years. Some counties will buck the trend, including Coconino, Gila, Maricopa, Mohave, and Yavapai, which are all expected to grow faster than the state average. Employment in Arizona grew at almost three times the national rate from 2000 to 2006, and is projected to keep growing faster than the nation until 2030. Figure 4-36 shows employment projections and related compound annual growth rates for each Arizona county.

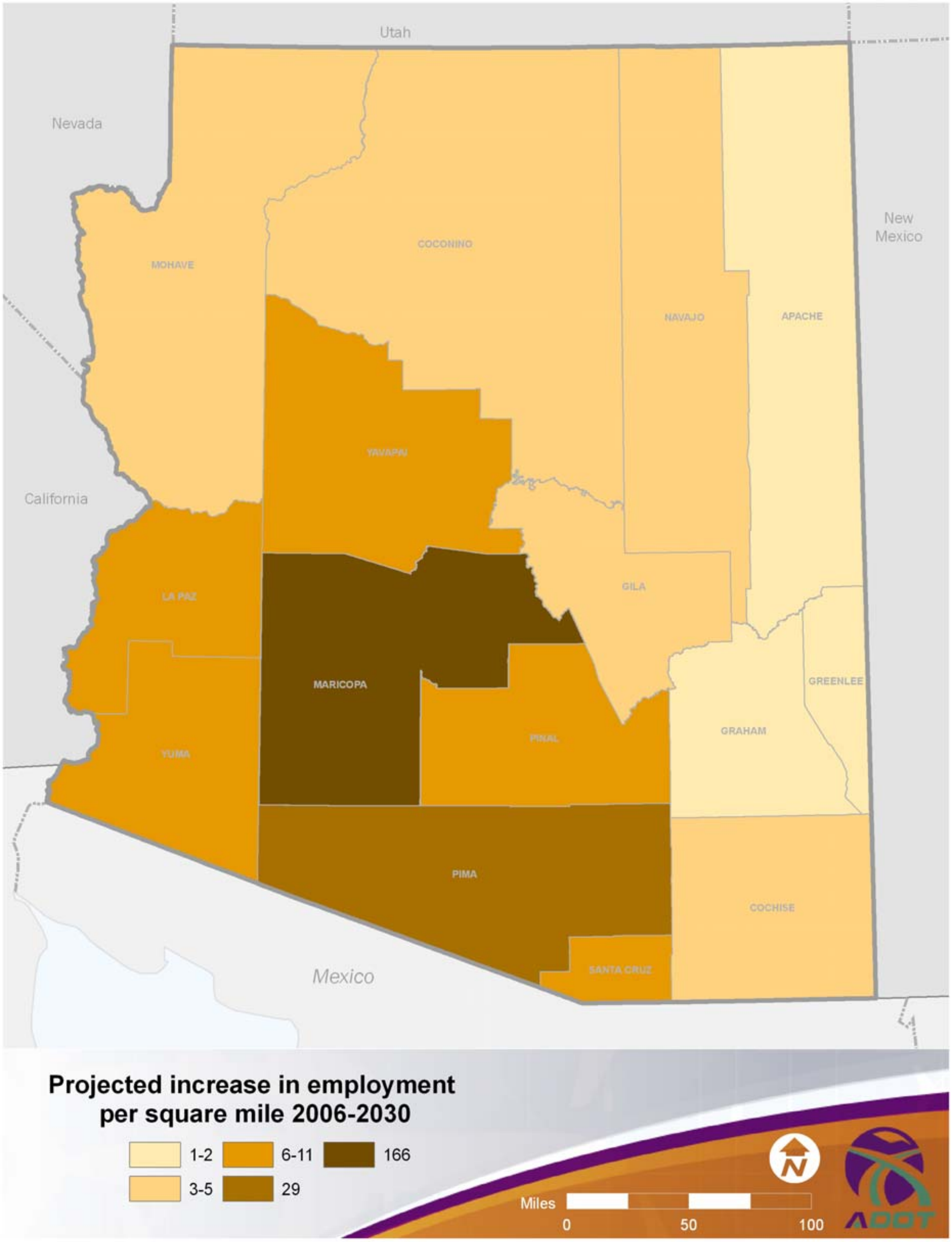
Figure 4-36: Arizona Employment (in thousands) and Employment Growth Rates by County, 2000-2030

	Employment (in thousands)			*Compound Annual Growth Rate*			
County	*2000*	*2006*	*2030*	*2000-2006*	*2006-2013*	*2006-2020*	*2006-2030*
Apache	25	27	40	1.3%	1.9%	1.8%	1.7%
Cochise	51	59	84	2.6%	1.7%	1.6%	1.5%
Coconino	70	82	138	2.6%	2.6%	2.4%	2.2%
Gila	21	23	39	1.5%	2.9%	2.6%	2.4%
Graham	11	11	17	0.3%	2.3%	2.2%	2.0%
Greenlee	5	5	7	-1.5%	1.8%	1.7%	1.6%
Maricopa	1,892	2,252	3,791	3.0%	2.6%	2.4%	2.2%
Mohave	55	72	125	4.7%	2.8%	2.6%	2.3%
Navajo	34	39	61	2.5%	2.2%	2.0%	1.8%
Pima	444	497	768	1.9%	2.1%	2.0%	1.8%
Pinal	50	61	96	3.4%	2.2%	2.1%	1.9%
Santa Cruz	16	18	24	1.8%	1.3%	1.3%	1.3%
Yavapai	70	88	149	3.7%	2.7%	2.5%	2.2%
Yuma & La Paz	76	93	143	3.4%	1.8%	1.8%	1.8%
ARIZONA	**2,819**	**3,327**	**5,483**	**2.8%**	**2.5%**	**2.3%**	**2.1%**
United States	166,759	176,970	246,949	1.0%	1.6%	1.5%	1.4%

Source: Woods and Poole Inc, 2008

Despite a higher rate of employment growth in Mohave, Yavapai, and Gila counties, a larger number of new employees will still be located in Maricopa and Pima counties. Figure 4-37 shows the projected change in employment per square mile between 2006 and 2030.

Figure 4-37: Projected Change in Employment Density, 2006 -2030



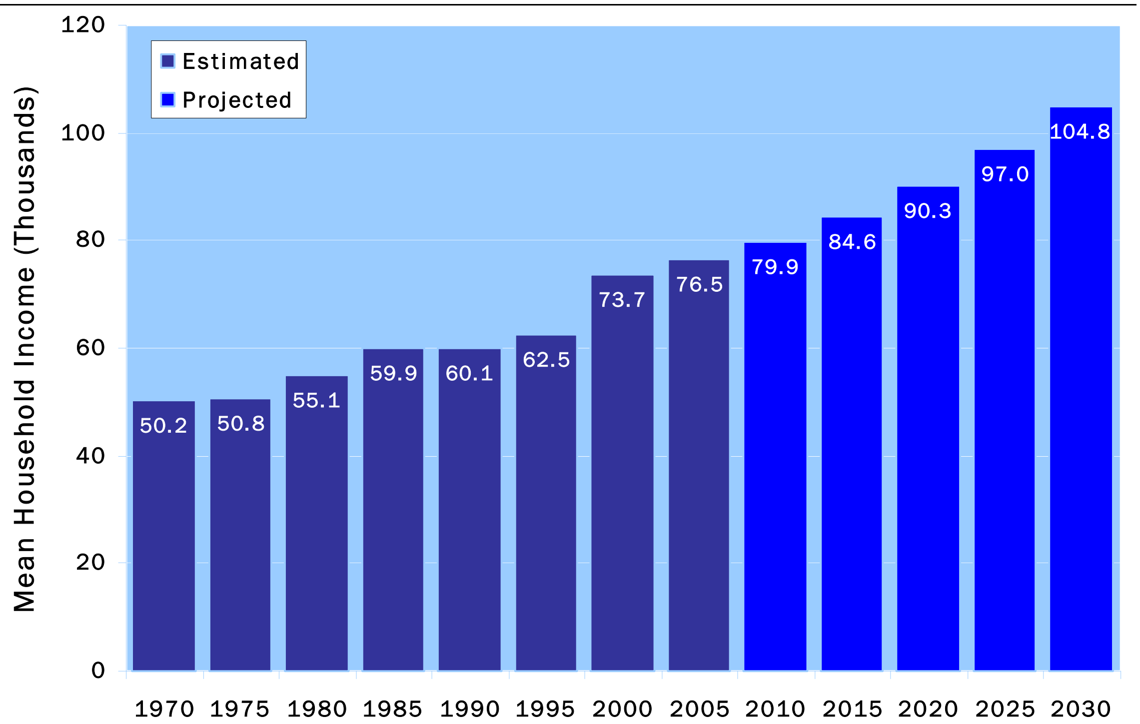
Source: Woods and Poole Inc, 2008, Wilbur Smith Associates

Mean Household Income

Mean income is an important factor in the support of general aviation, with higher mean incomes correlating to higher general aviation use, both through total and fractional plane ownership. Because it is an average of the income of all the households in a county, the very high incomes of a limited number of households tends to make mean household income higher than that of the 'average' household. While Arizona's mean household income is projected to continue to increase, it will not increase as steadily as either population or total income. In the 1980s and early 1990s, it increased very little. However, between 1995 and 2000 it rose rapidly.

Figure 4-38 shows historic and projected mean household income from 1970 to 2030. Between 2005 and 2030 Arizona's mean household income is expected to grow at an average annual rate of 1.27 percent, compared to 1.32 percent average annual growth from 1980 to 2005.

Figure 4-38: Arizona Historic and Projected Mean Household Income, 1970-2030



Source: Woods and Poole Inc, 2008

Between 2000 and 2006, every county in Arizona, except Pinal, saw an increase in mean household income. In the near future (2006 to 2013), mean income is projected to increase in all counties, with the greatest increase projected to occur in Pinal County. Gila, Graham, Greenlee, Maricopa, and Mohave counties are all expected to see mean income grow faster than the Arizona average. Arizona mean household income is projected to increase at a faster rate than that for the rest of the United States. Between 2006 and 2020, Arizona's increase in mean income will track with the rest of the United States, but is projected to pull ahead by 2030. Within that long-term horizon (2006 to 2030), Gila, Graham, and Pinal counties are projected to see the largest growth in mean income, increasing by 1.5 percent a year. Figure 4-39 presents mean household income for the year 2000, 2006, and 2030 projections for each county in Arizona. Also presented are compound average growth rates projected for mean household income for each county.

Figure 4-39: Mean Household Income and Mean Household Income Growth Rates 2000-2030

	Income (in 2004 dollars)			*Compound Annual Growth Rates*			
County	*2000*	*2006*	*2030*	*2000-2006*	*2006-2013*	*2006-2020*	*2006-2030*
Apache	$50,427	$67,199	$78,476	4.9%	0.4%	0.5%	0.6%
Cochise	$55,075	$65,950	$82,387	3.0%	0.6%	0.8%	0.9%
Coconino	$69,395	$75,630	$96,230	1.4%	0.7%	0.9%	1.0%
Gila	$51,446	$63,131	$90,872	3.5%	1.3%	1.4%	1.5%
Graham	$46,777	$55,240	$79,010	2.8%	1.3%	1.4%	1.5%
Greenlee	$59,684	$70,635	$95,289	2.8%	1.2%	1.2%	1.3%
Maricopa	$84,214	$86,522	$119,278	0.5%	1.1%	1.2%	1.3%
Mohave	$49,396	$51,075	$68,330	0.6%	0.9%	1.0%	1.2%
Navajo	$49,957	$57,579	$73,401	2.4%	0.7%	0.8%	1.0%
Pima	$65,097	$68,534	$90,913	0.9%	0.9%	1.0%	1.2%
Pinal	$52,273	$50,361	$72,841	-0.6%	1.4%	1.4%	1.5%
Santa Cruz	$59,015	$63,034	$84,493	1.1%	0.9%	1.1%	1.2%
Yavapai	$53,693	$55,758	$76,610	0.6%	0.9%	1.1%	1.3%
Yuma & La Paz	$49,936	$58,610	$71,606	2.7%	0.3%	0.6%	0.8%
ARIZONA	**$73,726**	**$76,970**	**$104,783**	**0.7%**	**1.0%**	**1.1%**	**1.3%**
UNITED STATES	$84,324	$86,778	$115,723	0.5%	0.9%	1.1%	1.2%

Source: Woods and Poole Inc, 2008

Travel and Tourism

Travel is an important and growing part of the Arizona economy, of which air transportation forms an important part. The *Arizona 2006 Tourism Facts* brochure estimates that 49.3 percent of travel volumes in Arizona are non-resident leisure trips and another 13.8 percent are non-resident business trips. As a result, 78 percent of travel expenditures come from visitors outside Arizona.

The report also notes that the number of U.S. resident visitor enplanements has grown by 0.6 percent, while the number of international visitors has slightly declined. Although the rising cost of fuel is making aviation more expensive, the falling value of the dollar should make the United States and Arizona a cheaper and thus more attractive vacation destination for international visitors in the near future.

There were an estimated 4.4 million visitors to Grand Canyon National Park in 2006. The Grand Canyon National Park's airport saw a drop in the number of aircraft operations, due to a decline in the number of helicopter tours, but still had over 240,000 enplanements in 2007.

According to Arizona Travel Impacts 1998-2006 visitors to the state of Arizona spent $1.4 billion on air travel in 2006. This represents 8.1 percent of all visitor travel spending. It is estimated that this spending supports 11,300 aviation and aviation related jobs.

FORECASTS OF AVIATION ACTIVITY

Commercial Service Forecasts

This section projects passenger enplanements and scheduled commercial aircraft operations at Arizona airports. It is important to note that this type of activity for Grand Canyon National Park, Grand Canyon West, and Page Municipal was separated from the other, more traditional commercial service activity because of its nature. For Grand Canyon National Park and Grand Canyon West airports, the passenger and operational activity is related strictly to tour operators. Because of this, they are impacted differently than the other airports by the changes in the typical airline industry as it relates to legacy carriers and regional service providers. A separate forecast for air tour operations and enplanements is developed following the scheduled forecast projections.

Scheduled Commercial Service Forecasts

Due to recent service cutbacks in the airline industry in 2008, for the purpose of this plan, an estimate of 2008 enplanements and commercial service operations has been developed using actual data from the airports for the first six months and anticipated changes in the airline capacity through the remainder of the year. Forecasts were performed using a base year of 2008, with projections for 2012 and 2017, and an out-year of 2030.

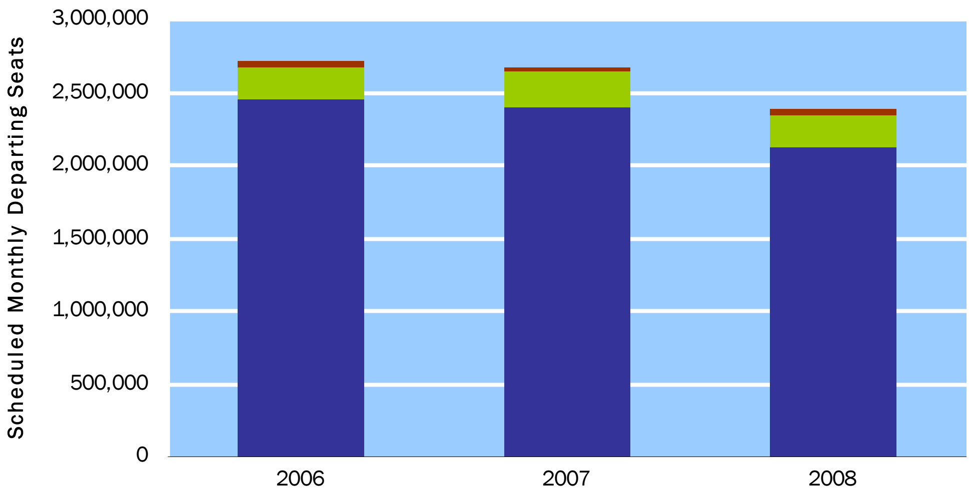
The FAA projects that U.S. enplanements will increase at an average annual rate of 2.7 percent between 2007 and 2010. However, several significant events have impacted and will continue to impact the realization of the FAA's near-term commercial service projections. These events include the following:

- Fuel Prices. Crude oil prices reached $135 per barrel on May 22, 2008. Most of the domestic carriers' breakeven level for oil prices is $80 to $90 per barrel. The airlines are spending four times what they spent in 2000 on jet fuel. This equates to the airlines losing approximately $60 on each round-trip ticket. JP Morgan Chase estimates that the airlines will lose $7.2 billion in 2008 based on current trends; if fuel prices remain near current levels, they estimate a loss of an additional $8 billion in 2009. The carriers with older gas-guzzling fleets may be the hardest hit. This will be devastating for many of the cash-strapped airlines and many are looking for ways to further consolidate or liquidate.
- Airline Bankruptcies and Shutdowns. The rise in fuel prices and the economic downturn of the entire U.S. has put a lot of pressure on carriers' abilities to make a profit. Several carriers have already succumbed to the economic pressure including ATA, Aloha, and Skybus.
- Airline Capacity Cuts and Shifts. If fuel prices remain high, experts believe that for the U.S. industry to shrink to a size that would allow the surviving carriers to earn a profit will require significant fare hikes and a 20 to 25 percent cut in seat capacity. This will mean even fewer routes and fewer flights. These cuts in capacity have already begun at Phoenix Sky Harbor and Tucson International.
- Airline Mergers. In addition to the proposed Delta-Northwest merger, further airline consolidation is likely. The Delta-Northwest proposal has limited potential to impact many of the commercial service airports in Arizona. However, other airline consolidation, including a potential US Airways merger may have more of a dramatic impact on service in Arizona as carriers ground planes, eliminate routes, and cut staff.

Aviation experts believe that the current crisis has the potential to drastically reshape the industry in coming years. That means not only fewer carriers, but forcing all other carriers to reconsider how they operate, from ticket pricing to the routes they serve. Carriers have added fees and surcharges and may need to push through additional fare hikes to increase revenue. There is fine line between what the flying public, especially one during an economic downturn, will bear in terms of fare increases and additional fees.

The changes in scheduled capacity (departing seats) at commercial service airports in Arizona from October 2006 to October 2008 are presented in **Figure 4-40**. As shown, statewide scheduled departing seats declined 10.8 percent from 2007 to 2008. Phoenix Sky Harbor is experiencing an 11.0 percent decline and Tucson International's capacity will be down 14.2 percent in October 2008 compared to October 2006. Some of the smaller airports in the state actually experienced an increase from 2007. New service in 2007/2008 includes Phoenix Mesa Gateway service on Allegiant, Yuma International service to Salt Lake City on Delta Connection, Show Low service to Denver by Great Lakes, and Flagstaff-Pulliam and Prescott service to Los Angeles on Horizon Airlines. It is worth noting that Delta recently announced the discontinuation of Yuma service to Salt Lake City in August 2008.

Figure 4-40: Monthly Departing Seats at Arizona Scheduled Commercial Service Airports, October 2006 - October 2008



	2006	2007	2008
All Other	32,268	36,306	39,108
TUS	226,161	249,693	214,227
PHX	2,447,744	2,390,932	2,127,238

Source: *Official Airline Guide*

Even though statewide capacity in October 2008 is down nearly 11 percent from 2007, it is estimated that annual statewide enplanements will decline by just 2.2 percent in 2008 from 2007 levels. This shows that the demand for air service is still relatively strong, despite larger capacity cuts by the airlines and higher load factors on flights leaving the state. Actual 2007 numbers and estimates for 2008 of commercial service enplanements and operations are presented in **Figure 4-41**. The 2008 estimates were determined by examining published airline schedules through the remainder of the year and assuming a slightly higher load factor at several airports based on the availability of fewer seats.

Figure 4-41: Arizona Scheduled Commercial Service Airport Enplanements and Operations, 2007 and 2008

	Enplanements		*Operations*	
Airport Name	*2007*	*2008E*	*2007*	*2008E*
Laughlin/Bullhead International	106,347	83,000	1,417	900
Flagstaff Pulliam	38,600	66,400	5,844	4,200
Kingman	2,602	2,000	1,812	1,200
Page Municipal	5,298	5,500	2,058	2,200
Phoenix Sky Harbor International	20,943,933	20,321,000	408,641	473,300
Phoenix-Mesa Gateway	2,817	155,600	1,962	2,500
Ernest A. Love Field	7,889	7,100	2,630	2,400
Show Low Regional	6,433	7,700	832	1,400
Tucson International	2,223,008	2,181,000	42,666	41,400
Yuma International Airport	63,426	91,300	7,886	10,500
ARIZONA TOTAL	21,686,389	23,269,400	475,748	634,600

Sources *Official Airline Guide*, airport management records, Wilbur Smith Associates
Note: E=estimate

This section forecasts passenger enplanements and commercial aircraft operations at Arizona airports. Forecasts were performed using a base year of 2008, with forecasts for 2012, 2017, and an out-year of 2030.

Forecast Assumptions

The following is a list of general assumptions that were applied to Arizona airports while conducting commercial service forecasts:

- It is assumed that, during the forecast period, the economy will experience typical business cycles. These cycles will result in fluctuations in air service demand.
- It is assumed that the high cost of fuel will continue and the airlines will continue to make adjustments in the near term for both ticket prices and capacity to minimize the effects of the fuel crisis. It is assumed that in the mid to long term, the industry will once again experience growth. Near term projections were developed that are slightly lower than longer term projections based on the current cutbacks in the industry.
- Enplanements will grow at a faster rate than operations. As demand increases, the airlines will first accept higher load factors and then deploy larger aircraft, if available, before adding frequencies.
- All short term projections should continue to be monitored based on unanticipated changes in the airline industry which experts note may change the entire commercial service landscape over the next few years.
- The existing service patterns and types of service at the airports will remain the same in the future. The growth of airports' use will be reflective on the growth of the market area.
- Commercial service forecasts are unconstrained with respect to facilities. This means that for "normal" growth, there should be sufficient airfield, terminal, and landside facilities to accommodate the level of activity anticipated at the airports during the forecast period.
- The forecasts assume that mainline or legacy carriers will continue to operate their hubs in a manner consistent with current operations.

- No specific expansion of Southwest Airlines (or other low cost carrier) and no additional entry of low cost carriers is built into the forecasts.
- For the Essential Air Service (EAS) communities of Page, Show Low, Kingman, and Prescott, the forecasts assume airport activity will continue at present levels as long as these communities continue to qualify for EAS subsidy and the subsidy remains sufficient. The forecasts also assume that aircraft will be available to serve these communities.
- It is assumed that Phoenix Mesa Gateway will continue to emerge as a commercial service airport complement to Phoenix Sky Harbor over the forecast period.

Forecast Methodology

Since Arizona airports are very different, each commercial service airport was examined individually to determine which factors have contributed to recent changes in air service levels. Historic passenger trends were examined and compared to regional and national trends. A review of *FAA Aerospace Forecasts, Fiscal Years 2008-2025*, SANS 2000, regional system plans, and individual master plans was undertaken. Nearly all Arizona counties are projected to experience population growth greater than that projected for the U.S. overall. This growth must also be considered as projections are developed. Assumptions were tested and the results were evaluated. The assumptions and considerations for each of the airports are summarized below:

- Laughlin/Bullhead City International: It is assumed that the casinos in Laughlin will continue to work with Sun Country to provide similar levels of service throughout the forecast period.
- Flagstaff Pulliam: An estimate of 2009 operations was developed based on the new service started by Horizon to Los Angeles on 74-seat Q400 aircraft in June 2008. Hence the near term projections are much higher than longer term projections. It was assumed that Mesa will continue to also add larger regional jets to replace the Dash-8 aircraft over time.
- Kingman: As an EAS airport, the schedule for Kingman is dictated by the EAS contract between the carrier and the US DOT. Commercial service operations are projected to be unchanged through the forecast period and enplanements are projected to grow slightly.
- Page: As an EAS airport, the schedule for Page is dictated by the EAS contract between the carrier and the US DOT. Commercial service operations are projected to be unchanged through the forecast period and load factors and enplanements are projected to continue to grow.
- Phoenix Sky Harbor International: The airport develops its own short term projections of enplanements. This rate of 2.16 percent per year was applied to develop the 2012 SASP projection. The FAA's projected rate of growth for all U.S. enplanements (2.7 percent per year) was applied to derive mid- and long-term projections. Higher load factors were assumed in the near term to forecast operations.
- Phoenix-Mesa Gateway: The role of the airport as a complement to commercial service at Phoenix Sky Harbor is projected to continue throughout the forecast period. It is projected that more service will be added at the airport by existing and new carriers.
- Ernest A. Love Field: An estimate of 2009 operations was developed based on the new service started by Horizon to Los Angeles on 74-seat Q400 aircraft in September 2008 and service to Ontario and Phoenix Sky Harbor on Great Lakes also starting in September 2008. Hence the near term projections are much higher than longer term projections.

- Show Low Regional: As an EAS airport, the schedule for Show Low Regional is dictated by the EAS contract between the carrier and the US DOT. Commercial service operations are projected to be unchanged through the forecast period and load factors and enplanements are projected to continue to grow. The new service to Denver, which began in July 2008 is projected to continue.
- Tucson International: Considering TAF and PAG RASP projections, Tucson International will experience considerable growth in enplanements and operations.
- Yuma international: SkyWest service to Salt Lake City will be discontinued in August 2008. Near term projections of enplanements and operations will be impacted by this loss.

Figure 4-42 presents the projections of enplanements and **Figure 4-43** summarizes the commercial operations forecasts. These forecasts are considered to be conservative based on overall industry trends and projections. It is expected that master plan projections will be much higher than the projections presented in the SASP.

Figure 4-42: Enplanement Projections for Arizona's Commercial Service Airports

Airport Name	*Base Year 2008E*	*Forecasts 2012*	*2017*	*2030*	*CAGR 2008E-2012*	*CAGR 2012-2030*	*CAGR 2008E-2030*
Laughlin/Bullhead Intl	83,000	86,700	96,700	128,300	1.1%	2.2%	2.0%
Flagstaff Pulliam	66,400	138,600	154,400	204,000	20.2%	2.2%	5.2%
Kingman	2,300	2,400	2,500	3,000	1.1%	1.2%	1.2%
Page	5,500	5,800	6,600	9,400	1.3%	2.7%	2.5%
Phoenix Sky Harbor Intl	20,321,000	22,134,400	25,313,000	35,880,500	2.2%	2.7%	2.6%
Phoenix-Mesa Gateway	155,600	168,400	219,100	434,100	2.0%	5.4%	4.8%
Ernest A. Love Field	11,700	39,900	45,200	62,300	35.9%	2.5%	7.9%
Show Low Regional	7,700	8,000	8,800	11,200	1.0%	1.9%	1.7%
Tucson International	2,181,000	2,360,800	2,671,000	3,682,000	2.0%	2.5%	2.4%
Yuma International	91,300	95,200	105,600	138,400	1.1%	2.1%	1.9%
ARIZONA TOTAL	22,925,500	25,040,300	28,622,900	40,553,200	2.2%	2.7%	2.6%

Source: Wilbur Smith Associates
Notes: E=estimate; CAGR= compound annual growth rate; enplanements may not sum to totals due to rounding

Figure 4-43: Commercial Service Operations Projections for Arizona's Airports

Airport Name	*Base Year 2008E*	*Forecasts 2012*	*2017*	*2030*	*CAGR 2008E-2012*	*CAGR 2012-2030*	*CAGR 2008E-2030*
Laughlin/Bullhead Intl	900	900	1,000	1,400	0.0%	2.5%	2.0%
Flagstaff Pulliam	4,200	6,300	6,900	8,500	10.7%	1.7%	3.3%
Kingman	1,200	1,500	1,500	1,500	5.7%	0.0%	1.0%
Page	2,200	2,200	2,200	2,200	0.0%	0.0%	0.0%
Phoenix Sky Harbor Intl	473,300	495,900	556,800	752,500	1.2%	2.3%	2.1%
Phoenix-Mesa Gateway	2,500	2,700	3,300	5,600	1.9%	4.1%	3.7%
Ernest A. Love Field	2,800	5,700	6,300	8,300	19.4%	2.1%	5.1%
Show Low Regional	1,400	1,400	1,400	1,400	0.0%	0.0%	0.0%
Tucson International	41,400	44,100	48,600	62,400	1.6%	1.9%	1.9%
Yuma International	10,500	10,700	11,800	15,000	0.5%	1.9%	1.6%
ARIZONA TOTAL	540,400	571,400	639,700	858,800	1.4%	2.3%	2.1%

Source: Wilbur Smith Associates
Notes: E=estimate; CAGR= compound annual growth rate; operations may not sum to totals due to rounding

Commercial Service Air Tour Projections

The commercial service activity at Grand Canyon National Park, Grand Canyon West, and Page Municipal airports is influenced by trends different than those that impact the projections for scheduled commercial service activity as noted above. The air tour industry has been impacted and will continue to be impacted by the price of fuel, tourism to Las Vegas, the financial viability of tour operators, and the limitation of over-flights of the Grand Canyon. Commercial activity indicators for the two Grand Canyon airports and Page Municipal (air tours portion only) were derived from a review of historical information and consideration of the FAA's Terminal Area Forecast (TAF). Projections of air tour enplanements and operations are presented in Figure 4-44 and Figure 4-45.

Figure 4-44: Enplanement Projections for Air Tour Service

Airport Name	Base Year 2007	Forecasts			CAGR 2007-2030
		2012	2017	2030	
Grand Canyon National Park	240,600	271,705	304,750	427,900	2.5%
Grand Canyon West	21,337	24,190	27,735	37,950	2.5%
Page Municipal	24,378	28,710	34,047	47,040	2.9%
ARIZONA TOTAL	286,315	324,605	366,532	512,890	2.6%

Source: FAA *Terminal Area Forecasts*, Airport Management Records, Wilbur Smith Associates
Note: CAGR= compound annual growth rate; enplanements may not sum to totals due to rounding

Figure 4-45: Commercial Operations Projections for Air Tour Service

Airport Name	Base Year 2007	Forecasts			CAGR 2007--2030
		2012	2017	2030	
Grand Canyon National Park	95,184	104,600	114,900	146,700	1.9%
Grand Canyon West	10,700	11,800	12,900	16,500	1.9%
Page Municipal	29,080	31,900	35,100	44,800	1.9%
ARIZONA TOTAL	134,964	148,300	162,900	208,000	1.9%

Source: FAA *Terminal Area Forecasts*, Airport Management Records, Wilbur Smith Associates
Note: CAGR= compound annual growth rate; operations may not sum to totals due to rounding

SASP Commercial Service Projections versus Other Projections

Commercial service activity projections have also been developed by airports, regional governments, and the FAA. Figure 4-46 compares enplanement forecasts produced in this plan for scheduled commercial service and air tour airports to those produced in the FAA *Terminal Area Forecasts*, airport master plans, and other plans. The most recent growth rates from these forecasts were applied to base years used in this plan so that an out-year percentage difference could be calculated.

Of the twelve commercial service and air tour airports, nine have recent master plans with current forecasts. When growth rates in these forecasts were applied to the SASP base year, the resulting forecasts were typically much larger than SASP results.

Enplanement forecasts at Phoenix Sky Harbor and Phoenix-Mesa Gateway were also compared to those conducted by the Maricopa Association of Governments (MAG). MAG conducted two scenarios for Sky Harbor. The first shows 2030 enplanements 17.5 percent under SASP forecasts, and the second 8.7 percent higher. MAG forecasts for Phoenix-Mesa Gateway show enplanements over 2.6 million in 2030.

The Pima Association of Governments (PAG) conducted two scenario enplanement forecasts for Tucson International Airport. The "high" forecast growth rate, when applied to SASP base year enplanements, results in an enplanement level only 4.9 percent higher than SASP results. The "average" forecast showed a result 22 percent below the SASP number.

Figure 4-46: Commercial Enplanement Forecasts Vs. FAA TAF, Airport Master Plan, and Regional Forecasts

Commercial Service/Air Tours Airport	*Base Year 2008E**	*CAGR 2008-2030*	*Forecast 2030*	*% Difference From SASP*
Laughlin/Bullhead International				
SASP Enplanement Forecast	83,000	2.00%	128,292	NA
Terminal Area Forecast	83,000	2.65%	147,548	15.0%
Airport Master Plan	83,000	6.14%	308,158	140.2%
Flagstaff Pulliam				
SASP Enplanement Forecast	66,400	5.24%	204,049	NA
Terminal Area Forecast	66,400	2.17%	106,553	-47.8%
Airport Master Plan	66,400	8.68%	414,088	102.9%
Grand Canyon National Park				
SASP Enplanement Forecast	240,600	2.53%	427,900	NA
Terminal Area Forecast	240,600	3.10%	471,409	10.2%
Airport Master Plan	240,600	3.90%	558,658	30.6%
Kingman				
SASP Enplanement Forecast	2,300	1.24%	3,014	NA
Terminal Area Forecast	2,300	0.00%	2,300	-23.7%
Airport Master Plan	2,300	9.80%	17,982	496.7%
Page				
SASP Enplanement Forecast	29,878	2.90%	47,040	NA
Terminal Area Forecast	29,878	2.45%	50,921	8.2%
Airport Master Plan	29,878	5.66%	100,301	113.2%
Grand Canyon West				
SASP Enplanement Forecast	21,337	2.54%	37,950	NA
Terminal Area Forecast	21,337	0.00%	21,337	-43.8%
Phoenix Sky Harbor International				
SASP Enplanement Forecast	20,321,000	2.62%	35,880,526	NA
Terminal Area Forecast	20,321,000	3.24%	41,020,891	14.3%
Airport Master Plan	20,321,000	2.16%	32,488,806	-9.5%
Maricopa Assoc of Govts Scenario 1 Forecast	20,321,000	1.73%	29,607,607	-17.5%
Maricopa Assoc of Govts Scenario 2 Forecast	20,321,000	3.01%	39,010,768	8.7%
Phoenix-Mesa Gateway				
SASP Enplanement Forecast	155,600	4.77%	434,052	NA
Terminal Area Forecast	155,600	0.00%	155,600	-64.2%
Airport**	155,600	13.04%	2,306,374	431.4%
Maricopa Assoc of Govts Scenario 1 Forecast	155,600	13.83%	2,687,784	519.2%

Figure 4-46: Commercial Enplanement Forecasts Vs. FAA TAF, Airport Master Plan, and Regional Forecasts (Continued)

Commercial Service/Air Tours Airport	*Base Year 2008E**	*CAGR 2008-2030*	*Forecast 2030*	*% Difference From SASP*
Ernest A. Love Field				
SASP Enplanement Forecast	11,700	7.90%	62,276	NA
Terminal Area Forecast	11,700	0.38%	12,716	-79.6%
Airport Master Plan	11,700	11.40%	125,792	102.0%
Show Low Regional				
SASP Enplanement Forecast	7,700	1.73%	11,222	NA
Terminal Area Forecast	7,700	0.00%	7,700	-31.4%
Airport Master Plan	7,700	10.19%	65,072	479.9%
Tucson International				
SASP Enplanement Forecast	2,181,000	2.41%	3,682,018	NA
Terminal Area Forecast	2,181,000	1.74%	3,185,123	-13.5%
Airport Master Plan	2,181,000	2.60%	3,836,168	4.2%
Pima Assoc. Govts High Forecast	2,181,000	2.63%	3,863,709	4.9%
Pima Assoc. Govts Avg. Forecast	2,181,000	1.25%	2,863,816	-22.2%
Yuma International Airport				
SASP Enplanement Forecast	91,300	1.91%	138,382	NA
Terminal Area Forecast	91,300	0.61%	104,449	-24.5%

Sources: FAA *Terminal Area Forecasts*, Airport Management Records, Wilbur Smith Associates, Maricopa Association of Governments, Pima Association of Governments
Notes: *Base year enplanements are 2008 estimates except for air tour enplanements, which are 2007. **Forecasts for Phoenix Sky Harbor International were derived from airport website; E=estimate, CAGR=compound annual growth rate.

Air Cargo Projections

The following presents forecasts of air cargo tonnage carried at Arizona's airports. Like forecasts of commercial service activity, these forecasts use the base year 2007, project for 2012, 2017, and use the out-year 2030.

As shown in **Figure 4-47**, 170,470 tons of air cargo was flown from Arizona airports in 2007. During 2007, Phoenix Sky Harbor accounted for over 150,000 tons, or 89 percent of the statewide total. Tucson International followed with just under 10 percent.

Figure 4-47: Air Cargo Tonnage Forecasts, 2007-2030

Airport Name	*Base Year 2007*	*Forecasts 2012*	*2017*	*2030*	*CAGR 2007-2012*	*CAGR 2012-2030*
Laughlin/Bullhead International	195	210	250	360	1.85%	3.00%
Flagstaff Pulliam	482	530	610	900	1.85%	3.00%
Lake Havasu City	342	370	430	640	1.85%	3.00%
Phoenix Sky Harbor International	152,158	166,800	193,300	283,900	1.85%	3.00%
Tucson International	16,519	18,100	21,000	30,800	1.85%	3.00%
Yuma International	774	850	980	1,440	1.85%	3.00%
ARIZONA TOTAL	170,470	186,800	216,600	318,100	1.85%	3.00%

Sources: *Arizona Multimodal Freight Analysis Study* 2007, Boeing Air Cargo Forecasts, Phoenix Sky Harbor International Airport
Note: CAGR= compound annual growth rate

As noted previously, the FAA is projecting U.S. air cargo revenue ton miles to grow at 3.7 percent per year on average through 2010 and then grow at 3.0 percent per year through 2025. Boeing also produces annual air cargo growth rates in their *World Air Cargo Forecasts*. In their most recent edition, 2006-2007, three annual growth rates were given for national air cargo tonnage: low (3.3 percent), base (3.8 percent), and high (4.2 percent). Phoenix Sky Harbor International developed projections of air cargo tonnage through 2015, using 2005 as the base year. The compound average annual growth rate of this forecast was 2.7 percent.

In the first six months of 2008, according to the International Air Transport Association, worldwide cargo was up only 1.3 percent. This compares to the 4.9 percent growth projected by the *FAA Aerospace Forecasts, Fiscal Years 2008-2025* for worldwide air cargo revenue ton miles. Due to the changes in the airline and air cargo industries since these projections were completed, the plan has estimated a lower rate of growth in the short term for air cargo tonnage flown. In addition, a 100 percent air cargo screening mandate will be in place by 2010. This will require all airports to have appropriate infrastructure, equipment, and personnel in place to screen all air cargo. Industry experts have noted that this mandate will adversely impact the levels of air cargo flown in the near term as airports meet this deadline.

Between 2007 and 2012, air cargo tonnage at Arizona airports is projected to grow at 1.85 percent per year, or one-half the near term FAA growth rate. Between 2012 and 2030, it is projected that Arizona air cargo tonnage will grow at 3.0 percent per year, on average. Using these growth rates, Arizona air cargo tonnage is projected to reach 186,800 tons in 2012, 216,600 tons in 2017, and 318,100 tons in 2030.

General Aviation Projections

General aviation forecasts are an important step in evaluating the need for and phasing of future development. The forecasts are used to identify potential shortfalls in the system, to accommodate future demand and to identify airports that may now or in the future function in a different role within the state system.

Due to increases in fuel costs and insurance, the cost of flying is becoming increasingly less affordable. Also a cause for concern is the increasing cost of flight instruction. Total pilot registrations are remaining constant, but the number of new registrations is falling. As a result, the number of pilots is not increasing at the same rate as the population.

Within Arizona, the proliferation of second homes and vacation communities populated by wealthy part-time residents should continue to create increased demand for general aviation facilities and services. Many of these communities are adjacent to golf courses, and other recreation opportunities, or are located in rural area with limited access to commercial service airports. This combined with the suitability of the Arizona climate for flying, suggests that the demand for general aviation facilities and services in Arizona will remain strong.

Even though they are not considered in the SASP, it is recognized that airport-specific growth and demand is driven by many additional factors including the influence of airport management efforts, pilot/tenant relationships, aircraft storage accommodation, overall customer service and even willingness to support the airport through airport activities towards on and off airport users. These factors must be considered when developing detailed projections as part of master planning efforts.

As with other forecast indicators, the timeline for general aviation forecasting is 2007 to 2030, with forecasts given at the interim five and ten year periods as well. The following are the main components of the Arizona general aviation forecasts:

- Based Aircraft: the total number of active general aviation aircraft that are either stored in hangars or tied down at an Arizona airport on a regular basis.
- Aircraft Fleet Mix: the types of aircraft that are based at an airport.
- Operations: the number of individual takeoffs and landings. An aircraft which takes off and lands performs two operations.

Based Aircraft

The based aircraft forecasts in this chapter were produced using three different methodologies. These forecasts were developed based on population projections, nationwide aviation trends, and historic growth of based aircraft at Arizona's system airports, and provide low, medium, and high results. The low, medium, and high results refer to combined state forecasted based aircraft. Based aircraft at individual airports may not reflect this same level of low, medium, and high forecasts. Figure 4-48 summarizes the results of each forecasting method on a statewide basis. For each methodology utilized, individual airport based aircraft forecasts were also produced. The following sections describe the process and detailed results of each methodology.

Figure 4-48: Statewide Summary of Based Aircraft at Arizona Airports, 2007-2030

	Base Year 2007	*Forecast*			*2007-2030 CAGR*
		2012	*2017*	*2030*	
Low: Socioeconomic - Population Projections in 30-Minute Market Areas	8,043	8,601	9,194	11,040	1.39%
Medium: Historic Based Aircraft Growth and Industry Trends	8,043	8,758	9,524	11,894	1.71%
High: County Population Projections and Industry Trends	8,043	9,119	10,326	14,325	2.54%

Sources: Wilbur Smith Associates, *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR= compound annual growth rate

Based military aircraft were not included in these forecasts. Similar to military operations, the numbers of based military aircraft are difficult to project as data is not readily available. Some airports may not wish to divulge this information, or may not have authority to do so. Because of these reasons, based military aircraft were not included in statewide based aircraft forecasts and discussions of fleet mix.

For airports recording zero based aircraft for the 2007 base year, it is assumed that they will have two based aircraft by 2030, the end of the study period. This represents a compound annual growth rate of 3.2 percent for these airports (from one based aircraft in 2008). This rate of growth and out-year based aircraft number will remain constant for the three methodologies at these airports.

Low: Socioeconomic- Population Projections in 30-Minute Market Areas

This forecasting methodology used a socioeconomic approach, projecting based aircraft using population forecasts. The Arizona Department of Commerce forecasts population in counties and populated places through the year 2050. For each airport in the Arizona State Airports System Plan, a market area was created of towns and cities located within a 30-minute drive of the airport. The projected total population of each 30-minute market area was calculated so that a compound annual growth rate could be determined for each market area. These growth rates were applied to the 2007 based aircraft estimate in a linear fashion over the study period of 2007 to 2030. For airports without market area data or a growth rate of zero percent, the projected population growth rate of the airport's county within each is located was used. Statewide, this forecast methodology projects 2030 Arizona based aircraft to be 11,040, with a statewide average annual growth rate of 1.39 percent.

Medium: Historic Based Aircraft Growth and Industry Trends

This methodology used a top-down approach and adapted it with the historic growth of based aircraft at each Arizona system airport. The *FAA Aerospace Forecasts, Fiscal Years 2008-2025* include projections of U.S. active aircraft. For the period of 2008-2025, U.S. active aircraft are projected to grow at an annual rate of 1.35 percent. This growth rate was adapted for each system airport using historic based aircraft growth. Each system airport was placed into a category based on their historic based aircraft growth, using these categories to adjust the FAA's projected average annual growth rate of 1.35 percent, as presented in Figure 4-49.

Figure 4-49: Categories of Growth in the Medium Based Aircraft Forecast

Historic CAGR 1998-2008	*Percentage of Industry Rate*	*Adjusted CAGR*
≤0%	50%	0.68%
0% to >3%	100%	1.35%
3% to >10%	150%	2.03%
≥10%	200%	2.70%

Sources: *Arizona State Aviation Needs Study 2000*, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR=Compound Average Annual Growth Rate

If historic data was not available, the industry rate was applied to current based aircraft. Linear growth was applied to all airports using these growth rates. This forecast methodology projects statewide based aircraft to reach 11,894 in 2030, with a compound average annual growth rate of 1.71 percent.

High: County Population Forecasts and Industry Trends

Much like the previous forecast, this methodology uses an adapted top-down approach. It also starts with the *FAA Aerospace Forecasts, Fiscal Years 2008-2025* annual growth rate of U.S. active aircraft of 1.35 percent, but is adapted for individual airports using the projected population growth for the county within which they are located (as presented in Figure 4-30). Also similar to the previous forecast, airports were placed into categories based on the level of population growth they are projected to experience. Figure 4-50 shows how the FAA's projected rate of growth for U.S. active aircraft was adjusted based on the forecasted growth of population in Arizona counties. Airports located in Pinal County showed the most significant growth of based aircraft in this forecast, as that county is projected to experience population growth at 4.9 percent annually.

Figure 4-50: Categories of Growth in the High Based Aircraft Forecast

Projected County Population Growth Rate	*Percentage of Industry Rate*	*Adjusted CAGR*
0%	50%	0.68%
>0% to 1.5%	100%	1.35%
>1.5% to 2%	150%	2.03%
>2% to 2.5%	200%	2.70%
4.9% (Pinal County)	300%	4.05%

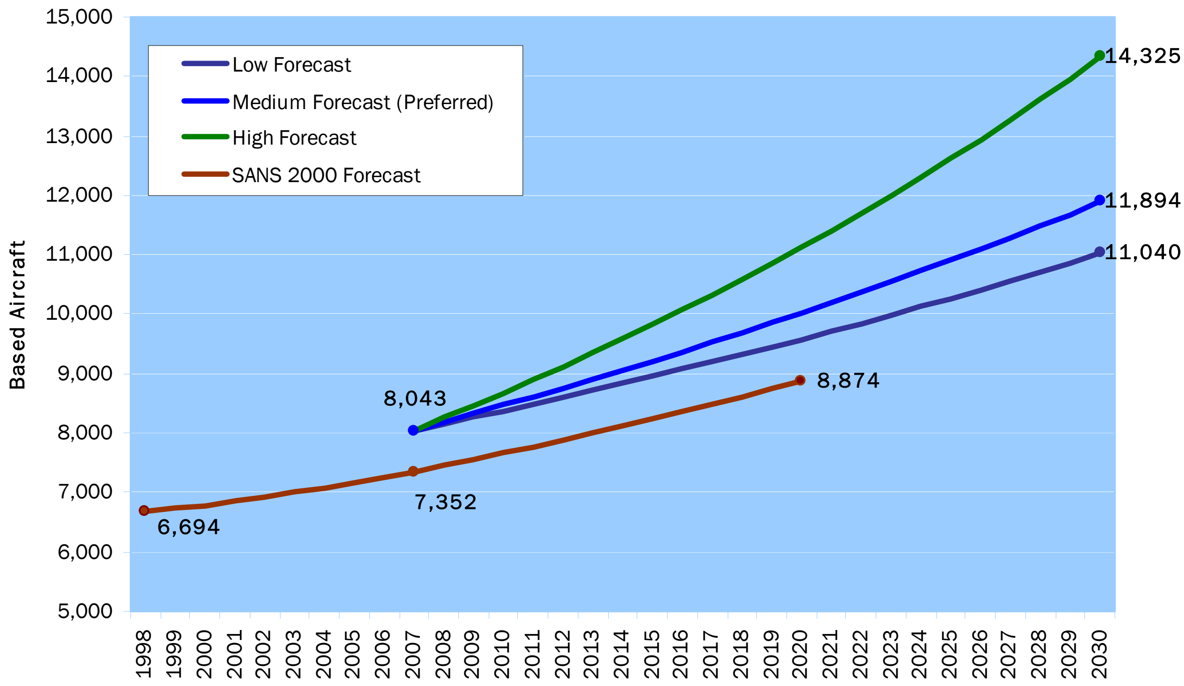
Sources: Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR=Compound average annual growth rate

Linear growth was applied to all airports using these growth rates. This forecast methodology projects Arizona based aircraft to be 14,325 in 2030, a statewide growth rate of 2.54 percent.

Preferred Based Aircraft Forecast

As summarized in Figure 4-48, these three forecasting methodologies present low, medium, and high results of forecasted based aircraft at Arizona airports. Figure 4-51 graphically compares these forecasts to those presented in the *Arizona State Aviation Needs Study 2000*. The SANS 2000 forecasts were low below the 2008 actual based aircraft numbers and below all three forecast methodologies presented in this plan.

Figure 4-51: Comparison of SASP Based Aircraft Forecasts to the *Arizona State Aviation Needs Study 2000 Forecasts*



Sources: Wilbur Smith Associates, *Arizona State Aviation Needs Study 2000*, *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

The medium forecast, based on historic based aircraft growth and FAA industry forecasts, has been chosen as the preferred based aircraft forecast. The low forecast is viewed as being too low for a state experiencing such rapid growth as Arizona, particularly in aviation.

The high forecast is seen as being too far above the FAA-forecasted rate of growth, based on the recent industry trends and large increases in fuel prices. The medium forecast, however, is viewed as a balance between the two, and the most likely reflection of how based aircraft will grow at Arizona airports, especially over the long term. The statewide projected average annual growth rate of 1.71 percent through 2030 is higher than the FAA rate of 1.35 percent annually (through 2025). This forecast of based aircraft encompasses the historic growth of based aircraft at Arizona airports, which is also a reflection of the rapid growth of population.

Figure 4-52 details the results of the three SASP methodologies for each airport included the Arizona State Airports System Plan.

Figure 4-52: Individual Airport Based Aircraft Forecasts

		Base Year	*2012*			*2017*			*2030*			*2007-2030 CAGR*		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
Aguila	Eagle Roost	48	53	51	55	59	55	63	77	65	89	2.10%	1.35%	2.70%
Ajo	Eric Marcus Municipal	8	9	9	9	9	10	10	12	13	13	1.60%	2.03%	2.03%
Bagdad	Bagdad	5	6	5	6	6	5	7	8	6	9	2.20%	0.68%	2.70%
Benson	Benson Municipal	42	42	46	45	43	51	48	44	67	57	0.22%	2.03%	1.35%
Bisbee	Bisbee Municipal	34	35	39	36	37	44	39	40	63	46	0.76%	2.70%	1.35%
Buckeye	Buckeye Municipal	62	80	64	71	104	66	81	204	72	114	5.31%	0.68%	2.70%
Bullhead City	Laughlin/Bullhead	30	32	31	34	34	32	39	40	35	55	1.22%	0.68%	2.70%
Bullhead City	Sun Valley	33	35	35	38	38	38	43	45	45	61	1.40%	1.35%	2.70%
Carefree	Sky Ranch at Carefree	115	119	119	131	122	123	150	133	134	212	0.62%	0.68%	2.70%
Casa Grande	Casa Grande Municipal	91	111	101	111	136	111	135	229	144	227	4.10%	2.03%	4.05%
Chandler	Chandler Municipal	499	517	552	570	535	610	651	585	792	921	0.69%	2.03%	2.70%
Chandler	Memorial Airfield	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Chandler	Stellar Airpark	152	160	163	174	167	174	198	190	207	281	0.97%	1.35%	2.70%
Chinle	Chinle Municipal	4	4	4	4	4	5	5	4	6	5	0.44%	2.03%	1.35%
Cibecue	Cibecue	0	1	1	1	1	1	1	2	2	2	3.20%	0.00%	3.20%
Clifton/Morenci	Greenlee County	2	2	2	2	2	2	2	2	2	2	0.03%	0.68%	0.68%
Colorado City	Colorado City Municipal	6	7	6	7	7	6	8	9	7	11	1.71%	0.68%	2.70%
Coolidge	Coolidge Municipal	34	41	39	41	50	44	51	82	63	85	3.92%	2.70%	4.05%
Cottonwood	Cottonwood	49	53	54	56	57	60	64	69	78	90	1.47%	2.03%	2.70%
Douglas	Cochise College	15	16	16	16	17	17	17	21	20	20	1.47%	1.35%	1.35%
Douglas	Douglas Municipal	27	29	28	29	31	29	31	37	32	37	1.40%	0.68%	1.35%
Douglas Bisbee	Bisbee Douglas	18	19	19	19	21	19	21	25	21	25	1.40%	0.68%	1.35%
Eloy	Eloy Municipal	41	50	45	50	61	50	61	103	65	102	4.10%	2.03%	4.05%
Flagstaff	Flagstaff Pulliam	132	139	141	141	145	151	151	165	180	180	0.98%	1.35%	1.35%
Gila Bend	Gila Bend Municipal	3	4	3	3	5	4	4	10	5	6	5.36%	2.03%	2.70%
Glendale	Glendale Municipal	413	448	457	472	486	505	539	600	655	762	1.63%	2.03%	2.70%
Globe	San Carlos Apache	47	48	52	50	50	57	54	54	75	64	0.61%	2.03%	1.35%
Goodyear	Phoenix Goodyear	276	304	305	315	336	337	360	433	438	509	1.97%	2.03%	2.70%
Grand Canyon	Grand Canyon NP	48	51	50	51	54	51	55	62	56	65	1.10%	0.68%	1.35%
Grand Canyon	Grand Canyon Valle	5	5	5	5	6	6	6	6	7	7	1.10%	1.35%	1.35%

Figure 4-52: Individual Airport Based Aircraft Forecasts (Continued)

		Base Year	2012			2017			2030			2007-2030 CAGR		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
Holbrook	Holbrook Municipal	20	21	22	22	22	24	24	25	32	32	1.05%	2.03%	2.03%
Kayenta	Kayenta	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Kearny	Kearny	5	6	6	6	6	6	7	8	8	12	2.12%	2.03%	4.05%
Kingman	Kingman	278	299	307	318	322	340	363	388	441	513	1.47%	2.03%	2.70%
Lake Havasu City	Lake Havasu City	229	251	245	262	276	262	299	351	312	423	1.88%	1.35%	2.70%
Marana	Marana Regional	306	320	338	338	335	374	374	377	485	485	0.91%	2.03%	2.03%
Marana	Pinal Airpark	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Marble Canyon	Marble Canyon	1	1	1	1	1	1	1	1	1	1	1.10%	1.35%	1.35%
Maricopa	Estrella Sailport	28	37	30	34	48	32	42	98	38	70	5.60%	1.35%	4.05%
Meadview	Pearce Ferry	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Mesa	Falcon Field	947	985	1,013	1,082	1,024	1,083	1,236	1,134	1,290	1,748	0.79%	1.35%	2.70%
Mesa	Phoenix-Mesa Gateway	103	108	114	118	114	126	134	129	163	190	0.98%	2.03%	2.70%
Nogales	Nogales International	35	38	39	39	41	43	43	50	56	56	1.53%	2.03%	2.03%
Page	Page	76	80	84	81	84	93	87	95	121	103	0.99%	2.03%	1.35%
Parker	Avi Suquilla	42	44	46	46	46	51	51	53	67	67	1.00%	2.03%	2.03%
Payson	Payson	86	91	89	92	97	92	98	113	100	117	1.18%	0.68%	1.35%
Peach Springs	Grand Canyon Caverns	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Peach Springs	Grand Canyon West	2	2	2	2	2	2	3	3	3	4	2.20%	1.35%	2.70%
Peach Springs	Hualapai	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	4.05%
Peoria	Pleasant Valley	35	37	36	40	40	37	46	47	41	65	1.29%	0.68%	2.70%
Phoenix	Phoenix Deer Valley	1,274	1,361	1,408	1,456	1,454	1,557	1,663	1,727	2,021	2,351	1.33%	2.03%	2.70%
Phoenix	Phoenix Regional	11	13	12	13	16	13	16	27	15	27	3.98%	1.35%	4.05%
Phoenix	Phoenix Sky Harbor	114	121	118	130	127	122	149	147	133	210	1.12%	0.68%	2.70%
Polacca	Polacca	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Prescott	Ernest A. Love Field	336	370	359	384	407	384	439	522	458	620	1.93%	1.35%	2.70%
Rimrock	Rimrock	36	39	38	41	42	41	47	50	49	66	1.45%	1.35%	2.70%
Safford	Safford Regional	41	42	45	44	44	50	47	48	65	56	0.66%	2.03%	1.35%
San Luis	Rolle Airfield	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
San Manuel	San Manuel/Ray/Blair	57	60	65	70	64	74	85	74	105	142	1.11%	2.70%	4.05%
Scottsdale	Scottsdale	447	468	478	511	491	511	583	554	609	825	0.94%	1.35%	2.70%
Sedona	Sedona	104	110	111	119	116	119	136	134	142	192	1.12%	1.35%	2.70%

Figure 4-52: Individual Airport Based Aircraft Forecasts (Continued)

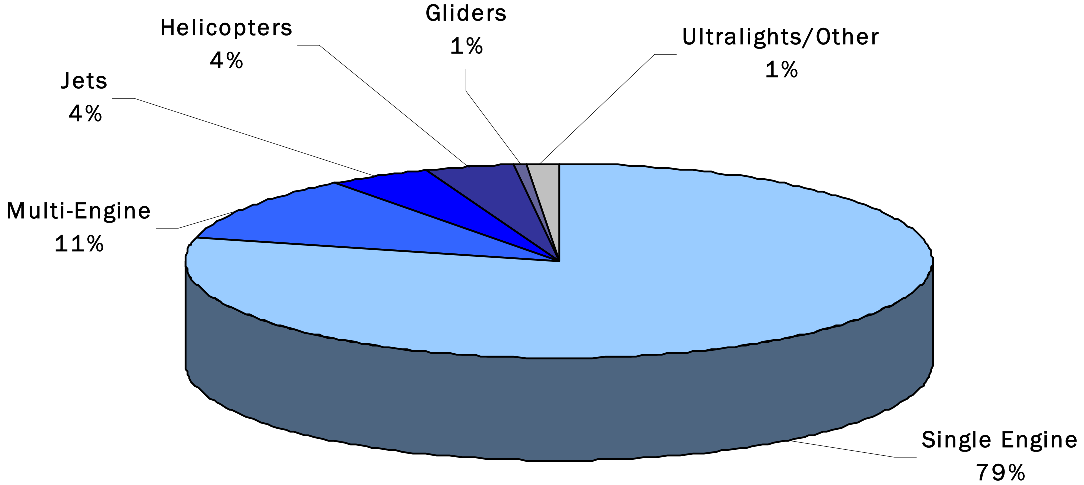
		Base Year	*2012*			*2017*			*2030*			*2007-2030 CAGR*		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
Seligman	Seligman	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Sells	Sells	1	1	1	1	1	1	1	1	1	2	1.60%	1.35%	2.03%
Sierra Vista	Sierra Vista Municipal/ LAA	82	87	91	88	93	100	94	108	130	112	1.22%	2.03%	1.35%
Show Low	Show Low Regional	66	72	73	73	79	81	81	101	105	105	1.87%	2.03%	2.03%
Springerville	Springerville Municipal	19	20	20	20	21	22	22	23	26	26	0.91%	1.35%	1.35%
St Johns	St Johns Industrial	15	16	17	16	18	18	17	22	24	20	1.58%	2.03%	1.35%
Superior	Superior Municipal	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	4.05%
Taylor	Taylor	14	15	14	15	16	15	17	20	16	22	1.54%	0.68%	2.03%
Temple Bar	Temple Bar	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Tombstone	Tombstone Municipal	2	2	2	2	2	2	2	2	3	3	0.69%	1.35%	1.35%
Tuba City	Tuba City	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Tucson	La Cholla Airpark	97	102	104	107	106	111	119	120	132	154	0.93%	1.35%	2.03%
Tucson	Ryan Field	304	315	336	336	326	372	371	356	482	482	0.69%	2.03%	2.03%
Tucson	Tucson International	308	325	319	340	344	329	376	396	360	488	1.10%	0.68%	2.03%
Whiteriver	Whiteriver	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Whitmore	Grand Canyon Bar Ten	0	1	1	1	1	1	1	2	2	2	3.20%	3.20%	3.20%
Wickenburg	Wickenburg Municipal	47	52	50	54	57	54	61	73	64	87	1.94%	1.35%	2.70%
Willcox	Cochise County	27	28	30	29	29	33	31	32	43	37	0.74%	2.03%	1.35%
Williams	H.A. Clark Memorial	18	19	20	19	20	22	21	23	29	25	1.06%	2.03%	1.35%
Window Rock	Window Rock	4	4	4	4	4	4	5	4	5	5	0.12%	0.68%	1.35%
Winslow	Winslow-Lindbergh	9	9	9	10	9	10	11	10	11	14	0.41%	0.68%	2.03%
Yuma	Yuma International	178	195	203	197	214	232	218	272	329	282	1.86%	2.70%	2.03%
ARIZONA TOTAL		8,043	8,601	8,758	9,119	9,194	9,524	10,326	11,040	11,894	14,325	1.39%	1.72%	2.54%

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR= compound annual growth rate

Fleet Mix

An airport's fleet mix is one indication of its operational role and facility needs. Figure 4-53 shows the 2007 general aviation fleet mix in Arizona. Single-engine aircraft account for the majority of all based aircraft, 76 percent of the statewide total. Multi-engine aircraft follow with 11 percent. Helicopters and jet aircraft account for four percent each of the state total.

Figure 4-53: Based Aircraft Fleet Mix at Arizona Airports, 2007



Source: *Airport Inventory & Data Survey* 2008

A statewide forecast of the based aircraft fleet mix was conducted based on total statewide based aircraft in the preferred forecast, as well as growth rates provided in the *FAA Aerospace Forecasts, Fiscal Years 2008-2025*. For this forecast, it was assumed that different types of aircraft would grow at different rates. The FAA projects that jet aircraft will grow at a much faster rate than single- and multi-engine aircraft. Helicopters are also projected to grow at a substantially higher rate, particularly in Arizona due to the volume of helicopter flight training and aerial tours. Figure 4-54 presents the projected based aircraft fleet mix in Arizona. Single-engine aircraft, the largest share of the statewide fleet, are projected to grow at an annual rate of 1.05 percent, reaching over 8,000 aircraft by 2030. Multi-engine aircraft are only projected to grow at a rate of 0.4 percent annually, to a 2030 total of 944 aircraft. Helicopters are projected to increase by nearly five percent each year in the forecast period, to a total of over 900 aircraft. Aircraft seeing the most significant gains are jets, gliders, and ultralight/other aircraft, all with annual forecasted growth rates over six percent for jets and over 5 percent for gliders and ultralight/other. The increased availability of very light jet (VLJ) aircraft is a major factor in jet aircraft being forecasted so high by the FAA.

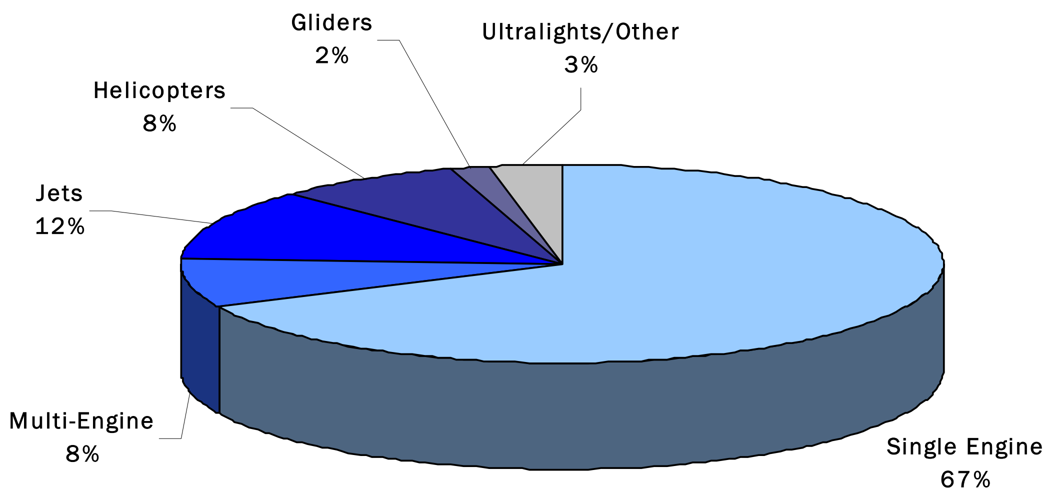
Figure 4-54: Statewide Fleet Mix Forecast, 2007 to 2030

Aircraft Type	Base Year 2007	Forecasts 2012	Forecasts 2017	Forecasts 2030	CAGR 2007-2030
Single Engine	6,353	6,735	7,105	8,078	1.05%
Multi-Engine	861	892	912	944	0.40%
Jets	358	487	645	1,382	6.05%
Helicopters	317	441	558	930	4.80%
Gliders	53	88	139	193	5.77%
Ultralights/Other	101	112	162	367	5.77%
ARIZONA TOTAL	8,043	8,755	9,521	11,894	1.72%

Sources: *Airport Inventory & Data Survey* 2008, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR= compound annual growth rate

Due to different growth rates being applied to different types of aircraft, shares of the statewide total are expected to be different in 2030 than they were in 2007. Figure 4-55 shows the percentage of total Arizona based aircraft for each type in 2030. Single-engine aircraft while still the largest portion, will decrease to 67 percent of the statewide total. Multi-engine aircraft will also decrease their share, falling to 8 percent of the total. Jet aircraft are projected to pass up multi-engine aircraft, accounting for 12 percent of the total in 2030. The statewide percentage for helicopters, gliders, and ultralight/other aircraft are also expected to increase over the forecast period.

Figure 4-55: Projected Based Aircraft Fleet Mix at Arizona Airports, 2030



Sources: *Airport Inventory & Data Survey* 2008, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

General Aviation Aircraft Operation Forecasts

Forecasting general aviation aircraft operations (landings and takeoffs) helps to determine whether existing capacity is sufficient to handle future demand. Operations included in these forecasts include air taxi operations and both local and itinerant general aviation operations, but not military or air cargo operations. The general aviation operations forecasts presented in this chapter were produced using three different methodologies, producing low, medium, and high results. Figure 4-56 presents a summary of these three methodologies. Individual airport forecasts were also produced, which are presented later with the selection of a preferred operations forecast methodology. As with based aircraft forecasts, the low, medium, and high forecast results refer to combined state forecasted operations. Operations at individual airports may not reflect these same levels of low, medium, and high forecasts. In the base year of 2007, over 3.8 million general aviation operations were recorded at system airports.

Figure 4-56: Summary of General Aviation Operations Forecasts

	2007	*Forecast*			*2007-2030*
	Base Year	*2012*	*2017*	*2030*	*CAGR*
Low: Operations Per Based Aircraft	3,842,736	4,166,500	4,520,800	5,661,200	1.70%
Medium: Historic Operations Growth and Industry Trends	3,842,736	4,213,900	4,626,300	5,929,000	1.90%
High: County Population Projections and Industry Trends	3,842,736	4,333,200	4,889,400	6,711,900	2.45%

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Notes: Operations may not sum to totals due to rounding;; CAGR= compound annual growth rate

Low: Operations Per Based Aircraft

The first projection of general aviation operations uses the current ratio of annual non-commercial and non-military operations per based aircraft (OPBA). This is a standard forecasting methodology used by the FAA. This ratio is multiplied by the projected number of based aircraft at each airport (from the preferred based aircraft forecast). This forecast assumes that this ratio of operations per based aircraft will remain constant over the forecast period. Because airports with zero based aircraft were projected to gain them, this forecast also assumes that these airports have one based aircraft in order to create a ratio that can be used to forecast general aviation operations. Figure 4-57 details the OPBA ratio at system airports. The average OPBA ratio at Arizona system airports is one based aircraft to 1,936 operations. Grand Canyon West Airport, with 54,664 OPBA, represents the highest ratio, while Rimrock, with only 17 OPBA, is the lowest. This methodology results in over 5.6 million annual general aviation operations at all system airports by 2030. This represents an annual average growth of 1.70 percent between 2007 and 2030.

Figure 4-57: Operations Per Based Aircraft (OPBA) Ratio at System Airports, 2007-2030

Associated City	*Airport Name*	*OPBA*
Aguila	Eagle Roost	73
Ajo	Eric Marcus Municipal	63
Bagdad	Bagdad	2,800
Benson	Benson Municipal	171
Bisbee	Bisbee Municipal	133
Buckeye	Buckeye Municipal	461
Bullhead City	Laughlin/Bullhead International	731
Bullhead City	Sun Valley	30
Carefree	Sky Ranch at Carefree	31
Casa Grande	Casa Grande Municipal	703
Chandler	Chandler Municipal	530
Chandler	Memorial Airfield	25,000
Chandler	Stellar Airpark	297
Chinle	Chinle Municipal	600
Cibecue	Cibecue	1,415
Clifton/Morenci	Greenlee County	4,380
Colorado City	Colorado City Municipal	504
Coolidge	Coolidge Municipal	175
Cottonwood	Cottonwood	396
Douglas	Cochise College	3,479
Douglas	Douglas Municipal	407
Douglas Bisbee	Bisbee Douglas International	211
Eloy	Eloy Municipal	561
Flagstaff	Flagstaff Pulliam	299
Ganado	Ganado	3,667
Gila Bend	Gila Bend Municipal	354
Glendale	Glendale Municipal	340
Globe	San Carlos Apache	648
Goodyear	Phoenix Goodyear	95
Grand Canyon	Grand Canyon National Park	160
Grand Canyon	Grand Canyon Valle	245
Holbrook	Holbrook Municipal	4,524
Kayenta	Kayenta	840
Kearny	Kearny	207
Kingman	Kingman	225
Lake Havasu City	Lake Havasu City	359
Marana	Marana Regional	7,296
Marana	Pinal Airpark	2,585
Marble Canyon	Marble Canyon	589
Maricopa	Estrella Sailport	1,100
Meadview	Pearce Ferry	329
Mesa	Falcon Field	2,770
Mesa	Phoenix-Mesa Gateway	1,066
Nogales	Nogales International	288
Page	Page	346
Parker	Avi Suquilla	491
Payson	Payson	1,350
Peach Springs	Grand Canyon Caverns	73

Figure 4-57: Operations Per Based Aircraft (OPBA) Ratio at Arizona Airports, 2007-2030 (Continued)

Associated City	*Airport Name*	*OPBA*
Peach Springs	Grand Canyon West	54,664
Peach Springs	Hualapai	200
Peoria	Pleasant Valley	1,714
Phoenix	Phoenix Deer Valley	296
Phoenix	Phoenix Regional	1,327
Phoenix	Phoenix Sky Harbor International	1,119
Polacca	Polacca	1,000
Prescott	Ernest A. Love Field	663
Rimrock	Rimrock	17
Safford	Safford Regional	421
San Luis	Rolle Airfield	2,900
San Manuel	San Manuel/Ray/Blair	212
Scottsdale	Scottsdale	428
Sedona	Sedona	433
Seligman	Seligman	1,100
Sells	Sells	1,200
Show Low	Show Low Regional	450
Sierra Vista	Sierra Vista Municipal/Libby Army Airfield	475
Springerville	Springerville Municipal	211
St Johns	St Johns Industrial Air Park	933
Superior	Superior Municipal	200
Taylor	Taylor	344
Temple Bar	Temple Bar	1,800
Tombstone	Tombstone Municipal	150
Tuba City	Tuba City	910
Tucson	La Cholla Airpark	41
Tucson	Ryan Field	811
Tucson	Tucson International	596
Whiteriver	Whiteriver	3,440
Whitmore	Grand Canyon Bar Ten Airstrip	1,275
Wickenburg	Wickenburg Municipal	372
Willcox	Cochise County	271
Williams	H.A. Clark Memorial Field	203
Window Rock	Window Rock	1,750
Winslow	Winslow-Lindbergh Regional	2,517
Yuma	Yuma International	455

Sources: *Airport Inventory & Data Survey* 2008, FAA ATADs

Medium: Historic Operations Growth and Industry Trends

This methodology, similar to the preferred based aircraft forecast methodology, uses historic trends to adjust the FAA-forecasted rate of growth for operations nationally. As noted in Figure 4-24, historic general aviation operations at Arizona system airports grew at an average annual rate of 0.37 percent between 1998 and 2007. The *FAA Aerospace Forecasts, Fiscal Years 2008-2025* projects general aviation operations to grow at an annual average rate of 1.31 percent nationwide from 2007 to 2025. Figure 4-58 details how the FAA rate was adjusted for airports in Arizona based on each airport's historic growth in general aviation operations. These adjusted growth rates were applied to the base year data (2007) in a linear fashion to arrive at forecasted general aviation operations. Statewide, this forecast methodology yields nearly six million general aviation operations by 2030, representing an average annual growth rate of 1.90 percent. Airports for which historic data were not available were grown at the industry rate of 1.31 percent annually.[3]

Figure 4-58: Categories of Growth in the Medium Operations Forecast

Historic Growth Rate	*Percentage of Industry Rate*	*Adjusted CAGR*
≤-1%	50%	0.65%
-1% to <0.5%	100%	1.31%
0.5% to <5%	150%	1.96%
5% to <10%	200%	2.61%
≥10%	250%	3.27%

Sources: *Arizona State Aviation Needs Study 2000*, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR= compound annual growth rate

High: County Population Forecasts and Industry Trends

This forecast methodology is similar to the high based aircraft methodology It uses projected growth in county population developed by the Arizona Department of Commerce to adjust the FAA's projected rate of growth for general aviation operations. The FAA Aerospace Forecast growth rate of 1.31 percent is adjusted based on each airport's projected county population (Figure 4-30). The adjusted growth rates shown in Figure 4-59 were applied to 2007 general aviation operations at a linear rate. Statewide, this methodology has a compound average annual growth rate of 2.45 percent, resulting in a total statewide operations number of over 6.7 million by 2030.

Figure 4-59: Categories of Growth in the High Operations Forecast

Forecasted County Population Growth Rate	*Percentage of Industry Rate*	*Adjusted CAGR*
≤0%	50%	0.65%
>0% to 1.5%	100%	1.31%
>1.5% to 2%	150%	1.96%
>2% to 2.5%	200%	2.61%
4.9% (Pinal County)	300%	3.92%

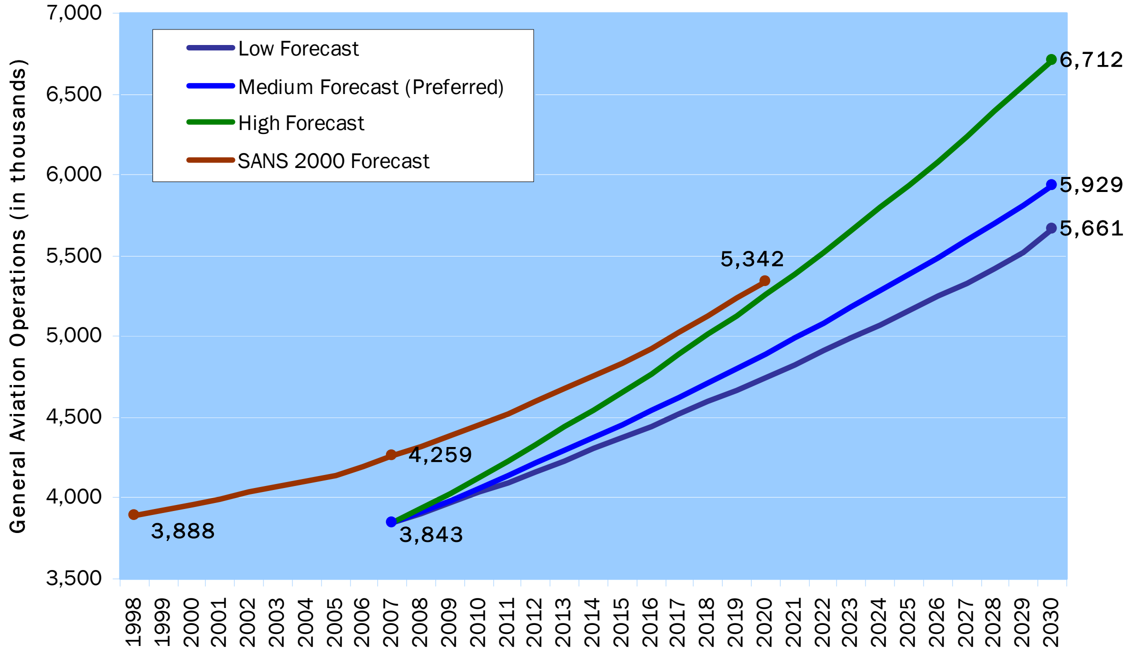
Sources: Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: CAGR= compound annual growth rate

[3] Historic data were not available for Grand Canyon West Airport; however, operations were grown at 150% of the industry rate due to rapid growth of the airport and nearby tourist attractions.

Preferred Operations Forecast

As summarized in Figure 4-55, these three forecast methodologies present low, medium, and high results of projected general aviation operations at system airports. **Figure 4-60** compares these forecasts to those presented in the *SANS 2000.* The SANS 2000 projection of general aviation operations was higher than actual 2008 general aviation operations.

Figure 4-60: Comparison of SASP General Aviation Operations Forecasts to the SANS 2000 Forecasts (operations in thousands)



Sources: Wilbur Smith Associates, *Arizona State Aviation Needs Study 2000*, *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

The forecast showing a medium range of results, based on the historic growth of operations and the FAA-forecasted industry trends, is the preferred long-term forecast. The low forecast, which used a constant OPBA ratio applied to the preferred based aircraft forecast, is viewed as being low, as general aviation operations are likely to grow at a higher rate than based aircraft in a state such as Arizona that accommodates a high level of training activity. The high forecast, having a statewide average annual growth rate of 2.45 percent, is seen as being too high based on current industry trends. Factors such as rising fuel costs will likely prevent general aviation operations levels from reaching this level by 2030. The growth produced by the medium forecast methodology (1.90 percent) is higher than both the FAA-forecasted rate (1.31 percent) and the preferred based aircraft forecast. This forecast acknowledges that general aviation operations in Arizona will grow at a slightly more rapid rate than based aircraft and at a faster rate than general aviation operations nationally.

Figure 4-61 details the results of each of the methodologies for each airport included in the Arizona State Airports System Plan.

Figure 4-61: Projections of General Aviation Operations at Individual Airports, 2007-2030

		Base Year	2012			2017			2030			2007-2030 CAGR		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
Aguila	Eagle Roost	3,500	3,700	3,700	4,000	4,000	4,000	4,500	4,800	4,700	6,300	1.35%	1.31%	2.61%
Ajo	Eric Marcus Municipal	500	600	500	600	600	500	600	800	600	800	2.03%	0.65%	1.96%
Bagdad	Bagdad	14,000	14,500	14,900	15,900	15,000	15,900	18,100	16,300	18,900	25,300	0.68%	1.31%	2.61%
Benson	Benson Municipal	7,200	8,000	8,500	7,700	8,800	9,900	8,200	11,400	15,100	9,700	2.03%	3.27%	1.31%
Bisbee	Bisbee Municipal	4,508	5,200	5,300	4,800	5,900	6,200	5,100	8,300	9,400	6,100	2.70%	3.27%	1.31%
Buckeye	Buckeye Municipal	28,562	29,500	32,500	32,500	30,600	37,000	37,000	33,300	51,700	51,700	0.68%	2.61%	2.61%
Bullhead City	Laughlin/Bullhead Int.	21,936	22,700	22,700	25,000	23,500	23,400	28,400	25,600	25,500	39,700	0.68%	0.65%	2.61%
Bullhead City	Sun Valley	1,000	1,100	1,100	1,100	1,100	1,200	1,300	1,400	1,600	1,800	1.35%	1.96%	2.61%
Carefree	Sky Ranch at Carefree	3,572	3,700	3,700	4,100	3,800	3,800	4,600	4,200	4,100	6,500	0.68%	0.65%	2.61%
Casa Grande	Casa Grande Municipal	63,980	70,700	68,300	77,500	78,200	72,800	94,000	101,500	86,200	154,900	2.03%	1.31%	3.92%
Chandler	Chandler Municipal	264,526	292,400	300,900	300,900	323,300	342,300	342,300	419,700	478,700	478,700	2.03%	2.61%	2.61%
Chandler	Memorial Airfield	25,000	25,000	26,700	28,400	25,000	28,500	32,400	50,000	33,700	45,200	3.20%	1.31%	2.61%
Chandler	Stellar Airpark	45,100	48,200	49,700	51,300	51,600	54,800	58,400	61,400	70,500	81,600	1.35%	1.96%	2.61%
Chinle	Chinle Municipal	2,400	2,700	2,800	2,600	2,900	3,300	2,700	3,800	5,000	3,200	2.03%	3.27%	1.31%
Cibecue	Cibecue	1,415	1,400	1,500	1,600	1,400	1,600	1,700	2,800	1,900	2,200	3.20%	1.31%	1.96%
Clifton/Morenci	Greenlee County	8,760	9,100	9,700	9,000	9,400	10,600	9,300	10,200	13,700	10,200	0.68%	1.96%	0.65%
Colorado City	Colorado City Municipal	3,025	3,100	3,100	3,400	3,200	3,200	3,900	3,500	3,500	5,500	0.68%	0.65%	2.61%
Coolidge	Coolidge Municipal	5,960	6,800	6,200	7,200	7,800	6,400	8,800	11,000	6,900	14,400	2.70%	0.65%	3.92%
Cottonwood	Cottonwood	19,400	21,400	20,700	22,100	23,700	22,100	25,100	30,800	26,100	35,100	2.03%	1.31%	2.61%
Douglas	Cochise College	52,180	55,800	57,500	55,700	59,700	63,400	59,400	71,100	81,500	70,300	1.35%	1.96%	1.31%
Douglas	Douglas Municipal	11,000	11,400	11,700	11,700	11,800	12,500	12,500	12,800	14,800	14,800	0.68%	1.31%	1.31%
Douglas Bisbee	Bisbee Douglas Int.	3,800	3,900	3,900	4,100	4,100	4,100	4,300	4,400	4,400	5,100	0.68%	0.65%	1.31%
Eloy	Eloy Municipal	23,000	25,400	24,500	27,900	28,100	26,200	33,800	36,500	31,000	55,700	2.03%	1.31%	3.92%
Flagstaff	Flagstaff Pulliam	39,408	42,100	40,700	42,000	45,100	42,100	44,900	53,700	45,800	53,100	1.35%	0.65%	1.31%
Gila Bend	Gila Bend Municipal	11,000	12,200	12,900	12,500	13,400	15,200	14,200	17,500	23,000	19,900	2.03%	3.27%	2.61%
Glendale	Glendale Municipal	146,137	161,600	155,900	166,200	178,600	166,400	189,100	231,800	197,000	264,400	2.03%	1.31%	2.61%
Globe	San Carlos Apache	16,000	17,700	17,100	17,100	19,600	18,200	18,200	25,400	21,600	21,600	2.03%	1.31%	1.31%
Goodyear	Phoenix Goodyear	178,896	197,800	197,100	203,500	218,700	217,200	231,500	283,800	279,500	323,700	2.03%	1.96%	2.61%
Grand Canyon	Grand Canyon NP	4,560	4,700	4,700	4,900	4,900	4,900	5,200	5,300	5,300	6,100	0.68%	0.65%	1.31%
Grand Canyon	Grand Canyon Valle	800	900	900	900	900	900	900	1,100	1,100	1,100	1.35%	1.31%	1.31%
Holbrook	Holbrook Municipal	4,900	5,400	5,200	5,400	6,000	5,600	5,900	7,800	6,600	7,700	2.03%	1.31%	1.96%
Kayenta	Kayenta	4,524	4,500	4,800	5,000	4,500	5,200	5,500	9,000	6,100	7,100	3.20%	1.31%	1.96%

Figure 4-61: Projections of General Aviation Operations at Individual Airports, 2007-2030 (Continued)

		Base Year	2012			2017			2030			2007-2030 CAGR		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
Kearny	Kearny	4,200	4,600	4,500	5,100	5,100	4,800	6,200	6,700	5,700	10,200	2.03%	1.31%	3.92%
Kingman	Kingman	57,437	63,500	65,300	65,300	70,200	74,300	74,300	91,100	103,900	103,900	2.03%	2.61%	2.61%
Lake Havasu City	Lake Havasu City	51,514	55,100	55,000	58,600	58,900	58,700	66,700	70,100	69,400	93,200	1.35%	1.31%	2.61%
Marana	Marana Regional	110,000	121,600	121,200	121,200	134,400	133,600	133,600	174,500	171,900	171,900	2.03%	1.96%	1.96%
Marana	Pinal Airpark	7,296	7,300	7,500	8,800	7,300	7,800	10,700	14,600	8,500	17,700	3.20%	0.65%	3.92%
Marble Canyon	Marble Canyon	2,585	2,800	2,800	2,800	3,000	3,100	2,900	3,500	4,000	3,500	1.35%	1.96%	1.31%
Maricopa	Estrella Sailport	16,500	17,600	17,600	20,000	18,900	18,800	24,200	22,500	22,200	39,900	1.35%	1.31%	3.92%
Meadview	Pearce Ferry	1,100	1,100	1,200	1,300	1,100	1,300	1,400	2,200	1,500	2,000	3.20%	1.31%	2.61%
Mesa	Falcon Field	311,691	333,300	343,400	354,600	356,500	378,400	403,400	424,400	487,000	564,000	1.35%	1.96%	2.61%
Mesa	Phoenix-Mesa Gateway	285,334	315,400	324,600	324,600	348,700	369,300	369,300	452,700	516,300	516,300	2.03%	2.61%	2.61%
Nogales	Nogales International	37,300	41,200	42,400	41,100	45,600	48,300	45,300	59,200	67,500	58,300	2.03%	2.61%	1.96%
Page	Page	21,882	24,200	22,600	23,300	26,700	23,400	24,900	34,700	25,400	29,500	2.03%	0.65%	1.31%
Parker	Avi Suquilla	14,520	16,100	15,500	16,000	17,700	16,500	17,600	23,000	19,600	22,700	2.03%	1.31%	1.96%
Payson	Payson	42,250	43,700	48,100	45,100	45,200	54,700	48,100	49,300	76,500	56,900	0.68%	2.61%	1.31%
Peach Springs	Grand Canyon Caverns	1,350	1,400	1,500	1,400	1,400	1,700	1,500	2,700	2,400	1,800	3.20%	2.61%	1.31%
Peach Springs	Grand Canyon West	109,328	116,900	120,500	124,400	125,000	132,700	141,500	148,900	170,800	197,800	1.35%	1.96%	2.61%
Peach Springs	Hualapai	200	200	200	200	200	200	200	400	200	300	3.20%	0.65%	1.31%
Peoria	Pleasant Valley	60,000	62,100	66,100	68,300	64,200	72,800	77,600	70,100	93,700	108,600	0.68%	1.96%	2.61%
Phoenix	Phoenix Deer Valley	377,696	417,600	416,200	429,700	461,600	458,600	488,800	599,200	590,100	683,500	2.03%	1.96%	2.61%
Phoenix	Phoenix Regional	14,600	15,600	15,600	17,700	16,700	16,600	21,400	19,900	19,700	35,300	1.35%	1.31%	3.92%
Phoenix	Phoenix Sky Harbor Int.	127,563	131,900	131,800	145,100	136,400	136,100	165,100	148,900	148,200	230,800	0.68%	0.65%	2.61%
Polacca	Polacca	1,000	1,000	1,000	1,100	1,000	1,100	1,200	2,000	1,200	1,600	3.20%	0.65%	1.96%
Prescott	Ernest A. Love Field	222,804	238,300	230,200	253,500	254,800	237,800	288,300	303,400	258,800	403,200	1.35%	0.65%	2.61%
Rimrock	Rimrock	600	600	600	700	700	700	800	800	800	1,100	1.35%	1.31%	2.61%
Safford	Safford Regional	17,250	19,100	19,000	18,400	21,100	20,900	19,600	27,400	27,000	23,200	2.03%	1.96%	1.31%
San Luis	Rolle Airfield	2,900	2,900	3,000	3,200	2,900	3,100	3,500	5,800	3,400	4,500	3.20%	0.65%	1.96%
San Manuel	San Manuel/Ray/Blair	12,080	13,800	14,200	14,600	15,800	16,700	17,700	22,300	25,300	29,200	2.70%	3.27%	3.92%
Scottsdale	Scottsdale	191,503	204,800	211,000	217,900	219,000	232,500	247,800	260,800	299,200	346,500	1.35%	1.96%	2.61%
Sedona	Sedona	45,000	48,100	49,600	51,200	51,500	54,600	58,200	61,300	70,300	81,400	1.35%	1.96%	2.61%
Seligman	Seligman	1,100	1,100	1,200	1,300	1,100	1,300	1,400	2,200	1,500	2,000	3.20%	1.31%	2.61%
Sells	Sells	1,200	1,300	1,300	1,300	1,400	1,400	1,500	1,600	1,600	1,900	1.35%	1.31%	1.96%
Show Low	Show Low Regional	40,060	44,300	44,100	44,100	49,000	48,600	48,600	63,600	62,600	62,600	2.03%	1.96%	1.96%
Sierra Vista	Sierra Vista Municipal/LAA	38,987	43,100	44,400	41,600	47,700	50,500	44,400	61,900	70,500	52,500	2.03%	2.61%	1.31%
Springerville	Springerville Municipal	4,000	4,300	4,100	4,300	4,600	4,300	4,600	5,400	4,600	5,400	1.35%	0.65%	1.31%

Figure 4-61: Projections of General Aviation Operations at Individual Airports, 2007-2030 (Continued)

		Base Year	*2012*			*2017*			*2030*			*2007-2030 CAGR*		
Associated City	*Airport Name*	*2007*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
St Johns	St Johns Industrial	14,000	15,500	14,900	14,900	17,100	15,900	15,900	22,200	18,900	18,900	2.03%	1.31%	1.31%
Superior	Superior Municipal	200	200	200	200	200	200	300	400	200	500	3.20%	0.65%	3.92%
Taylor	Taylor	4,810	5,000	5,100	5,300	5,100	5,500	5,800	5,600	6,500	7,500	0.68%	1.31%	1.96%
Temple Bar	Temple Bar	1,800	1,800	1,900	2,000	1,800	2,000	2,300	3,600	2,400	3,300	3.20%	1.31%	2.61%
Tombstone	Tombstone Municipal	300	300	300	300	300	400	300	400	500	400	1.35%	1.96%	1.31%
Tuba City	Tuba City	910	900	900	1,000	900	1,000	1,000	1,800	1,100	1,200	3.20%	0.65%	1.31%
Tucson	La Cholla Airpark	4,000	4,300	4,300	4,400	4,600	4,600	4,900	5,400	5,400	6,200	1.35%	1.31%	1.96%
Tucson	Ryan Field	246,438	272,400	280,400	271,500	301,200	318,900	299,200	391,000	445,900	385,000	2.03%	2.61%	1.96%
Tucson	Tucson International	183,512	189,800	189,600	202,200	196,300	195,900	222,800	214,300	213,100	286,700	0.68%	0.65%	1.96%
Whiteriver	Whiteriver	3,440	3,400	3,600	3,800	3,400	3,700	4,200	6,900	4,000	5,400	3.20%	0.65%	1.96%
Whitmore	Grand Canyon Bar Ten	1,275	1,300	1,300	1,500	1,300	1,400	1,700	2,600	1,500	2,300	3.20%	0.65%	2.61%
Wickenburg	Wickenburg Municipal	17,500	18,700	20,500	19,900	20,000	24,100	22,600	23,800	36,600	31,700	1.35%	3.27%	2.61%
Willcox	Cochise County	7,310	8,100	7,800	7,800	8,900	8,300	8,300	11,600	9,900	9,900	2.03%	1.31%	1.31%
Williams	H.A. Clark Memorial	3,650	4,000	3,900	3,900	4,500	4,200	4,200	5,800	4,900	4,900	2.03%	1.31%	1.31%
Window Rock	Window Rock	7,000	7,200	8,200	7,500	7,500	9,700	8,000	8,200	14,700	9,400	0.68%	3.27%	1.31%
Winslow	Winslow-Lindbergh	22,650	23,400	23,400	25,000	24,200	24,200	27,500	26,400	26,300	35,400	0.68%	0.65%	1.96%
Yuma	Yuma International	80,944	92,500	92,100	89,200	105,700	104,800	98,300	149,500	146,500	126,500	2.70%	2.61%	1.96%
ARIZONA TOTAL		3,842,736	4,166,500	4,213,900	4,333,200	4,520,800	4,626,300	4,889,400	5,661,200	5,929,000	6,711,900	1.70%	1.90%	2.45%

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: Operations may not sum to totals due to rounding

Local/Itinerant Split

The FAA defines local general aviation operations as those performed by aircraft that:

- Operate in the local traffic pattern or within sight of an airport,
- Are known to be departing for or arriving from flight in local practice areas within a 20-mile radium of the airport, or
- Are executing practice instrument approaches.

All other operations are considered itinerant. A split of local and iterant operations was obtained from air traffic control towers and the Airport Inventory and Data Survey. It is assumed that the split between local and itinerant operations will remain constant for each airport throughout the study period. Statewide, approximately 53 percent of all general aviation operations are considered local, while the remaining 47 percent are itinerant. Figure 4-62 details the 2007 local/itinerant split of general aviation operations for each system airport, and a projection of general aviation operations.

Figure 4-62: Local/Itinerant Split of General Aviation Operations

			2007		Split		2012		2017		2030	
Associated City	*Airport Name*	*2007 Total*	*Local*	*Itinerant*	*Local Share*	*Itinerant Share*	*Local*	*Itinerant*	*Local*	*Itinerant*	*Local*	*Itinerant*
Aguila	Eagle Roost	3,500	3,500	0	100.0%	0.0%	3,700	0	4,000	0	4,700	0
Ajo	Eric Marcus Municipal	500	200	300	40.0%	60.0%	200	300	200	300	200	300
Bagdad	Bagdad	14,000	5,000	9,000	35.7%	64.3%	5,300	9,600	5,700	10,200	6,700	12,100
Benson	Benson Municipal	7,200	1,772	5,428	24.6%	75.4%	2,100	6,400	2,400	7,500	3,700	11,400
Bisbee	Bisbee Municipal	4,508	3,156	1,352	70.0%	30.0%	3,700	1,600	4,400	1,900	6,600	2,800
Buckeye	Buckeye Municipal	28,562	19,137	9,425	67.0%	33.0%	21,800	10,700	24,800	12,200	34,600	17,100
Bullhead City	Laughlin/Bullhead International	21,936	4,738	17,198	21.6%	78.4%	4,900	17,800	5,100	18,400	5,500	20,000
Bullhead City	Sun Valley	1,000	1,000	0	100.0%	0.0%	1,100	0	1,200	0	1,600	0
Carefree	Sky Ranch at Carefree	3,572	3,392	180	95.0%	5.0%	3,500	200	3,600	200	3,900	200
Casa Grande	Casa Grande Municipal	63,980	52,400	11,580	81.9%	18.1%	55,900	12,400	59,700	13,200	70,600	15,600
Chandler	Chandler Municipal	264,526	175,147	89,379	66.2%	33.8%	199,200	101,700	226,700	115,700	316,900	161,700
Chandler	Memorial Airfield	25,000	20,000	5,000	80.0%	20.0%	21,300	5,300	22,800	5,700	27,000	6,700
Chandler	Stellar Airpark	45,100	35,000	10,100	77.6%	22.4%	38,600	11,100	42,500	12,300	54,700	15,800
Chinle	Chinle Municipal	2,400	800	1,600	33.3%	66.7%	900	1,900	1,100	2,200	1,700	3,400
Cibecue	Cibecue	1,415	415	1,000	29.3%	70.7%	400	1,100	500	1,100	600	1,300
Clifton/Morenci	Greenlee County	8,760	1,460	7,300	16.7%	83.3%	1,600	8,000	1,800	8,900	2,300	11,400
Colorado City	Colorado City Municipal	3,025	1,000	2,025	33.1%	66.9%	1,000	2,100	1,100	2,200	1,200	2,400
Coolidge	Coolidge Municipal	5,960	160	5,800	2.7%	97.3%	200	6,000	200	6,200	200	6,700
Cottonwood	Cottonwood	19,400	9,000	10,400	46.4%	53.6%	9,600	11,100	10,200	11,800	12,100	14,000
Douglas	Cochise College	52,180	480	51,700	0.9%	99.1%	500	57,000	600	62,800	700	80,800
Douglas	Douglas Municipal	11,000	2,500	8,500	22.7%	77.3%	2,700	9,100	2,800	9,700	3,400	11,500
Douglas Bisbee	Bisbee Douglas International	3,800	3,000	800	78.9%	21.1%	3,100	800	3,200	900	3,500	900
Eloy	Eloy Municipal	23,000	15,000	8,000	65.2%	34.8%	16,000	8,500	17,100	9,100	20,200	10,800
Flagstaff	Flagstaff Pulliam	39,408	7,403	32,005	18.8%	81.2%	7,600	33,100	7,900	34,200	8,600	37,200
Gila Bend	Gila Bend Municipal	11,000	8,000	3,000	72.7%	27.3%	9,400	3,500	11,000	4,100	16,800	6,300
Glendale	Glendale Municipal	146,137	102,384	43,753	70.1%	29.9%	109,200	46,700	116,600	49,800	138,000	59,000
Globe	San Carlos Apache	16,000	12,000	4,000	75.0%	25.0%	12,800	4,300	13,700	4,600	16,200	5,400
Goodyear	Phoenix Goodyear	178,896	91,480	87,416	51.1%	48.9%	100,800	96,300	111,100	106,100	142,900	136,600
Grand Canyon	Grand Canyon National Park	4,560	859	3,701	18.8%	81.2%	900	3,800	900	3,900	1,000	4,300
Grand Canyon	Grand Canyon Valle	800	200	600	25.0%	75.0%	200	600	200	700	300	800
Holbrook	Holbrook Municipal	4,900	1,000	3,900	20.4%	79.6%	1,100	4,200	1,100	4,400	1,300	5,300
Kayenta	Kayenta	4,524	20	4,504	0.4%	99.6%	20	4,800	20	5,100	30	6,100
Kearny	Kearny	4,200	3,000	1,200	71.4%	28.6%	3,200	1,300	3,400	1,400	4,000	1,600
Kingman	Kingman	57,437	33,880	23,557	59.0%	41.0%	38,500	26,800	43,800	30,500	61,300	42,600
Lake Havasu City	Lake Havasu City	51,514	26,000	25,514	50.5%	49.5%	27,700	27,200	29,600	29,000	35,000	34,400
Marana	Marana Regional	110,000	75,000	35,000	68.2%	31.8%	82,600	38,600	91,100	42,500	117,200	54,700
Marana	Pinal Airpark	7,296	7,025	271	96.3%	3.7%	7,300	300	7,500	300	8,200	300
Marble Canyon	Marble Canyon	2,585	125	2,460	4.8%	95.2%	100	2,700	200	3,000	200	3,800
Maricopa	Estrella Sailport	16,500	16,000	500	97.0%	3.0%	17,100	500	18,200	600	21,600	700
Meadview	Pearce Ferry	1,100	0	1,100	0.0%	100.0%	0	1,200	0	1,300	0	1,500
Mesa	Falcon Field	311,691	170,026	141,665	54.5%	45.5%	187,300	156,100	206,400	172,000	265,700	221,300
Mesa	Phoenix-Mesa Gateway	285,334	188,334	97,000	66.0%	34.0%	214,300	110,300	243,700	125,500	340,800	175,500
Nogales	Nogales International	37,300	22,000	15,300	59.0%	41.0%	25,000	17,400	28,500	19,800	39,800	27,700
Page	Page	21,882	600	21,282	2.7%	97.3%	600	22,000	600	22,700	700	24,700
Parker	Avi Suquilla	14,520	2,000	12,520	13.8%	86.2%	2,100	13,400	2,300	14,300	2,700	16,900
Payson	Payson	42,250	25,000	17,250	59.2%	40.8%	28,400	19,600	32,400	22,300	45,200	31,200

Figure 4-62: Local/Itinerant Split of General Aviation Operations (Continued)

			2007		Split		2012		2017		2030	
Associated City	*Airport Name*	*2007 Total*	*Local*	*Itinerant*	*Local Share*	*Itinerant Share*	*Local*	*Itinerant*	*Local*	*Itinerant*	*Local*	*Itinerant*
Peach Springs	Grand Canyon Caverns	1,350	0	1,350	0.0%	100.0%	0	1,500	0	1,700	0	2,400
Peach Springs	Grand Canyon West	109,328	0	109,328	0.0%	100.0%	0	120,500	0	132,700	0	170,800
Peach Springs	Hualapai	200	100	100	50.0%	50.0%	100	100	100	100	100	100
Peoria	Pleasant Valley	60,000	60,000	0	100.0%	0.0%	66,100	0	72,800	0	93,700	0
Phoenix	Phoenix Deer Valley	377,696	236,472	141,224	62.6%	37.4%	260,600	155,600	287,100	171,500	369,500	220,700
Phoenix	Phoenix Regional	14,600	10,950	3,650	75.0%	25.0%	11,700	3,900	12,500	4,200	14,800	4,900
Phoenix	Phoenix Sky Harbor International	127,563	9,379	118,184	7.4%	92.6%	9,700	122,100	10,000	126,100	10,900	137,300
Polacca	Polacca	1,000	100	900	10.0%	90.0%	100	900	100	1,000	100	1,000
Prescott	Ernest A. Love Field	222,804	141,525	81,279	63.5%	36.5%	146,200	84,000	151,000	86,700	164,400	94,400
Rimrock	Rimrock	600	500	100	83.3%	16.7%	500	100	600	100	700	100
Safford	Safford Regional	17,250	3,650	13,600	21.2%	78.8%	4,000	15,000	4,400	16,500	5,700	21,200
San Luis	Rolle Airfield	2,900	2,900	0	100.0%	0.0%	3,000	0	3,100	0	3,400	0
San Manuel	San Manuel/Ray/Blair	12,080	5,000	7,080	41.4%	58.6%	5,900	8,300	6,900	9,800	10,500	14,800
Scottsdale	Scottsdale	191,503	58,129	133,374	30.4%	69.6%	64,100	147,000	70,600	161,900	90,800	208,400
Sedona	Sedona	45,000	10,000	35,000	22.2%	77.8%	11,000	38,600	12,100	42,500	15,600	54,700
Seligman	Seligman	1,100	500	600	45.5%	54.5%	500	600	600	700	700	800
Sells	Sells	1,200	0	1,200	0.0%	100.0%	0	1,300	0	1,400	0	1,600
Show Low	Show Low Regional	40,060	7,000	33,060	17.5%	82.5%	7,700	36,400	8,500	40,100	10,900	51,700
Sierra Vista	Sierra Vista Municipal/LAA	38,987	31,526	7,461	80.9%	19.1%	35,900	8,500	40,800	9,700	57,000	13,500
Springerville	Springerville Municipal	4,000	820	3,180	20.5%	79.5%	800	3,300	900	3,400	1,000	3,700
St Johns	St Johns Industrial Air Park	14,000	3,000	11,000	21.4%	78.6%	3,200	11,700	3,400	12,500	4,000	14,800
Superior	Superior Municipal	200	0	200	0.0%	100.0%	0	200	0	200	0	200
Taylor	Taylor	4,810	3,000	1,810	62.4%	37.6%	3,200	1,900	3,400	2,100	4,000	2,400
Temple Bar	Temple Bar	1,800	0	1,800	0.0%	100.0%	0	1,900	0	2,000	0	2,400
Tombstone	Tombstone Municipal	300	0	300	0.0%	100.0%	0	300	0	400	0	500
Tuba City	Tuba City	910	45	865	4.9%	95.1%	50	900	50	900	50	1,000
Tucson	La Cholla Airpark	4,000	4,000	0	100.0%	0.0%	4,300	0	4,600	0	5,400	0
Tucson	Ryan Field	246,438	171,410	75,028	69.6%	30.4%	195,000	85,400	221,800	97,100	310,200	135,800
Tucson	Tucson International	183,512	80,684	102,828	44.0%	56.0%	83,400	106,200	86,100	109,700	93,700	119,400
Whiteriver	Whiteriver	3,440	850	2,590	24.7%	75.3%	900	2,700	900	2,800	1,000	3,000
Whitmore	Grand Canyon Bar Ten Airstrip	1,275	0	1,275	0.0%	100.0%	0	1,300	0	1,400	0	1,500
Wickenburg	Wickenburg Municipal	17,500	9,800	7,700	56.0%	44.0%	11,500	9,000	13,500	10,600	20,500	16,100
Willcox	Cochise County	7,310	510	6,800	7.0%	93.0%	500	7,300	600	7,700	700	9,200
Williams	H.A. Clark Memorial Field	3,650	360	3,290	9.9%	90.1%	400	3,500	400	3,700	500	4,400
Window Rock	Window Rock	7,000	1,500	5,500	21.4%	78.6%	1,800	6,500	2,100	7,600	3,100	11,500
Winslow	Winslow-Lindbergh Regional	22,650	4,000	18,650	17.7%	82.3%	4,100	19,300	4,300	19,900	4,600	21,700
Yuma	Yuma International Airport	80,944	36,425	44,519	45.0%	55.0%	41,400	50,600	47,100	57,600	65,900	80,600
ARIZONA TOTAL		3,842,736	2,051,040	1,791,696	53.4%	46.6%	2,249,200	1,964,800	2,469,300	2,157,100	3,164,600	2,764,400

Source: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*
Note: Operations may not sum to totals due to rounding

Projections of Military Activity at Civilian Airports

During the base year of 2007, 47 Arizona civilian airports recorded military operations (Figure 4-63). The two Arizona military joint use airports account for the majority of military aviation activity. During 2007, Sierra Vista Municipal recorded 116,850 military operations, and Yuma International recorded 109,502. Together these two airports account for approximately 70 percent of all military aviation activity at civilian airports in the state. The airport with the next largest number of military operations in 2007 is Tucson International, recording 31,526 military operations. For the purpose of this study, it is assumed that military operations recorded in 2007 will remain constant throughout the study period. Therefore, operations in the out-year of 2030 will be the same as that during 2007.

Figure 4-63: Military Operations at Arizona Airports, 2007-2030

Associated City	*Airport Name*	*Annual Military Operations (Constant 2007 to 2030)*
Ajo	Eric Marcus Municipal	100
Benson	Benson Municipal	1,000
Buckeye	Buckeye Municipal	100
Bullhead City	Laughlin/Bullhead International	325
Chandler	Chandler Municipal	686
Chandler	Memorial Airfield	500
Colorado City	Colorado City Municipal	25
Coolidge	Coolidge Municipal	40
Cottonwood	Cottonwood	10
Douglas	Cochise College	3,000
Douglas	Douglas Municipal	100
Douglas Bisbee	Bisbee Douglas International	1,500
Eloy	Eloy Municipal	100
Flagstaff	Flagstaff Pulliam	1,172
Gila Bend	Gila Bend Municipal	10
Glendale	Glendale Municipal	71
Globe	San Carlos Apache	200
Goodyear	Phoenix Goodyear	9,029
Grand Canyon	Grand Canyon National Park	1,172
Kingman	Kingman	240
Lake Havasu City	Lake Havasu City	140
Marana	Marana Regional	2,000
Marana	Pinal Airpark	3,332
Mesa	Falcon Field	2,418
Mesa	Phoenix-Mesa Gateway	2,800
Nogales	Nogales International	60
Page	Page	250
Payson	Payson	653
Phoenix	Phoenix Deer Valley	3,007
Phoenix	Phoenix Sky Harbor International	9,380
Prescott	Ernest A. Love Field	1,917
Safford	Safford Regional	1,500
San Luis	Rolle Airfield	2,000
San Manuel	San Manuel/Ray/Blair	1,000
Scottsdale	Scottsdale	479

Figure 4-63: Military Operations at Arizona Airports, 2007-2030 (Continued)

Associated City	*Airport Name*	*Annual Military Operations (Constant 2007 to 2030)*
Sedona	Sedona	5,000
Sells	Sells	10
Show Low	Show Low Regional	300
Sierra Vista	Sierra Vista Municipal/Libby Army Airfield	116,850
Springerville	Springerville Municipal	100
St Johns	St Johns Industrial Air Park	1,000
Tucson	Ryan Field	2,978
Tucson	Tucson International	31,526
Wickenburg	Wickenburg Municipal	500
Willcox	Cochise County	550
Winslow	Winslow-Lindbergh Regional	5,000
Yuma	Yuma International	109,502
Arizona Total		**323,632**

Sources: Airport Inventory & Data Survey 2008, FAA ATADS

Operational Mix

An operational mix looks at how each airport's aviation operations are spread between types of aviation activity. In this study, three main types of operations were forecasted to the year 2030: commercial service, general aviation, and military. Cargo operations and air taxi operations are included in general aviation in this operational mix. Figure 4-64 details the 2007 and forecasted 2030 operational mix for each airport. Thirty-three of Arizona's system airports report only general aviation operations, leading to general aviation operations accounting for 81 percent of the state total. Commercial operations (both scheduled and unscheduled air tour) account for 13 percent and military operations the remaining seven percent. In 2030, general aviation operations are projected to maintain 81 percent of the state total operations. Commercial service operations are forecasted to increase to 15 percent of the total, while military operations drop to four percent.

Figure 4-64: Operational Mix at Arizona Airports, 2007-2030

		Base Year 2007				Forecast Year 2030			
Associated City	*Airport Name*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*
Aguila	Eagle Roost	0	3,500	0	3,500	0	4,717	0	4,717
Ajo	Eric Marcus Municipal	0	500	100	600	0	581	100	681
Bagdad	Bagdad	0	14,000	0	14,000	0	18,869	0	18,869
Benson	Benson Municipal	0	7,200	1,000	8,200	0	15,076	1,000	16,076
Bisbee	Bisbee Municipal	0	4,508	4	4,512	0	9,439	4	9,443
Buckeye	Buckeye Municipal	0	28,562	100	28,662	0	51,685	100	51,785
Bullhead City	Laughlin/Bullhead International	900	21,936	325	23,161	1,400	25,479	325	27,204
Bullhead City	Sun Valley	0	1,000	0	1,000	0	1,562	0	1,562
Carefree	Sky Ranch at Carefree	0	3,572	1	3,573	0	4,149	1	4,150
Casa Grande	Casa Grande Municipal	0	63,980	0	63,980	0	86,231	0	86,231
Chandler	Chandler Municipal	0	264,526	686	265,212	0	478,680	686	479,366
Chandler	Memorial Airfield	0	25,000	500	25,500	0	33,694	500	34,194
Chandler	Stellar Airpark	0	45,100	0	45,100	0	70,466	0	70,466
Chinle	Chinle Municipal	0	2,400	0	2,400	0	5,025	0	5,025
Cibecue	Cibecue	0	1,415	0	1,415	0	1,907	0	1,907
Clifton/Morenci	Greenlee County	0	8,760	0	8,760	0	13,687	0	13,687
Colorado City	Colorado City Municipal	0	3,025	25	3,050	0	3,514	25	3,539
Coolidge	Coolidge Municipal	0	5,960	40	6,000	0	6,923	40	6,963
Cottonwood	Cottonwood	0	19,400	10	19,410	0	26,147	10	26,157
Douglas	Cochise College	0	52,180	3,000	55,180	0	81,528	3,000	84,528
Douglas	Douglas Municipal	0	11,000	100	11,100	0	14,826	100	14,926
Douglas Bisbee	Bisbee Douglas International	0	3,800	1,500	5,300	0	4,414	1,500	5,914
Eloy	Eloy Municipal	0	23,000	100	23,100	0	30,999	100	31,099
Flagstaff	Flagstaff Pulliam	4,200	39,408	1,172	44,780	8,500	45,772	1,172	55,444
Gila Bend	Gila Bend Municipal	0	11,000	10	11,010	0	23,032	10	23,042
Glendale	Glendale Municipal	0	146,137	71	146,208	0	196,960	71	197,031
Globe	San Carlos Apache	0	16,000	200	16,200	0	21,564	200	21,764
Goodyear	Phoenix Goodyear	0	178,896	9,029	187,925	0	279,514	9,029	288,543
Grand Canyon	Grand Canyon National Park	95,184	4,560	1,172	100,916	146,700	5,296	1,172	153,168
Grand Canyon	Grand Canyon Valle	0	800	0	800	0	1,078	0	1,078
Holbrook	Holbrook Municipal	0	4,900	0	4,900	0	6,604	0	6,604
Kayenta	Kayenta	0	4,524	0	4,524	0	6,097	0	6,097
Kearny	Kearny	0	4,200	0	4,200	0	5,661	0	5,661
Kingman	Kingman	1,200	57,437	240	58,877	1,500	103,937	240	105,677
Lake Havasu City	Lake Havasu City	0	51,514	140	51,654	0	69,429	140	69,569
Marana	Marana Regional	0	110,000	2,000	112,000	0	171,868	2,000	173,868

Figure 4-64: Operational Mix at Arizona Airports, 2007-2030 (Continued)

		Base Year 2007				Forecast Year 2030			
Associated City	*Airport Name*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*
Marana	Pinal Airpark	0	7,296	3,332	10,628	0	8,474	3,332	11,806
Marble Canyon	Marble Canyon	0	2,585	0	2,585	0	4,039	0	4,039
Maricopa	Estrella Sailport	0	16,500	0	16,500	0	22,238	0	22,238
Meadview	Pearce Ferry	0	1,100	0	1,100	0	1,483	0	1,483
Mesa	Falcon Field	0	311,691	2,418	314,109	0	486,997	2,418	489,415
Mesa	Phoenix-Mesa Gateway	2,500	285,334	9,380	297,214	5,600	516,333	9,380	531,313
Nogales	Nogales International	0	37,300	2,800	40,100	0	67,497	2,800	70,297
Page	Page	31,280	21,882	60	53,222	47,000	25,416	60	72,476
Parker	Avi Suquilla	0	14,520	0	14,520	0	19,570	0	19,570
Payson	Payson	0	42,250	250	42,500	0	76,455	250	76,705
Peach Springs	Grand Canyon Caverns	0	1,350	0	1,350	0	2,443	0	2,443
Peach Springs	Grand Canyon West	10,700	109,328	0	120,028	16,500	170,818	0	187,318
Peach Springs	Hualapai	0	200	0	200	0	232	0	232
Peoria	Pleasant Valley	0	60,000	0	60,000	0	93,746	0	93,746
Phoenix	Phoenix Deer Valley	0	377,696	653	378,349	0	590,126	653	590,779
Phoenix	Phoenix Regional	0	14,600	0	14,600	0	19,678	0	19,678
Phoenix	Phoenix Sky Harbor International	473,300	127,563	3,007	603,870	752,500	148,165	3,007	903,672
Polacca	Polacca	0	1,000	0	1,000	0	1,162	0	1,162
Prescott	Ernest A. Love Field	2,800	222,804	1,917	227,521	8,300	258,787	1,917	269,004
Rimrock	Rimrock	0	600	0	600	0	809	0	809
Safford	Safford Regional	0	17,250	1,500	18,750	0	26,952	1,500	28,452
San Luis	Rolle Airfield	0	2,900	2,000	4,900	0	3,368	2,000	5,368
San Manuel	San Manuel/Ray/Blair	0	12,080	1,000	13,080	0	25,294	1,000	26,294
Scottsdale	Scottsdale	0	191,503	479	191,982	0	299,211	479	299,690
Sedona	Sedona	0	45,000	5,000	50,000	0	70,310	5,000	75,310
Seligman	Seligman	0	1,100	0	1,100	0	1,483	0	1,483
Sells	Sells	0	1,200	10	1,210	0	1,617	10	1,627
Show Low	Show Low Regional	1,400	29,678	200	31,278	1,400	46,370	200	47,970
Sierra Vista	Sierra Vista Municipal/LAA	0	38,987	116,850	155,837	0	70,550	116,850	187,400
Springerville	Springerville Municipal	0	4,000	100	4,100	0	4,646	100	4,746
St Johns	St Johns Industrial Air Park	0	14,000	1,000	15,000	0	18,869	1,000	19,869
Superior	Superior Municipal	0	200	0	200	0	232	0	232
Taylor	Taylor	0	4,810	0	4,810	0	6,483	0	6,483
Temple Bar	Temple Bar	0	1,800	0	1,800	0	2,426	0	2,426
Tombstone	Tombstone Municipal	0	300	0	300	0	469	0	469

Figure 4-64: Operational Mix at Arizona Airports, 2007-2030 (Continued)

		Base Year 2007				*Forecast Year 2030*			
Associated City	*Airport Name*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*	*Commercial Service*	*General Aviation*	*Military*	*Total Airport Operations*
Tuba City	Tuba City	0	910	0	910	0	1,057	0	1,057
Tucson	La Cholla Airpark	0	4,000	0	4,000	0	5,391	0	5,391
Tucson	Ryan Field	0	246,438	2,978	249,416	0	445,948	2,978	448,926
Tucson	Tucson International	41,400	183,512	31,526	256,438	62,400	213,149	31,526	307,075
Whiteriver	Whiteriver	0	3,440	0	3,440	0	3,996	0	3,996
Whitmore	Grand Canyon Bar Ten Airstrip	0	1,275	0	1,275	0	1,481	0	1,481
Wickenburg	Wickenburg Municipal	0	17,500	500	18,000	0	36,642	500	37,142
Willcox	Cochise County	0	7,310	550	7,860	0	9,852	550	10,402
Williams	H.A. Clark Memorial Field	0	3,650	0	3,650	0	4,919	0	4,919
Window Rock	Window Rock	0	7,000	0	7,000	0	14,657	0	14,657
Winslow	Winslow-Lindbergh Regional	0	22,650	5,000	27,650	0	26,308	5,000	31,308
Yuma	Yuma International Airport	10,500	80,944	109,502	200,946	15,000	146,474	109,502	270,976
ARIZONA TOTAL		675,364	3,842,736	323,537	4,841,637	1,066,800	5,929,031	323,537	7,319,368

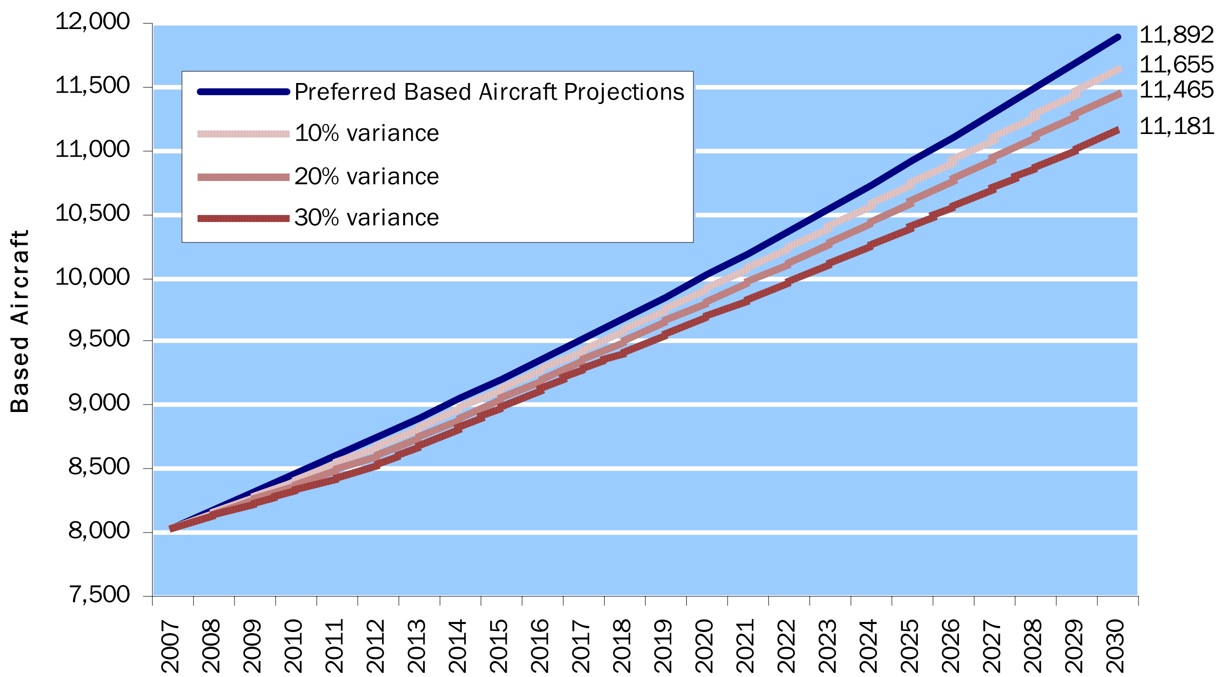
Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*

Possible Impacts of Economic Conditions on Arizona's Aviation Activity

It is unknown what short and longer term effects the current economic downturn may have on aviation activity and the number of based aircraft in Arizona as well as throughout the U.S. Based on this uncertainty, the impact of a 10, 20, and 30 percent variance in the growth of statewide based aircraft and general aviation operations was developed. This analysis provides some insight on a range of activity if Arizona continues to feel the impact of the economic downturn. It is not possible to predict the impact of the economic downturn on each individual airport for the purposes of this study.

As shown in Figure 4-65, the 2030 projections of based aircraft in the state could range from a low of 11,140 if 30 percent less growth occurred to 11,613 based aircraft if 10 percent less growth occurred. This compares to 11,849 based aircraft in 2030 developed under the preferred aircraft scenario.

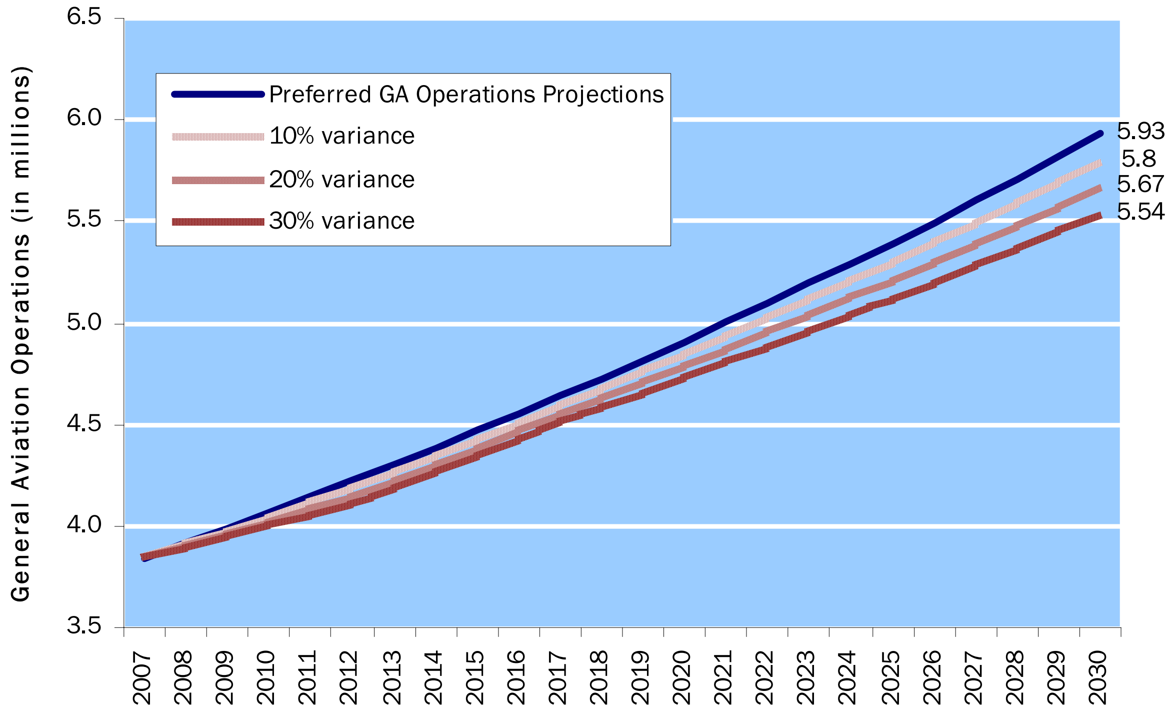
Figure 4-65: Impact of Economic Conditions on Preferred Based Aircraft Projections



Source: Wilbur Smith Associates

Figure 4-66 presents the similar possible impact on general aviation operations. If the growth was 10 percent less than the preferred general aviation projections developed in this chapter, general aviation operations would reach just 5.81 million by 2030 compared to 5.93 million. If the projection of growth was 30 percent compromised by the economic downturn, general aviation operations could reach just 5.55 million per year by 2030.

Figure 4-66: Impact of Economic Conditions on Preferred General Aviation Operations Projections

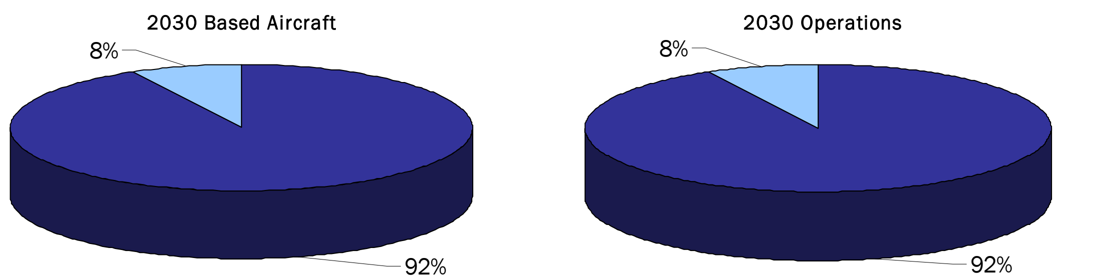


Source: Wilbur Smith Associates

Operations and Based Aircraft at NPIAS and Non-NPIAS Airports

Fifty-seven of the 83 airports included in the SASP are included in the National Plan of Integrated Airport Systems (NPIAS). **Figure 4-67** presents the share of projected general aviation operations and based aircraft for which NPIAS airports and non-NPIAS airports account. In 2030, NPIAS airports account for 92 percent of both based aircraft and general aviation operations, while Non-NPIAS airports account for the remaining eight percent.

Figure 4-67: Forecasted Based Aircraft and General Aviation Operations at NPIAS and Non-NPIAS Airports



Source: Wilbur Smith Associates

System Plan Forecasts vs. FAA TAF and Airport Master Plans

The forecasts developed in this chapter are not the only projections created for Arizona's airports. Many of the airports included in the Arizona State Airports System Plan conduct master plans which include projections of activity and based aircraft. Forecasts in master plans were only included if the master plan was written since 2003. The FAA, as part of the Terminal Area Forecasts (TAF), also develops projections of activity and based aircraft for many individual airports, some of which are included in the NPIAS. A total of 59 airports included in the system plan also have operations and based aircraft forecasted developed by the FAA in the TAF. Many of these forecasts show zero growth. If an airport has no air traffic control tower or has data that is not completely reliable, the FAA will forecast no growth in activity and based aircraft. The following sections discuss the difference between system plan, individual airport master plans, and the FAA TAF projections.

In most of the individual airport master plans the out-year time horizon was before 2030. Therefore, the projected average annual growth rate in these plans was used to extrapolate the out-year horizon numbers to 2030.

Based Aircraft

Figure 4-68 details differences between the SASP preferred forecast of based aircraft and projections in the TAF and airport master plans. Of the 59 system airports included in the FAA TAF, 44 are projected to show no increase in their based aircraft through 2026 due to the unavailability of data and the FAA's limited confidence in their ability to project based aircraft at these airports. Of these, differences between the preferred forecast and the TAF vary greatly. Year 2030 results for some are very similar, such as only a two percent difference in 2030 based aircraft at Flagstaff-Pulliam or only a four percent difference at Laughlin/Bullhead International. Others showed a much larger variance. In the FAA TAF, based aircraft at Phoenix Sky Harbor are expected to reach 176 by 2030, 75 percent higher than the preferred forecast in this plan. In all, the TAF based aircraft forecasts for seven airports showed at least a 10 percent difference from the preferred forecast.

Thirty-seven system plan airports also have master plans completed or in draft since 2003 that include forecasts of based aircraft. The majority of master plan projections showed results far higher than the SASP preferred based aircraft forecast. Only 2030 based aircraft in the Flagstaff-Pulliam, Cottonwood, Ryan Field, and Chandler Municipal master plans were within 10 percent of the preferred forecast. Several master plans showed 2030 based aircraft numbers more than 100 percent different than the preferred forecast. Buckeye, with a difference of 409 percent, and Casa Grande, with a difference of 347 percent, were the two airports with the highest variation. Greenlee County Airport also showed a large variance.

Figure 4-68: Comparison of Preferred Based Aircraft Forecast with FAA TAF and Airport Master Plans

			Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
Associated City	*Airport Name*	*Actual 2007*	*CAGR*	*2030*	*CAGR*	*2030*	*Difference*	*CAGR*	*2030*	*Difference*
Aguila	Eagle Roost	48	1.35%	65	NA	NA	NA	NA	NA	NA
Ajo	Eric Marcus Municipal	8	2.03%	13	0.00%	8	-37%	NA	NA	NA
Bagdad	Bagdad	5	0.68%	6	0.00%	5	-14%	NA	NA	NA
Benson	Benson Municipal	42	2.03%	67	0.00%	42	-37%	5.99%	160	140%
Bisbee	Bisbee Municipal	34	2.70%	63	0.00%	34	-46%	NA	NA	NA
Buckeye	Buckeye Municipal	62	0.68%	72	0.00%	62	-14%	8.06%	369	409%
Bullhead City	Laughlin/Bullhead International	30	0.68%	35	0.84%	36	4%	6.42%	125	258%
Bullhead City	Sun Valley	33	1.35%	45	NA	NA	NA	NA	NA	NA
Carefree	Sky Ranch at Carefree	115	0.68%	134	NA	NA	NA	NA	NA	NA
Casa Grande	Casa Grande Municipal	91	2.03%	144	0.00%	91	-37%	8.89%	646	347%
Chandler	Chandler Municipal	499	2.03%	792	2.44%	870	10%	2.44%	869	10%
Chandler	Memorial Airfield	1	3.20%	2	NA	NA	NA	NA	NA	NA
Chandler	Stellar Airpark	152	1.35%	207	NA	NA	NA	NA	NA	NA
Chinle	Chinle Municipal	4	2.03%	6	0.00%	4	-37%	NA	NA	NA
Cibecue	Cibecue	1	0.00%	2	0.00%	1	-50%	2.05%	2	-20%
Clifton/Morenci	Greenlee County	2	0.68%	2	0.00%	2	-14%	12.25%	29	1121%
Colorado City	Colorado City Municipal	6	0.68%	7	0.00%	6	-14%	2.73%	11	59%
Coolidge	Coolidge Municipal	34	2.70%	63	0.00%	34	-46%	NA	NA	NA
Cottonwood	Cottonwood	49	2.03%	78	0.00%	49	-37%	2.23%	81	5%
Douglas	Cochise College	15	1.35%	20	NA	NA	NA	NA	NA	NA
Douglas	Douglas Municipal	27	0.68%	32	NA	NA	NA	NA	NA	NA
Douglas Bisbee	Bisbee Douglas International	18	0.68%	21	0.00%	18	-14%	NA	NA	NA
Eloy	Eloy Municipal	41	2.03%	65	0.00%	41	-37%	NA	NA	NA
Flagstaff	Flagstaff Pulliam	132	1.35%	180	1.45%	184	2%	1.24%	175	-3%
Gila Bend	Gila Bend Municipal	3	2.03%	5	0.00%	3	-37%	4.33%	8	67%
Glendale	Glendale Municipal	413	2.03%	655	0.87%	504	-23%	3.12%	838	28%
Globe	San Carlos Apache	47	2.03%	75	0.00%	47	-37%	5.65%	166	123%
Goodyear	Phoenix Goodyear	276	2.03%	438	1.52%	391	-11%	5.31%	906	107%
Grand Canyon	Grand Canyon National Park	48	0.68%	56	1.74%	71	27%	1.22%	63	13%
Grand Canyon	Grand Canyon Valle	5	1.35%	7	NA	NA	NA	NA	NA	NA
Holbrook	Holbrook Municipal	20	2.03%	32	0.00%	20	-37%	NA	NA	NA

Figure 4-68: Comparison of Preferred Based Aircraft Forecast with FAA TAF and Airport Master Plans (Continued)

			Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
Associated City	*Airport Name*	*Actual 2007*	*CAGR*	*2030*	*CAGR*	*2030*	*Difference*	*CAGR*	*2030*	*Difference*
Kayenta	Kayenta	1	3.20%	2	0.00%	1	-50%	9.37%	8	293%
Kearny	Kearny	5	2.03%	8	NA	NA	NA	4.25%	13	64%
Kingman	Kingman	278	2.03%	441	0.00%	278	-37%	6.67%	1,229	179%
Lake Havasu City	Lake Havasu City	229	1.35%	312	0.00%	229	-27%	2.75%	427	37%
Marana	Marana Regional	306	2.03%	485	1.96%	478	-1%	2.54%	545	12%
Marana	Pinal Airpark	1	3.20%	2	0.00%	1	-50%	NA	NA	NA
Marble Canyon	Marble Canyon	1	1.35%	1	NA	NA	NA	NA	NA	NA
Maricopa	Estrella Sailport	28	1.35%	38	NA	NA	NA	NA	NA	NA
Meadview	Pearce Ferry	1	3.20%	2	NA	NA	NA	NA	NA	NA
Mesa	Falcon Field	947	1.35%	1,290	1.42%	1,309	1%	2.36%	1,620	26%
Mesa	Phoenix-Mesa Gateway	103	2.03%	163	2.15%	168	3%	5.44%	349	113%
Nogales	Nogales International	35	2.03%	56	0.00%	35	-37%	2.79%	66	19%
Page	Page	76	2.03%	121	0.00%	76	-37%	3.14%	155	28%
Parker	Avi Suquilla	42	2.03%	67	0.00%	42	-37%	NA	NA	NA
Payson	Payson	86	0.68%	100	0.00%	86	-14%	2.13%	140	39%
Peach Springs	Grand Canyon Caverns	1	3.20%	2	NA	NA	NA	NA	NA	NA
Peach Springs	Grand Canyon West	2	1.35%	3	0.00%	2	-27%	NA	NA	NA
Peach Springs	Hualapai	1	3.20%	2	0.00%	1	-50%	0.00%	NA	NA
Peoria	Pleasant Valley	35	0.68%	41	NA	NA	NA	NA	NA	NA
Phoenix	Phoenix Deer Valley	1,274	2.03%	2,021	1.50%	1,796	-11%	2.69%	2,344	16%
Phoenix	Phoenix Regional	11	1.35%	15	NA	NA	NA	NA	NA	NA
Phoenix	Phoenix Sky Harbor International	114	0.68%	133	3.15%	233	75%	NA	NA	NA
Polacca	Polacca	1	3.20%	2	0.00%	1	-50%	NA	NA	NA
Prescott	Ernest A. Love Field	336	1.35%	458	1.16%	439	-4%	2.29%	566	24%
Rimrock	Rimrock	36	1.35%	49	NA	NA	NA	NA	NA	NA
Safford	Safford Regional	41	2.03%	65	0.00%	41	-37%	3.09%	83	27%
San Luis	Rolle Airfield	1	3.20%	2	NA	NA	NA	NA	NA	NA
San Manuel	San Manuel/Ray/Blair	57	2.70%	105	0.00%	57	-46%	0.92%	70	-33%
Scottsdale	Scottsdale	447	1.35%	609	1.49%	628	3%	NA	NA	NA
Sedona	Sedona	104	1.35%	142	0.00%	104	-27%	NA	NA	NA
Seligman	Seligman	1	3.20%	2	NA	NA	NA	2.81%	2	-5%
Sells	Sells	1	1.35%	1	NA	NA	NA	NA	NA	NA

Figure 4-68: Comparison of Preferred Based Aircraft Forecast with FAA TAF and Airport Master Plans (Continued)

			Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
Associated City	*Airport Name*	*Actual 2007*	*CAGR*	*2030*	*CAGR*	*2030*	*Difference*	*CAGR*	*2030*	*Difference*
Show Low	Show Low Regional	66	2.03%	105	0.00%	66	-37%	2.78%	124	18%
Sierra Vista	Sierra Vista Municipal/LAA	82	2.03%	130	0.00%	82	-37%	4.95%	249	92%
Springerville	Springerville Municipal	19	1.35%	26	0.00%	19	-27%	2.59%	34	32%
St Johns	St Johns Industrial Air Park	15	2.03%	24	0.00%	15	-37%	NA	NA	NA
Superior	Superior Municipal	1	3.20%	2	NA	NA	NA	NA	NA	NA
Taylor	Taylor	14	0.68%	16	0.00%	14	-14%	2.69%	26	58%
Temple Bar	Temple Bar	1	3.20%	2	NA	NA	NA	NA	NA	NA
Tombstone	Tombstone Municipal	2	1.35%	3	NA	NA	NA	NA	NA	NA
Tuba City	Tuba City	1	3.20%	2	0.00%	1	-50%	NA	NA	NA
Tucson	La Cholla Airpark	97	1.35%	132	NA	NA	NA	NA	NA	NA
Tucson	Ryan Field	304	2.03%	482	2.18%	499	3%	2.26%	508	5%
Tucson	Tucson International	308	0.68%	360	1.33%	417	16%	0.44%	340	-5%
Whiteriver	Whiteriver	1	3.20%	2	0.00%	1	-50%	NA	NA	NA
Whitmore	Grand Canyon Bar Ten Airstrip	1	3.20%	2	NA	NA	NA	NA	NA	NA
Wickenburg	Wickenburg Municipal	47	1.35%	64	0.00%	47	-27%	2.76%	88	37%
Willcox	Cochise County	27	2.03%	43	0.00%	27	-37%	NA	NA	NA
Williams	H.A. Clark Memorial Field	18	2.03%	29	0.00%	18	-37%	3.53%	40	40%
Window Rock	Window Rock	4	0.68%	5	0.00%	4	-14%	NA	NA	NA
Winslow	Winslow-Lindbergh Regional	9	0.68%	11	0.00%	9	-14%	NA	NA	NA
Yuma	Yuma International Airport	178	2.70%	329	0.00%	178	-46%	NA	NA	NA

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*, FAA *Terminal Area Forecasts*, Individual Airport Master Plans

Notes: CAGR=Compound Annual Growth Rate; N/A= not available; airports having zero based aircraft in 2007 were shown with one to make comparisons with master plans and the TAF possible.

General Aviation Operations

Figure 4-69 details differences between the preferred general aviation operations forecast and those in the FAA TAF and airport master plans. Of the 59 system plan airports included in the FAA TAF, 44 are projected to show zero increase in their general aviation operations. Of these, differences between the preferred forecast and the TAF vary greatly. Marana Regional in Tucson shows less than one percent difference between the two. Laughlin/Bullhead International and Chandler Municipal have TAF operations forecasts within four percent (above or below) of the preferred forecast for 2030. Others showed a much larger variance. Like based aircraft forecasts, differences between this plan and the FAA TAF vary greatest at Phoenix Sky Harbor, with a 76 percent difference in 2030 operations. In all, the TAF operations forecasts for ten airports showed at least a 10 percent difference from the preferred forecast.

Thirty-eight system plan airports also have master plans completed or in draft since 2003 that include forecasts of general aviation operations. Like the master plan based aircraft forecasts, the majority of these showed results far higher than the preferred operations forecast. Only projected based aircraft in the Chandler Municipal, Payson, Phoenix-Mesa Gateway, Ryan Field, and Mesa-Falcon Field master plans were within 10 percent of the preferred forecast in 2030. Several master plans projected general aviation operations more than 100 percent higher than the preferred SASP forecast. Greenlee County, with a difference of 811 percent, and San Carlos Apache, with a difference of 731 percent, were the most varied.

Figure 4-69: Comparison of Preferred General Aviation Operations Forecast with FAA TAF and Airport Master Plans

		Actual	Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
Associated City	*Airport Name*	*2007*	*CAGR*	*2030*	*CAGR*	*2030*	*Difference*	*CAGR*	*2030*	*Difference*
Aguila	Eagle Roost	3,500	1.31%	4,700	NA	NA	NA	NA	NA	NA
Ajo	Eric Marcus Municipal	500	0.65%	600	0.00%	500	-17%	NA	NA	NA
Bagdad	Bagdad	14,000	1.31%	18,900	0.00%	14,000	-26%	NA	NA	NA
Benson	Benson Municipal	7,200	3.27%	15,100	0.00%	7,200	-52%	8.94%	51,649	242%
Bisbee	Bisbee Municipal	4,508	3.27%	9,400	0.00%	4,508	-52%	NA	NA	NA
Buckeye	Buckeye Municipal	28,562	2.61%	51,700	0.00%	28,562	-45%	7.97%	166,467	222%
Bullhead City	Laughlin/Bullhead International	21,936	0.65%	25,500	0.84%	26,563	4%	4.83%	64,975	155%
Bullhead City	Sun Valley	1,000	1.96%	1,600	NA	NA	NA	NA	NA	NA
Carefree	Sky Ranch at Carefree	3,572	0.65%	4,100	NA	NA	NA	NA	NA	NA
Casa Grande	Casa Grande Municipal	63,980	1.31%	86,200	0.00%	63,980	-26%	6.15%	252,263	193%
Chandler	Chandler Municipal	264,526	2.61%	478,700	2.44%	461,006	-4%	2.70%	488,227	2%
Chandler	Memorial Airfield	25,000	1.31%	33,700	NA	NA	NA	NA	NA	NA
Chandler	Stellar Airpark	45,100	1.96%	70,500	NA	NA	NA	NA	NA	NA
Chinle	Chinle Municipal	2,400	3.27%	5,000	0.00%	2,400	-52%	NA	NA	NA
Cibecue	Cibecue	1,415	1.31%	1,900	0.00%	1,415	-26%	2.34%	2,408	27%
Clifton/Morenci	Greenlee County	8,760	1.96%	13,700	0.00%	8,760	-36%	12.25%	124,868	811%
Colorado City	Colorado City Municipal	3,025	0.65%	3,500	0.00%	3,025	-14%	2.73%	5,624	61%
Coolidge	Coolidge Municipal	5,960	0.65%	6,900	0.00%	5,960	-14%	NA	NA	NA
Cottonwood	Cottonwood	19,400	1.31%	26,100	0.00%	19,400	-26%	2.34%	32,995	26%
Douglas	Cochise College	52,180	1.96%	81,500	NA	NA	NA	NA	NA	NA
Douglas	Douglas Municipal	11,000	1.31%	14,800	NA	NA	NA	NA	NA	NA
Douglas Bisbee	Bisbee Douglas International	3,800	0.65%	4,400	0.00%	3,800	-14%	NA	NA	NA
Eloy	Eloy Municipal	23,000	1.31%	31,000	0.00%	23,000	-26%	NA	NA	NA
Flagstaff	Flagstaff Pulliam	39,408	0.65%	45,800	1.45%	54,850	20%	2.14%	64,193	40%
Gila Bend	Gila Bend Municipal	11,000	3.27%	23,000	0.00%	11,000	-52%	2.42%	19,065	-17%
Glendale	Glendale Municipal	146,137	1.31%	197,000	0.87%	178,274	-10%	2.72%	271,118	38%
Globe	San Carlos Apache	16,000	1.31%	21,600	0.00%	16,000	-26%	11.08%	179,431	731%
Goodyear	Phoenix Goodyear	178,896	1.96%	279,500	1.52%	253,324	-9%	6.39%	743,289	166%
Grand Canyon	Grand Canyon National Park	4,560	0.65%	5,300	1.74%	6,781	28%	3.40%	9,843	86%
Grand Canyon	Grand Canyon Valle	800	1.31%	1,100	NA	NA	NA	NA	NA	NA

Figure 4-69: Comparison of Preferred Operations Forecast with FAA TAF and Airport Master Plans (Continued)

Associated City	Airport Name	Actual 2007	Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
			CAGR	2030	CAGR	2030	Difference	CAGR	2030	Difference
Holbrook	Holbrook Municipal	4,900	1.31%	6,600	0.00%	4,900	-26%	NA	NA	NA
Kayenta	Kayenta	4,524	1.31%	6,100	0.00%	4,524	-26%	4.40%	12,191	100%
Kearny	Kearny	4,200	1.31%	5,700	NA	NA	NA	4.71%	12,104	112%
Kingman	Kingman	57,437	2.61%	103,900	0.00%	57,437	-45%	3.24%	119,460	15%
Lake Havasu City	Lake Havasu City	51,514	1.31%	69,400	0.00%	51,514	-26%	3.05%	102,790	48%
Marana	Marana Regional	110,000	1.96%	171,900	1.96%	171,973	0%	4.90%	330,674	92%
Marana	Pinal Airpark	7,296	0.65%	8,500	0.00%	7,296	-14%	NA	NA	NA
Marble Canyon	Marble Canyon	2,585	1.96%	4,000	NA	NA	NA	NA	NA	NA
Maricopa	Estrella Sailport	16,500	1.31%	22,200	NA	NA	NA	NA	NA	NA
Meadview	Pearce Ferry	1,100	1.31%	1,500	NA	NA	NA	NA	NA	NA
Mesa	Falcon Field	311,691	1.96%	487,000	1.42%	430,748	-12%	1.82%	472,412	-3%
Mesa	Phoenix-Mesa Gateway	285,334	2.61%	516,300	2.15%	465,933	-10%	2.99%	562,123	9%
Nogales	Nogales International	37,300	2.61%	67,500	0.00%	37,300	-45%	3.98%	91,474	36%
Page	Page	21,882	0.65%	25,400	0.00%	21,882	-14%	4.29%	57,449	126%
Parker	Avi Suquilla	14,520	1.31%	19,600	0.00%	14,520	-26%	NA	NA	NA
Payson	Payson	42,250	2.61%	76,500	0.00%	42,250	-45%	2.46%	73,966	-3%
Peach Springs	Grand Canyon Caverns	1,350	2.61%	2,400	NA	NA	NA	NA	NA	NA
Peach Springs	Grand Canyon West	109,328	1.96%	170,800	0.00%	109,328	-36%	NA	NA	NA
Peach Springs	Hualapai	200	0.65%	200	0.00%	200	0%	0.00%	NA	NA
Peoria	Pleasant Valley	60,000	1.96%	93,700	NA	NA	NA	NA	NA	NA
Phoenix	Phoenix Deer Valley	377,696	1.96%	590,100	1.50%	532,489	-10%	2.96%	738,560	25%
Phoenix	Phoenix Regional	14,600	1.31%	19,700	NA	NA	NA	NA	NA	NA
Phoenix	Phoenix Sky Harbor International	127,563	0.65%	148,200	3.15%	260,605	76%	NA	NA	NA
Polacca	Polacca	1,000	0.65%	1,200	0.00%	1,000	-17%	NA	NA	NA
Prescott	Ernest A. Love Field	222,804	0.65%	258,800	1.16%	290,782	12%	1.78%	334,106	29%
Rimrock	Rimrock	600	1.31%	800	NA	NA	NA	NA	NA	NA
Safford	Safford Regional	17,250	1.96%	27,000	0.00%	17,250	-36%	3.80%	40,702	51%
San Luis	Rolle Airfield	2,900	0.65%	3,400	NA	NA	NA	NA	NA	NA
San Manuel	San Manuel/Ray/Blair	12,080	3.27%	25,300	0.00%	12,080	-52%	5.14%	38,244	51%
Scottsdale	Scottsdale	191,503	1.96%	299,200	1.49%	268,878	-10%	NA	NA	NA
Sedona	Sedona	45,000	1.96%	70,300	0.00%	45,000	-36%	NA	NA	NA
Seligman	Seligman	1,100	1.31%	1,500	NA	NA	NA	5.99%	4,196	180%
Sells	Sells	1,200	1.31%	1,600	NA	NA	NA	NA	NA	NA

Figure 4-69: Comparison of Preferred Operations Forecast with FAA TAF and Airport Master Plans (Continued)

		Actual 2007	Preferred Forecast		FAA Terminal Area Forecast			Airport Master Plan		
Associated City	*Airport Name*		*CAGR*	*2030*	*CAGR*	*2030*	*Difference*	*CAGR*	*2030*	*Difference*
Show Low	Show Low Regional	40,060	1.96%	62,600	0.00%	40,060	-36%	3.63%	91,051	45%
Sierra Vista	Sierra Vista Municipal/Libby Army Airfield	38,987	2.61%	70,500	0.00%	38,987	-45%	1.96%	60,872	-14%
Springerville	Springerville Municipal	4,000	0.65%	4,600	0.00%	4,000	-13%	3.37%	8,576	86%
St Johns	St Johns Industrial Air Park	14,000	1.31%	18,900	0.00%	14,000	-26%	NA	NA	NA
Superior	Superior Municipal	200	0.65%	230	NA	NA	NA	NA	NA	NA
Taylor	Taylor	4,810	1.31%	6,500	0.00%	4,810	-26%	9.81%	41,418	537%
Temple Bar	Temple Bar	1,800	1.31%	2,400	NA	NA	NA	NA	NA	NA
Tombstone	Tombstone Municipal	300	1.96%	500	NA	NA	NA	NA	NA	NA
Tuba City	Tuba City	910	0.65%	1,100	0.00%	910	-17%	NA	NA	NA
Tucson	La Cholla Airpark	4,000	1.31%	5,400	NA	NA	NA	NA	NA	NA
Tucson	Ryan Field	246,438	2.61%	445,900	2.18%	404,502	-9%	2.64%	448,654	1%
Tucson	Tucson International	183,512	0.65%	213,100	1.33%	248,521	17%	1.30%	246,991	16%
Whiteriver	Whiteriver	3,440	0.65%	4,000	0.00%	3,440	-14%	NA	NA	NA
Whitmore	Grand Canyon Bar Ten Airstrip	1,275	0.65%	1,500	NA	NA	NA	NA	NA	NA
Wickenburg	Wickenburg Municipal	17,500	3.27%	36,600	0.00%	17,500	-52%	4.49%	48,083	31%
Willcox	Cochise County	7,310	1.31%	9,900	0.00%	7,310	-26%	NA	NA	NA
Williams	H.A. Clark Memorial Field	3,650	1.31%	4,900	0.00%	3,650	-26%	4.33%	9,671	97%
Window Rock	Window Rock	7,000	3.27%	14,700	0.00%	7,000	-52%	NA	NA	NA
Winslow	Winslow-Lindbergh Regional	22,650	0.65%	26,300	0.00%	22,650	-14%	NA	NA	NA
Yuma	Yuma International Airport	80,944	2.61%	146,500	0.00%	80,944	-45%	NA	NA	NA

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Commerce, FAA ATAD, *FAA Aerospace Forecasts, Fiscal Years 2008-2025*, FAA *Terminal Area Forecasts*, Individual Airport Master Plan
Notes: CAGR=Compound Annual Growth Rate; N/A= not available; 2030 operations have been rounded to the nearest 100.

CHAPTER FIVE: ESTABLISH EXISTING AIRPORT ROLES

This chapter establishes the measures that will aid in the identification of each airport's initial functional role based on a variety of factors. After additional analysis is performed and presented in subsequent chapters, these initial roles will be reviewed to determine if changes may be needed in order for Arizona's airport system to meet future transportation, economic, and access needs.

INTRODUCTION

Airport roles are defined differently from a national, state, and local perspective. Prior to determining current roles for the SASP or analyzing the future system's needs, it is essential to review the historic role classifications. This review looked at SANS 2000, ADOT Aeronautics Division classifications, and other state's classification systems. Historically, Arizona has used service levels established by the FAA in the National Plan of Integrated Airport Systems (NPIAS) as a baseline to define each Arizona system airport's role.

FAA's National Airport Classifications & Previous State Airport Classification

As a national plan, the NPIAS is used by the FAA to identify aviation facilities of significance to the national air transportation network. The NPIAS defines an airport's role by its service level, and the airport's service level reflects the type of service the airport provides to the nation, state, and local community. The service level also reflects the funding categories established by Congress to assist in airport development.

As noted in Chapter One, the service levels used by the NPIAS include the following:

- Primary Service (PR) - Primary Service airports are public use airports receiving scheduled airline passenger service, enplaning 10,000 or more passengers per year.
- Commercial Service (CM) - Commercial Service airports are public use airports which receive scheduled airline passenger service and which enplane 2,500 or more passengers annually.
- Reliever (RL) - Reliever airports are general aviation or commercial service airports which serve to relieve congestion for a Primary Service airport by providing general aviation and non-airline commercial operators with alternative access to the community.
- General Aviation (GA) - General Aviation airports are either publicly or privately owned public use airports that primarily serve general aviation users.

The NPIAS for years 2008-2012 includes 59 of the 83 airports in the Arizona State Airports System Plan. The service level classification of these 59 airports includes nine Primary Service, three Commercial Service, eight Reliever, and 38 General Aviation airports. The NPIAS service level for each Arizona airport was presented in the previous chapter. It is important to note that one general aviation airport, Ganado, was identified as a closed airport by its sponsor during the inventory site visits. Therefore, the list of NPIAS airports has been reduced to 37 General Aviation airports (58 total) for the purpose of the SASP.
While these service levels are useful to the FAA in making funding decisions, they do not adequately describe the function or role of each airport in the Arizona airport system, especially those in the General Aviation category. The 37 General Aviation NPIAS airports in

Arizona do not serve the same function or role, nor should they be designed to do so. In addition to these 37 general aviation airports, there are an additional 24 non-NPIAS airports included in the Arizona SASP that also require analysis of their function or role in the system.

These airports have varying levels of activity, facilities, and services and meet a wide variety of needs. Some general aviation airports are used extensively by large business-class aircraft, others are used primarily by small aircraft for recreational purposes, and others are used for emergency medical air transport. The FAA's NPIAS service levels do not relate to the manner in which airports function within the state system. Inclusion in NPIAS simply means that an airport has some national significance and is eligible to receive FAA Airport Improvement Program (AIP) grants. The NPIAS service level classification provides little guidance on the types of facilities that should be developed and/or maintained to meet other functions. Both federal and state funding for airport improvements is extremely limited; therefore, it is essential that airports in Arizona be developed to the extent necessary to perform their identified roles, and state funding be applied in a manner to support these roles.

SANS 2000 Classifications

The SANS 2000 developed airport classifications and subsequent airport planning guidelines based on:

1. NPIAS category
2. Current airport ARC
3. State Primary and Secondary categories
4. Old FAA airport categories (GA Community, GA Rural, and GA Emergency)

The SANS 2000 "airport planning guidelines," are similar to the "facility and service objectives" used in this system plan and defined later in the chapters. The airport planning guidelines used in the previous plan, however, were based strictly on the airport's current ARC, not airport role, as proposed here.

Review of Other State Classifications

This review evaluated several statewide airport system plans to provide background on other airport role or classification systems. These state system plans are:

- Arkansas State Airport System Plan Update (2006)
- California Aviation System Plan (2002)
- Maryland State Aviation System Plan (2008)
- Minnesota Aviation System Plan Update (2006)
- Missouri State Airport System Plan (2006)
- Iowa Aviation System Plan (2005)
- Colorado Aviation System Plan Update (2006)
- Utah Continuous Airport System Plan (2007)
- Wisconsin Airport Classification Review and Update (2008)

These system plans were included due to their recent completion date and/or the use of factors applied to the systems. All airport systems share commonalities between them while at the same time being able to fine-tune various factors that are important to the specific needs and goals of the state. As discussed previously, the FAA role classification of general aviation airports is relatively generic. When systems are further defined by states, the roles are more clearly defined with nomenclature that is specific to each state and easy to comprehend by both the aviation and non-aviation public.

The review identified a similarity of role classifications, nomenclature, and quantity adopted by states in recent airport system plans. A few of the particulars identified in the review of other state systems include:

- Not all systems use the same number of roles or the same nomenclature.
- Some systems, such as the Minnesota system, have roles directly tied to legislative law.
- Others, such as the Iowa system, are more flexible in nature and not tied to statutes.

AIRPORT ROLE CONSIDERATIONS

Typically, state-specific roles are developed through consideration of many different factors including geography, demographic characteristics, economic development potential, and the demand for aviation services. The combination of these factors determines the role that each airport plays within a defined system, such as the Arizona airport system. The Arizona-specific roles developed in this chapter are tools for use by ADOT and airport sponsors for long-term planning and evaluation of the performance of Arizona's airport system. These roles supplement rather than replace the FAA NPIAS service levels and provide a broader opportunity to view the state's airport system in its full context.

In order to identify each airport's initial/current functional role in the system, a detailed analysis of the specific factors that impact an airport's function was conducted. By analyzing each system airport in relation to the specific factors selected for this analysis, the demand for aviation that each airport supports within the system is identified. Based on this analysis, airports in the existing system are classified in different roles based on the current types and levels of activity occurring at the facility or in the community.

Demand for aviation services is influenced by factors that are related to aviation as well as factors that are unrelated. It was determined that both aviation and non-aviation factors should be considered to achieve a balance in evaluating airport needs throughout the state. These factors were then further defined into the following four general system performance criteria/goal categories that were previously established:

- Development
- Economic Support
- Safety and Security
- Environmental Sensitivity and Stewardship

Data was evaluated for its availability and reliability to provide sufficient detail to support comparison of the various factors for each airport.

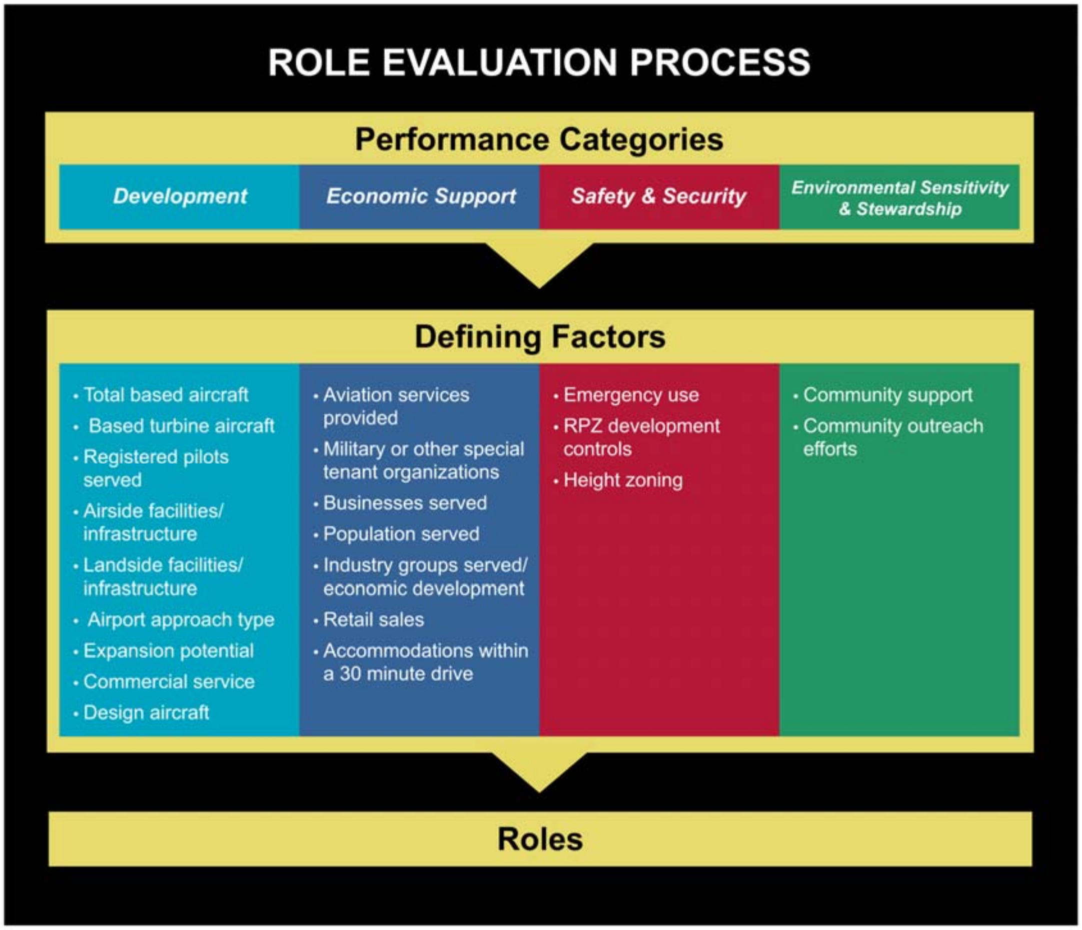
Once roles are defined, the facility and service attributes associated with each role classification are identified. These facility and service attributes provide a baseline for evaluating how well each airport's facilities and services are serving the needs of the state system based on each airport's initial role.

ROLE EVALUATION

Through extensive discussion with ADOT staff, review of other comparable statewide airport systems, analysis of available data, and input from the Planning Advisory Committee (PAC) members, specific measurable factors were selected to evaluate the role of each airport in the Arizona airport system. These measurable factors were chosen because they are the most significant determinants in establishing the role or function of an airport within the system. By using factors that are measurable, the determination of roles becomes a quantitative process rather than a subjective, qualitative process. The process used to evaluate Arizona's airport classifications is depicted graphically in Figure 5-1.

Figure 5-1: Role Evaluation Process

Source: Wilbur Smith Associates



Prepared: July 2008

Factors in Determining Airport Roles

The following summarizes the factors used to determine each airport's role, by system performance category:

- Development
  - Total based aircraft
  - Based turbine aircraft
  - Registered pilots served
  - Airside facilities/infrastructure
  - Landside facilities/infrastructure
  - Airport approach type
  - Expansion potential
  - Commercial service
  - Design aircraft
- Economic Support
  - Aviation services provided
  - Military or other special tenant organizations
  - Businesses served
  - Population served
  - Industry groups served/economic development
  - Retail sales
  - Accommodations within a 30 minute drive
- Safety and Security
  - Emergency use
  - RPZ development controls
  - Height zoning
- Environmental Sensitivity and Stewardship
  - Community support
  - Community outreach efforts

In general terms, each airport was scored separately for each factor. The maximum score for each airport for each measurable factor was 10, with the scores for each airport stratified based on the range of data identified for each factor. For example, in some cases data were numeric and a statistical method could be used to assign scores. This is true for based aircraft. For other factors, the data were limited to only several choices. For example, the type of approach to the runway was defined as visual, non-precision, or precision. Therefore, each measurable factor was analyzed separately to determine the appropriate scoring process. The scoring process and data analyzed for each factor is discussed below.

It is important to note that for purposes of the 30-minute service area evaluations, Geographic Information System (GIS) analyses were completed to determine the drive time, or service area, for each system airport. A service area of 30 minutes was chosen to correspond to the FAA's use of 30-minute drive times in its determination of eligibility for airports in the NPIAS.

A base map of Arizona's road system was obtained from Environmental Systems Research Institute (ESRI) Data and Maps 2007 for use in the GIS analysis. The quantity and quality of the roads leading to each airport was considered in the GIS analysis, and associated speed limits were assigned based on the type of road (primary highway, secondary or connecting road, or local/rural road). Based on the posted speed limits and road network, a 30-minute service area was developed for each of Arizona's airports.

The factors within each goal category are discussed below.

Development

Airports were evaluated based on the types of aviation activity currently occurring at each facility and their physical attributes. In general, an airport's total number of based aircraft and the number of aircraft that are twin-engine aircraft or larger provides an indication of the role that the airport plays. Additionally, higher concentrations of pilots usually signal higher demand levels and greater rates of airport utilization. Airports that have longer runways and more precise approach capabilities, precision or non-precision, tend to play more essential roles within the airport system. The data was gathered from the Airport Inventory and Data Survey which was completed during on-site visits to each study airport in May 2008 unless otherwise noted. The nine factors analyzed under Development include the following:

- Total based aircraft – Higher numbers of based aircraft reflect the role the airport is playing in meeting air transportation and economic needs of the market area it serves. Airports were rated based on the total number of permanently based aircraft data that was gathered from the Airport Inventory and Data Survey 2008.
- Based turbine aircraft – Airports were rated based on the number of permanently based turbine and jet aircraft.
- Registered pilots served – Airports were rated based on the estimated number of pilots within a 30-minute drive time of each Arizona airport. Data on registered pilots was obtained from FAA records.
- Airside facilities/infrastructure – The quality of airside facilities provided by an airport typically increases the usage of that facility and its corresponding role within that system. Airports were evaluated based on the length of their primary runway length, type of taxiway, and on-site weather capabilities.
- Landside facilities/infrastructure – Similar to airside facilities, the quality of an airport's landside facilities plays an important role in the activity of the airport. Airports were evaluated on the presence of a terminal building and the total number of hangar spaces as determined by the aircraft that could be stored in hangars.
- Airport approach type – Airports were evaluated based on the type of the most demanding approach available/published. The approach classifications of precision, near-precision, non-precision, and visual were used for this evaluation. Data was gathered from FAA US Terminal Procedures.
- Expansion potential – An airport's ability to expand both its landside and airside facilities contributes to its role. Each airport's expansion potential was determined by the relationship of the airport to its host and neighboring communities, physical/topographical constraints, environmental issues, manmade constraints, and financial limitations. Airports were rated based on this ranking. Airports were asked to rank their expansion potential on a scale of 1 to 10, with 10 being the greatest potential, on the Airport Inventory and Data Survey 2008.
- Commercial service – Airports were rated on whether or not they provided commercial airline service. Data was gathered from FAA records and Airport Inventory and Data Survey 2008.
- Design aircraft – Airports were analyzed based on the airport reference code (ARC) for each airport's design aircraft.

Economic Support

As a result of the important role that airports in Arizona have in supporting and leading economic growth, it is important to examine factors that could help establish the role that each airport has in supporting the state's economy. The following seven factors were considered:

- Aviation services provided – Services provided at system airports are key to attracting both locally based and visiting aviation demand. Specific services that bear upon an airport's role within a particular system include the presence of a fixed base operator (FBO) and fuel availability. Aviation services were identified in the Airport Inventory and Data Survey 2008 that was conducted as part of the inventory process.
- Military or other special tenant organizations – The presence of military units or other special tenant organizations on an airport mirror the importance of the airport's role on the community and economy. Airports that support a high level of pilot training through accommodating these flights were also considered to be important to the Arizona airport system. Airports were rated based the presence of these types of tenants and activities at each of the study airports. Data was gathered from the Airport Inventory and Data Survey 2008.
- Businesses served – Airports were rated based on the total number of businesses located within a 30-minute drive time of each Arizona airport. Data was gathered from Woods and Poole Economics, Inc 2006.
- Population served – Airports were rated based on block group data of total population within a 30-minute drive time of each Arizona airport. Data was gathered from Arizona Department of Commerce.
- Industry groups served/economic potential – The number of businesses and overall employment are indicators of the economic viability of an area. Businesses that have 20 or more employees are more likely to utilize commercial service and business aviation airports, than are smaller businesses employing fewer people. Using GIS, the number of businesses that have the propensity to use aviation services were located for each airport's service area. Data was gathered from InfoUSA.
- Retail sales – Retail sales reflect the level of overall economic activity in an area, and spending provides a general representation of the tourism demand in an area. Since the combined service areas of the airports only cover a portion of the entire state, only that data in those service areas was considered. As such, this factor was used as a tool to compare the relative economic strength of each airport's service area with that of the other airports' service areas. Retail sales data was collected from Woods and Poole Economics, Inc. for the year 2006.
- Accommodations within a 30 minute drive – The number of hotel and motel accommodations are an indicator of the economic state within a community. Accommodations can be directly tied to the business travel and tourism industries. Data was gathered from the Arizona Department of Commerce.

Safety and Security

One of the most important characteristics of a good aviation system is the system's ability to provide a safe and secure operating environment that is commensurate with needs and potential risks. Airports that meet applicable safety and security standards, as well as support health, welfare, and safety-related services and activities are vital in today's environment. The three factors considered under the Safety and Security performance category include the following:

- Emergency use – Airports that support emergency use activity provide their surrounding communities and the state important quality of life benefits. Emergency use activity includes patient transfer, medical evacuation, air ambulance, etc. Airports were evaluated on the frequency of emergency use at their facilities. Data was gathered from the Airport Inventory and Data Survey 2008.
- Runway Protection Zone (RPZ) development controls – RPZ compatibility initiatives were identified as the second key subset of this performance category. The compatible use of land within the trapezoidal RPZ (as defined in FAA AC 150/5300-13, change 13, *Airport Design*) area off the ends of runways includes open space, agricultural, or low-intensity recreational uses. The FAA discourages such uses as residential development, retail commercial, or places of public congregation, including schools, churches, hospitals, or sports stadiums. Airports were evaluated based on the level of control they maintain over their RPZs. Data was gathered from the Airport Inventory and Data Survey 2008.
- Height zoning – Height restriction zoning is a land use initiative that can be implemented by each community that will protect the airport's airspace from incompatible encroachment, as well as protecting the community from aeronautical activities. Airports were evaluated on whether or not height zoning has been adopted by surrounding communities. Data was gathered from the Airport Inventory and Data Survey 2008.

Environmental Sensitivity and Stewardship

With an ever increasing awareness, the environmental movement is at the forefront of every day actions. Airports are quickly becoming active stewards of the environment by being considerate of the environment and supporting aviation programs and outreach opportunities. The two factors analyzed under Environmental Sensitivity and Stewardship include the following:

- Community support – Airports are valuable assets to the communities they reside in and go beyond providing just a transportation link to the rest of the state and nation. Airports often serve as a catalyst for economic growth, an access point for quality of life components such as life flight or forest fire fighting, and an educational forum. The more support an airport receives from its surrounding communities, the more successful that airport will be, in turn providing the community with an invaluable resource. Data was gathered from the Airport Inventory and Data Survey 2008.
- Community outreach efforts – An airport's outreach efforts in support of the airport are key factors in determining the degree of airport acceptance by the local community. Outreach efforts can include fly-ins, air shows, educational programs, or tours of the airport. Data was gathered from the Airport Inventory and Data Survey 2008.

Ranking of System Airports

The purpose of the system classification process is to identify the “relative” role that each airport in Arizona’s airport system is currently filling. Establishing a current role for each airport in the system is the first step in identifying adequacies and deficiencies that characterize the existing airport system. Identifying current roles for all system airports is essential to determining the future role for all airports.

To identify current system roles, 21 different factors which are indicative of the role that airports are currently playing were identified, as previously described. In most cases, each of these 21 factors can be linked to a numeric value. For each of the 21 factors, airports were assigned a numeric score that was related to a more relative score ranging from low to high. For each factor, the airport with the highest numeric value was assigned to “high” to start the scoring process. In this process, “high” represents those airports that currently best meet or fulfill the factor being scored. For example, the number of accommodations within a 30-minute drive of a system airport varied from zero at Polacca to nearly 51,600 at Phoenix Sky Harbor. All airports were assigned a number one through 10 based on the statistical breaks in the data. So for the purpose of this factor, Polacca received a zero and Phoenix Sky Harbor received a 10.

The current system classification/role assignment, based on the 21 factors, considers only the sum of raw scores assigned to each airport for its ability to satisfy each factor. Figures 5-2 through 5-5 show the relative scores assigned to each of the airports. *Note: Figures 5-2 through 5-5 can be found at the end of this chapter.*

Results of Evaluation

The factor scores for each performance category were summed to determine each airport’s initial score, prior to weighting. The sum of the four category scores for each airport, including the weight, produced the results of the role evaluation. The final scores for all airports were evaluated to determine where natural breaks in the scoring process occurred. These natural breaks were used to separate the airports into categories for role assignment.

With the airports scored based on the performance categories and factors, the number of roles for the Arizona airport system was considered next. Roles are needed to determine the facility and service objectives that should be used to evaluate the adequacy of Arizona’s airport system and how the system is functioning to meet its objectives.

As previously noted, the FAA no longer uses a standard classification system other than the delineation between commercial airports and general aviation airports. To further classify airports, especially as they relate to design, the FAA groups airports based on the type of aircraft that regularly operate at the airport. This classification system is referred to as Airport Reference Codes (ARCs). This system is discussed in more detail in a subsequent section.

To develop a role for each airport, based on the results of the analysis, the airport scores were reviewed. Airports were separated into five categories based on the number of standard deviations above or below their respective scores relative to the average score. Definitions for the five role categories were developed based on a review of the previous system plan, other state system plans, and the FAA system. These roles serve as the baseline for analysis of the Arizona system’s effectiveness, with possible refinement as the evaluation of the system is conducted in later tasks. The five roles are identified in the following section.

Airport Role Definitions

Based on a review of the previous system plan, and other state aviation and FAA classifications, as well as the roles the airports play in Arizona's airport system, five airport roles were developed. The five airport roles are defined as follows:

- Commercial Service Airports: Publicly owned airports which enplane 2,500 or more passengers annually and receive scheduled passenger air service.
- Reliever Airports: FAA-designated airports that relieve congestion at a commercial service airport.
- GA-Community Airports: Airports that serve regional economies[1], connecting to state and national economies, and serve all types of general aviation aircraft.
- GA-Rural Airports: Airports that serve a supplemental role in local economies[2], primarily serving smaller business, recreational, and personal flying.
- GA-Basic Airports: Airports that serve a limited role in the local economy, primarily serving recreational and personal flying.

Figure 5-6 lists airports alphabetically by the name of the associated city and classifies each into one of the five roles listed above. Figure 5-7 presents the information graphically with the five roles for Arizona's aviation system. This represents the initial airport roles that will be used as a baseline for analysis of the system.

[1] For the purpose of this report, a regional economy is defined as the economic activity of an area that encompasses multiple communities or political jurisdictions

[2] For the purpose of this report, a local economy is defined as the economic activity of a single community or a largely rural area.

Figure 5-6: Initial Airport Role Summary

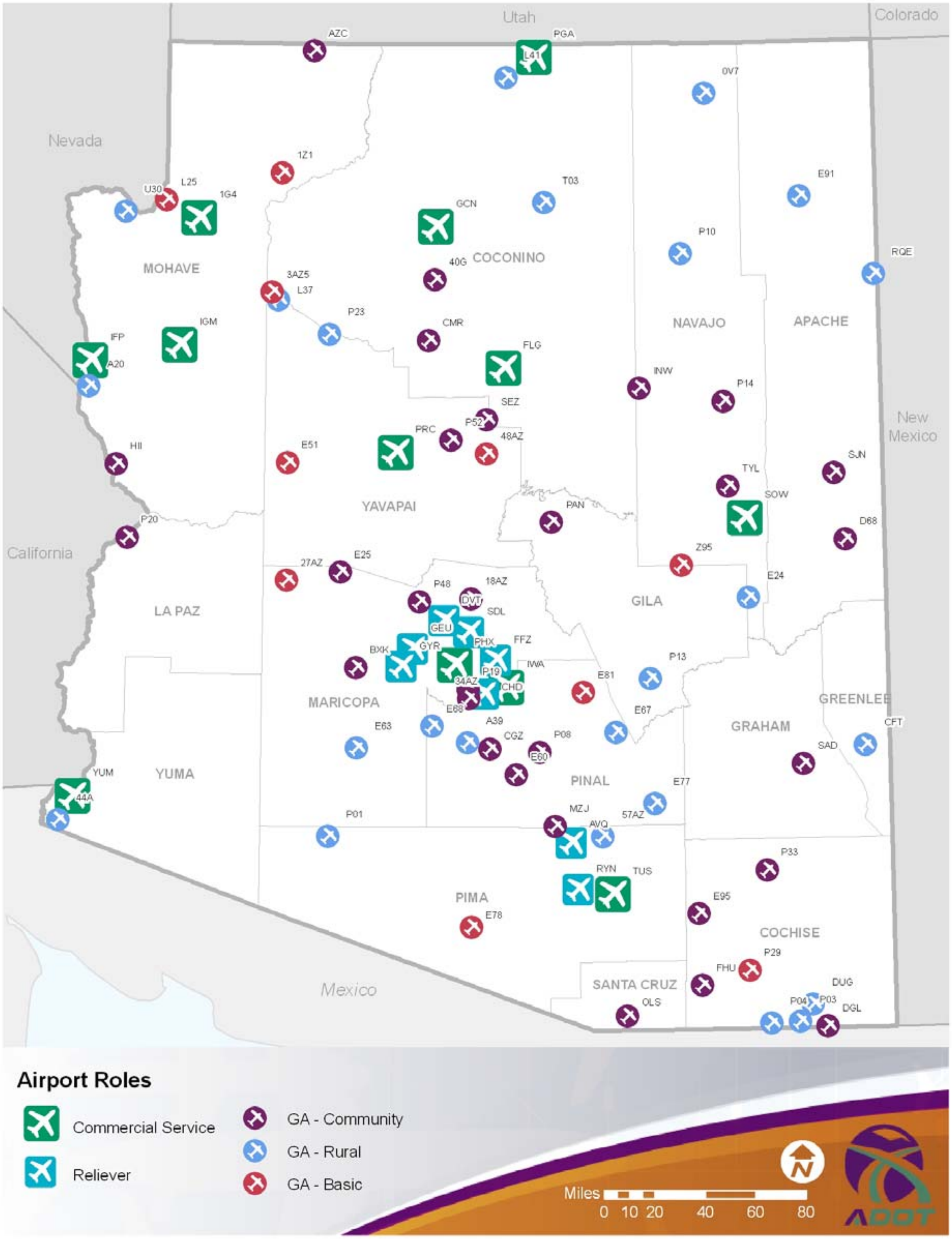
Airport Code	*Associated City*	*Airport Name*	*Role*
27AZ	Aguila	Eagle Roost	GA-Basic
P01	Ajo	Eric Marcus Municipal	GA-Rural
E51	Bagdad	Bagdad	GA-Basic
E95	Benson	Benson Municipal	GA-Community
P04	Bisbee	Bisbee Municipal	GA-Rural
BXK	Buckeye	Buckeye Municipal	GA-Community
IFP	Bullhead City	Laughlin/Bullhead International	Commercial Service
A20	Bullhead City	Sun Valley	GA-Rural
18AZ	Carefree	Sky Ranch at Carefree	GA-Community
CGZ	Casa Grande	Casa Grande Municipal	GA-Community
CHD	Chandler	Chandler Municipal	Reliever
34AZ	Chandler	Memorial Airfield	GA-Community
P19	Chandler	Stellar Airpark	GA-Community
E91	Chinle	Chinle Municipal	GA-Rural
Z95	Cibecue	Cibecue	GA-Basic
CFT	Clifton/Morenci	Greenlee County	GA-Rural
AZC	Colorado City	Colorado City Municipal	GA-Community
P08	Coolidge	Coolidge Municipal	GA-Community
P52	Cottonwood	Cottonwood	GA-Community
P03	Douglas	Cochise College	GA-Rural
DGL	Douglas	Douglas Municipal	GA-Community
DUG	Douglas Bisbee	Bisbee Douglas International	GA-Rural
E60	Eloy	Eloy Municipal	GA-Community
FLG	Flagstaff	Flagstaff Pulliam	Commercial Service
E63	Gila Bend	Gila Bend Municipal	GA-Rural
GEU	Glendale	Glendale Municipal	Reliever
P13	Globe	San Carlos Apache	GA-Rural
GYR	Goodyear	Phoenix Goodyear	Reliever
GCN	Grand Canyon	Grand Canyon National Park	Commercial Service
40G	Grand Canyon	Valle	GA-Community
P14	Holbrook	Holbrook Municipal	GA-Community
0V7	Kayenta	Kayenta	GA-Rural
E67	Kearny	Kearny	GA-Rural
IGM	Kingman	Kingman	Commercial Service
HII	Lake Havasu City	Lake Havasu City	GA-Community
AVQ	Marana	Marana Regional	Reliever
MZJ	Marana	Pinal Airpark	GA-Community
L41	Marble Canyon	Marble Canyon	GA-Rural
E68	Maricopa	Estrella Sailport	GA-Rural
L25	Meadview	Pearce Ferry	GA-Basic
FFZ	Mesa	Falcon Field	Reliever
IWA	Mesa	Phoenix-Mesa Gateway	Commercial Service
OLS	Nogales	Nogales International	GA-Community
PGA	Page	Page Municipal	Commercial Service
P20	Parker	Avi Suquilla	GA-Community
PAN	Payson	Payson	GA-Community
L37	Peach Springs	Grand Canyon Caverns	GA-Rural
1G4	Peach Springs	Grand Canyon West	GA-Rural

Figure 5-6: Initial Airport Role Summary (Continued)

Airport Code	*Associated City*	*Airport Name*	*Role*
3AZ5	Peach Springs	Hualapai	GA-Basic
P48	Peoria	Pleasant Valley	GA-Community
DVT	Phoenix	Phoenix Deer Valley	Reliever
A39	Phoenix	Phoenix Regional	GA-Rural
PHX	Phoenix	Phoenix Sky Harbor International	Commercial Service
P10	Polacca	Polacca	GA-Rural
PRC	Prescott	Ernest A. Love Field	Commercial Service
48AZ	Rimrock	Rimrock	GA-Basic
SAD	Safford	Safford Regional	GA-Community
44A	San Luis	Rolle Airfield	GA-Rural
E77	San Manuel	San Manuel	GA-Rural
SDL	Scottsdale	Scottsdale	Reliever
SEZ	Sedona	Sedona	GA-Community
P23	Seligman	Seligman	GA-Rural
E78	Sells	Sells	GA-Basic
SOW	Show Low	Show Low Regional	Commercial Service
FHU	Sierra Vista	Sierra Vista Municipal- Libby AAF	GA-Community
D68	Springerville	Springerville Municipal	GA-Community
SJN	St Johns	St Johns Industrial Air Park	GA-Community
E81	Superior	Superior Municipal	GA-Basic
TYL	Taylor	Taylor	GA-Community
U30	Temple Bar	Temple Bar	GA-Rural
P29	Tombstone	Tombstone Municipal	GA-Basic
T03	Tuba City	Tuba City	GA-Rural
57AZ	Tucson	La Cholla Airpark	GA-Rural
RYN	Tucson	Ryan Field	Reliever
TUS	Tucson	Tucson International	Commercial Service
E24	Whiteriver	Whiteriver	GA-Rural
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip	GA-Basic
E25	Wickenburg	Wickenburg Municipal	GA-Community
P33	Willcox	Cochise County	GA-Community
CMR	Williams	H.A. Clark Memorial Field	GA-Community
RQE	Window Rock	Window Rock	GA-Rural
INW	Winslow	Winslow-Lindbergh Regional	GA-Community
NYL	Yuma	Yuma Marine Corps Air	Commercial Service

Source: Wilbur Smith Associates
Prepared: July 2008

Figure 5-7: Arizona Airport Roles



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A
Prepared: July 2008

In subsequent analysis, each airport is evaluated to determine its future role within the Arizona airport system. This includes identification of airports in close proximity to other airports that provide duplicate services or areas of the state where services are insufficient to meet demand. The identification of airports within a region where aviation services are duplicated may dictate moving an airport to a different role. This subsequent process also evaluates if more advanced aviation services are needed to serve an area. This may indicate that a more demanding role is needed for a particular airport. An underserved area of the state could indicate the need for a different category of airport, or possibly development of a new airport.

It is important to note this role analysis is based on a “snapshot in time” of present conditions and is only a starting point in Arizona’s system planning process. Based on analyses that are conducted in subsequent steps, some airports may be identified to serve a greater role in the future for the system to function at its highest level.

FACILITY AND SERVICE OBJECTIVES

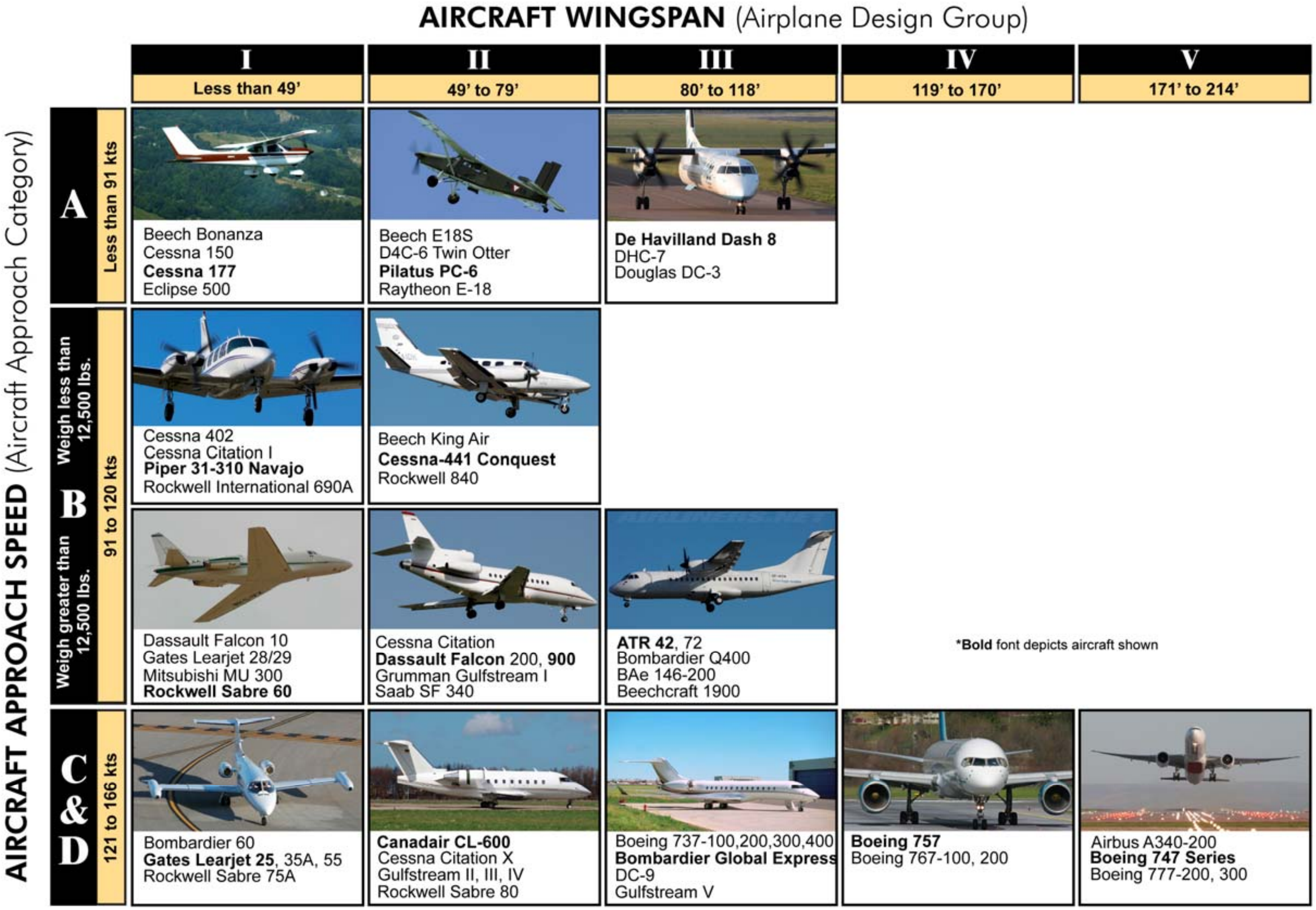
With system airports assigned to a role, it is desirable to identify facilities and services that should be available at airports assigned to one of the five roles. Facility and service objectives delineated in this section are just that, objectives; they are not standards or requirements. It is possible that airports included in, or recommended for, an elevated role may be unable to achieve certain facility and service objectives. An airport’s inability to meet all facility and service objectives for its role does not necessarily preclude that airport from filling its recommended role within the system.

The objectives present the minimum level of development that the airport should have to meet its recommended system role. It is possible that some airports may have facilities or services that are in excess of those attached to its functional role. Reduction or removal of facilities and services was not considered in this analysis.

FAA’s Airport Reference Code (ARC) System

In the ARC system, the FAA relates airport design criteria to the operational and physical characteristics of the most demanding aircraft, or design aircraft, intended to regularly operate at an airport. The ARC has two components related to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category; it is related to the aircraft approach speed. The second component, depicted by a Roman numeral, is the airplane design group; it relates to the airplane wingspan. Generally, the size and characteristics of an airport’s runway and other facilities are related to aircraft approach speed, airplane wingspan, and designated or planned instrument approach visibility minimums. Figure 5-8 provides a list of common airplanes with their approach category and design group as specified by FAA standards.

Figure 5-8: Aircraft Classification Standards



Source: Federal Aviation Administration
Prepared: July 2008

Figure 5-9 identifies facility and service objectives for each of the five role categories. A subsequent chapter of this report compares current facilities and services at system airports to the objectives presented in the following tables. From this comparison, enhancements for system airports will subsequently be developed.

Figure 5-9: Initial Airport Role Summary

Commercial Service Airports	
Airport Criteria	**Minimum Objectives**
ARC	Consistent with Master Plan
Runway Length	Consistent with Master Plan
Runway Width	To Meet ARC
Taxiway	Consistent with Master Plan
Surface	Asphalt/Paved
Approach Capability	Precision Desired; Near Precision (minimum)
Visual Aids	Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI
Lighting	HIRL/HITL Desired; MIRL/MITL (minimum)
Approach Lighting System	ALS
Fencing	Perimeter Fencing and Controlled Access
Services	Full Service FBO/Maintenance/On-Site Rental Car/Phone/Restroom/ 24-7 Fuel (Jet and AvGas)
Facilities	Consistent with Master Plan
Reliever Airports	
Airport Criteria	**Minimum Objectives**
ARC	C-III
Runway Length	Accommodate 75% of large aircraft at 90% useful load
Runway Width	To Meet ARC
Taxiway	Full Parallel; width per ARC
Surface	Asphalt/Paved
Approach Capability	Near-Precision Desired; Non-Precision (minimum)
Visual Aids	Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI
Lighting	MIRL/MITL
Approach Lighting System	ALS Desired
Fencing	Perimeter Fencing and Controlled Access
Services	Full Service FBO/Maintenance/On-Site Rental Car/Phone/Restroom/ 24-7 Fuel (Jet and AvGas)
Facilities	Terminal with Pilots' Lounge Hangars: 75% of based fleet and 25% overnight Apron: 25% of based fleet and 75% for transient Auto Parking: 75% of based fleet

Figure 5-9: Initial Airport Role Summary ((Continued)

GA-Community Airports	
Airport Criteria	**Minimum Objectives**
ARC	B-II
Runway Length	Accommodate 75% of large aircraft at 60% useful load
Runway Width	To Meet ARC
Taxiway	Full or Partial Parallel; width per ARC
Surface	Asphalt/Paved
Approach Capability	Non-Precision
Visual Aids	Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI
Lighting	MIRL/MITL
Approach Lighting System	None
Fencing	Perimeter Fencing
Services	Limited Service FBO/Limited Maintenance/On-Site Ground Transportation/Phone/Restroom/Fuel (Jet and AvGas)
Facilities	Terminal with appropriate facilities Hangars: 60% of based fleet and 25% overnight Apron: 40% of based fleet and 50% for transient Auto Parking: 33% of based fleet
GA-Rural Airports	
Airport Criteria	**Minimum Objectives**
ARC	B-I
Runway Length	Accommodate 75% of small airplanes
Runway Width	To Meet ARC
Taxiway	Full or Partial Parallel, Connectors, or Turnarounds; width per ARC
Surface	Asphalt Desired; Unpaved
Approach Capability	Non-Precision or Circling
Visual Aids	Rotating Beacon, Wind Cone/Segmented Circle, VGSI
Lighting	MIRL/MITL
Approach Lighting System	None
Fencing	Perimeter Fencing
Services	Phone/Restroom/Fuel (AvGas)/Ground Transportation
Facilities	Hangars: 50% of based fleet and 25% for overnight Apron: 50% of based fleet and 25% for transient Auto Parking: Equal to # of based fleet
GA-Basic Airports	
Airport Criteria	**Minimum Objectives**
ARC	A-I
Runway Length	Maintain existing
Runway Width	To Meet ARC
Taxiway	None
Surface	Gravel/Dirt
Approach Capability	None
Visual Aids	Rotating Beacon, Wind Sock
Lighting	LIRL or Reflectors
Approach Lighting System	None
Fencing	Perimeter Fencing Desired
Services	Phone and Restroom Desired
Facilities	None

Source: Wilbur Smith Associates
Prepared: July 2008

SUMMARY

This chapter has set forth the initial role classification system that will be used in subsequent analyses to evaluate the adequacy of Arizona's airport system. With the initial airport roles and the facility and service minimum objectives identified, the ability of the system to meet the goals and objectives now and in the future will be analyzed in the next step of the system plan.

Figure 5-2: Role Evaluation - Development

Associated City	*Airport Name*	*Total Based Aircraft*	*Based Turbine Aircraft*	*Registered Pilots*	*Airside Facilities/Infrastructure*	*Landside Facilities/Infrastructure*	*Airport Approach Type*	*Expansion Potential*	*Commercial Service*	*Design Aircraft*
Aguila	Eagle Roost	L	L	L	L	L	L	L	L	L
Ajo	Eric Marcus Municipal	L	L	L	L	L	L	M	L	L
Bagdad	Bagdad	L	L	L	L	L	L	M	L	L
Benson	Benson Municipal	L	L	L	M	M	L	H	L	L
Bisbee	Bisbee Municipal	L	L	L	M	M	L	M	L	L
Buckeye	Buckeye Municipal	L	L	H	M	M	L	H	L	M
Bullhead City	Laughlin/Bullhead International	L	L	L	H	M	M	M	H	M
Bullhead City	Sun Valley	L	L	L	M	M	L	L	L	L
Carefree	Sky Ranch at Carefree	M	L	H	M	H	L	L	L	L
Casa Grande	Casa Grande Municipal	L	L	H	M	M	L	H	L	M
Chandler	Chandler Municipal	H	L	H	H	H	M	H	L	M
Chandler	Memorial Airfield	L	L	H	M	M	L	H	L	H
Chandler	Stellar Airpark	M	L	H	M	H	M	M	L	L
Chinle	Chinle Municipal	L	L	L	L	L	L	M	L	L
Cibecue	Cibecue	L	L	L	L	L	L	H	L	M
Clifton/Morenci	Greenlee County	L	L	L	M	M	L	M	L	M
Colorado City	Colorado City Municipal	L	L	L	M	M	M	M	L	M
Coolidge	Coolidge Municipal	L	L	L	M	M	M	H	L	M
Cottonwood	Cottonwood	L	L	M	M	M	L	M	L	L
Douglas	Cochise College	L	L	L	M	M	L	M	L	L
Douglas	Douglas Municipal	L	L	L	M	M	L	H	L	M
Douglas Bisbee	Bisbee Douglas International	L	L	L	M	M	M	H	L	L
Eloy	Eloy Municipal	L	L	M	M	M	L	M	L	M
Flagstaff	Flagstaff Pulliam	M	L	M	H	M	H	H	H	M
Gila Bend	Gila Bend Municipal	L	L	L	M	M	L	M	L	M
Glendale	Glendale Municipal	H	L	H	H	H	M	H	L	M
Globe	San Carlos Apache	L	L	L	M	L	M	H	L	H
Goodyear	Phoenix Goodyear	H	L	H	H	H	M	H	L	M
Grand Canyon	Grand Canyon National Park	L	L	L	H	M	H	H	L	L
Grand Canyon	Valle	L	L	L	L	M	M	H	L	M
Holbrook	Holbrook Municipal	L	L	L	H	M	L	H	L	M
Kayenta	Kayenta	L	L	L	L	L	L	H	L	L
Kearny	Kearny	L	L	L	L	M	L	M	L	M
Kingman	Kingman	H	M	M	H	M	M	H	H	M
Lake Havasu City	Lake Havasu City	M	M	H	H	M	M	H	L	H
Marana	Marana Regional	H	M	H	H	H	M	H	L	M
Marana	Pinal Airpark	L	L	H	M	M	L	M	L	L
Marble Canyon	Marble Canyon	L	L	L	L	M	L	H	L	L
Maricopa	Estrella Sailport	L	L	M	L	M	L	H	L	L
Meadview	Pearce Ferry	L	L	L	L	L	L	L	L	M
Mesa	Falcon Field	H	L	H	H	H	M	L	L	H
Mesa	Phoenix-Mesa Gateway	L	L	H	H	M	H	H	H	L
Nogales	Nogales International	L	L	L	H	M	M	H	L	M
Page	Page Municipal	L	L	L	H	M	M	H	H	M
Parker	Avi Suquilla	L	L	L	M	M	M	H	L	M
Payson	Payson	L	L	L	M	M	M	H	L	M
Peach Springs	Grand Canyon Caverns	L	L	L	M	M	L	L	L	L
Peach Springs	Grand Canyon West	L	L	L	L	M	L	M	L	M

Figure 5-2: Role Evaluation - Development (Continued)

Associated City	*Airport Name*	*Total Based Aircraft*	*Based Turbine Aircraft*	*Registered Pilots*	*Airside Facilities/Infrastructure*	*Landside Facilities/Infrastructure*	*Airport Approach Type*	*Expansion Potential*	*Commercial Service*	*Design Aircraft*
Peoria	Pleasant Valley	L	L	H	L	M	L	H	L	L
Phoenix	Phoenix Deer Valley	H	H	H	H	H	M	H	L	M
Phoenix	Phoenix Regional	L	L	M	M	M	L	H	L	L
Phoenix	Phoenix Sky Harbor International	L	L	H	H	M	H	H	H	H
Polacca	Polacca	L	L	L	L	L	L	M	L	M
Prescott	Ernest A. Love Field	H	L	L	H	H	H	H	H	L
Rimrock	Rimrock	L	L	M	L	L	L	M	L	M
Safford	Safford Regional	L	L	L	M	L	M	H	L	L
San Luis	Rolle Airfield	L	L	M	L	L	L	H	L	M
San Manuel	San Manuel	L	L	L	M	M	L	H	L	M
Scottsdale	Scottsdale	H	H	H	H	M	M	L	L	M
Sedona	Sedona	L	L	M	M	M	M	L	L	L
Seligman	Seligman	L	L	L	M	M	L	L	L	L
Sells	Sells	L	L	L	L	L	L	L	L	M
Show Low	Show Low Regional	L	L	L	H	M	M	H	H	H
Sierra Vista	Sierra Vista Municipal- Libby AAF	L	L	H	H	M	H	L	L	M
Springerville	Springerville Municipal	L	L	L	M	M	M	H	L	M
St Johns	St Johns Industrial Air Park	L	L	L	M	M	M	M	L	M
Superior	Superior Municipal	L	L	L	L	L	L	M	L	L
Taylor	Taylor	L	L	L	M	M	M	H	L	M
Temple Bar	Temple Bar	L	L	L	L	L	L	L	L	L
Tombstone	Tombstone Municipal	L	L	L	L	L	L	M	L	L
Tuba City	Tuba City	L	L	L	L	L	L	M	L	M
Tucson	La Cholla Airpark	L	L	H	M	L	L	L	L	L
Tucson	Ryan Field	H	L	H	H	H	H	H	L	M
Tucson	Tucson International	H	M	H	H	H	H	H	H	H
Whiteriver	Whiteriver	L	L	L	M	L	L	L	L	M
Whitmore	Grand Canyon Bar Ten Airstrip	L	L	L	L	L	L	H	L	L
Wickenburg	Wickenburg Municipal	L	L	L	M	M	L	H	L	M
Willcox	Cochise County	L	L	L	M	M	M	H	L	M
Williams	H.A. Clark Memorial Field	L	L	L	M	M	L	H	L	M
Window Rock	Window Rock	L	L	L	M	M	M	M	L	M
Winslow	Winslow-Lindbergh Regional	L	L	L	M	M	M	H	L	M
Yuma	Yuma MCAS/Yuma International	H	L	H	H	M	H	L	H	H

Source: Wilbur Smith Associates
Prepared: July 2008

Figure 5-3: Role Evaluation – Economic Support

Associated City	*Airport Name*	*Aviation Services Provided*	*Military or Other Special Tenant Organizations*	*Businesses Served*	*Population Served*	*Industry Groups Served/Economic Potential*	*Retail Sales*	*Accommodations within a 30 Minute Drive*
Aguila	Eagle Roost	L	L	L	L	M	L	L
Ajo	Eric Marcus Municipal	L	M	L	L	H	L	L
Bagdad	Bagdad	L	L	L	L	M	L	L
Benson	Benson Municipal	H	M	L	L	M	L	L
Bisbee	Bisbee Municipal	L	L	L	L	M	L	L
Buckeye	Buckeye Municipal	H	M	L	M	H	L	L
Bullhead City	Laughlin/Bullhead International	H	L	L	L	M	L	L
Bullhead City	Sun Valley	H	L	L	L	M	L	L
Carefree	Sky Ranch at Carefree	M	L	H	M	H	L	M
Casa Grande	Casa Grande Municipal	H	M	L	L	H	L	L
Chandler	Chandler Municipal	H	M	H	H	H	L	L
Chandler	Memorial Airfield	L	L	H	H	H	L	L
Chandler	Stellar Airpark	H	L	H	H	H	H	M
Chinle	Chinle Municipal	L	M	L	L	H	L	L
Cibecue	Cibecue	L	L	L	L	M	L	L
Clifton/Morenci	Greenlee County	L	L	L	L	M	L	L
Colorado City	Colorado City Municipal	H	L	L	L	L	L	L
Coolidge	Coolidge Municipal	H	M	L	L	M	L	L
Cottonwood	Cottonwood	H	L	L	L	M	L	L
Douglas	Cochise College	L	M	L	L	L	L	L
Douglas	Douglas Municipal	H	L	L	L	L	L	L
Douglas Bisbee	Bisbee Douglas International	M	M	L	L	M	L	L
Eloy	Eloy Municipal	H	M	L	L	M	L	L
Flagstaff	Flagstaff Pulliam	H	L	L	L	M	L	L
Gila Bend	Gila Bend Municipal	L	L	L	L	M	L	L
Glendale	Glendale Municipal	H	M	H	H	H	M	M
Globe	San Carlos Apache	L	L	L	L	L	L	L
Goodyear	Phoenix Goodyear	M	M	H	H	H	M	M
Grand Canyon	Grand Canyon National Park	H	L	L	L	M	L	L
Grand Canyon	Valle	H	L	L	L	M	L	L
Holbrook	Holbrook Municipal	H	M	L	L	M	L	L
Kayenta	Kayenta	L	M	L	L	L	L	L
Kearny	Kearny	L	M	L	L	M	L	L
Kingman	Kingman	H	M	L	L	M	L	L
Lake Havasu City	Lake Havasu City	H	M	M	M	M	M	M
Marana	Marana Regional	H	M	L	M	H	M	L
Marana	Pinal Airpark	H	L	L	L	H	L	L
Marble Canyon	Marble Canyon	L	L	L	L	L	L	L
Maricopa	Estrella Sailport	L	M	L	L	H	L	L
Meadview	Pearce Ferry	L	L	M	L	H	L	L
Mesa	Falcon Field	H	M	H	H	H	M	L
Mesa	Phoenix-Mesa Gateway	H	M	H	H	H	H	M
Nogales	Nogales International	H	L	L	L	M	L	L
Page	Page Municipal	H	L	L	L	L	L	L
Parker	Avi Suquilla	H	L	L	L	M	L	L
Payson	Payson	H	L	L	L	M	L	L
Peach Springs	Grand Canyon Caverns	L	L	L	L	M	L	L

Figure 5-3: Role Evaluation – Economic Support (Continued)

Associated City	*Airport Name*	*Aviation Services Provided*	*Military or Other Special Tenant Organizations*	*Businesses Served*	*Population Served*	*Industry Groups Served/Economic Potential*	*Retail Sales*	*Accommodations within a 30 Minute Drive*
Peach Springs	Grand Canyon West	L	L	L	L	M	L	L
Peoria	Pleasant Valley	H	M	H	M	H	L	L
Phoenix	Phoenix Deer Valley	H	M	H	H	H	H	H
Phoenix	Phoenix Regional	L	M	H	L	H	L	L
Phoenix	Phoenix Sky Harbor International	H	H	H	H	H	H	H
Polacca	Polacca	L	M	L	L	M	L	L
Prescott	Ernest A. Love Field	H	M	L	L	M	L	L
Rimrock	Rimrock	L	L	L	L	L	L	L
Safford	Safford Regional	H	L	L	L	M	L	L
San Luis	Rolle Airfield	L	M	L	L	M	L	L
San Manuel	San Manuel	H	L	L	L	M	L	L
Scottsdale	Scottsdale	H	L	H	H	H	H	H
Sedona	Sedona	H	L	L	L	M	L	L
Seligman	Seligman	L	L	L	L	M	L	L
Sells	Sells	L	L	L	L	L	L	L
Show Low	Show Low Regional	H	L	L	L	M	L	L
Sierra Vista	Sierra Vista Municipal- Libby AAF	H	M	L	L	L	L	L
Springerville	Springerville Municipal	H	M	L	L	L	L	L
St Johns	St Johns Industrial Air Park	H	L	L	L	L	L	L
Superior	Superior Municipal	L	L	L	L	M	L	L
Taylor	Taylor	H	L	L	L	M	L	L
Temple Bar	Temple Bar	L	L	M	L	H	L	L
Tombstone	Tombstone Municipal	L	L	L	L	M	L	L
Tuba City	Tuba City	L	M	L	L	H	L	L
Tucson	La Cholla Airpark	L	L	L	M	H	M	M
Tucson	Ryan Field	H	M	L	M	H	M	L
Tucson	Tucson International	H	M	L	H	H	M	M
Whiteriver	Whiteriver	L	M	L	L	M	L	L
Whitmore	Grand Canyon Bar Ten Airstrip	L	L	L	L	M	L	L
Wickenburg	Wickenburg Municipal	H	L	L	L	M	L	L
Willcox	Cochise County	H	M	L	L	M	L	L
Williams	H.A. Clark Memorial Field	H	L	L	L	M	L	L
Window Rock	Window Rock	L	L	L	L	H	L	L
Winslow	Winslow-Lindbergh Regional	H	M	L	L	L	L	L
Yuma	Yuma MCAS/Yuma International	H	H	L	L	M	L	L

Source: Wilbur Smith Associates
Prepared: July 2008

Figure 5-4: Role Evaluation – Safety and Security

Associated City	*Airport Name*	*Emergency Use*	*Runway Protection Zone (RPZ) Development Controls*	*Adopted Height Zoning*
Aguila	Eagle Roost	L	H	L
Ajo	Eric Marcus Municipal	M	H	L
Bagdad	Bagdad	L	H	L
Benson	Benson Municipal	M	H	H
Bisbee	Bisbee Municipal	L	L	L
Buckeye	Buckeye Municipal	M	H	L
Bullhead City	Laughlin/Bullhead International	H	H	H
Bullhead City	Sun Valley	L	L	H
Carefree	Sky Ranch at Carefree	M	H	H
Casa Grande	Casa Grande Municipal	H	H	L
Chandler	Chandler Municipal	M	H	H
Chandler	Memorial Airfield	L	H	L
Chandler	Stellar Airpark	L	L	L
Chinle	Chinle Municipal	H	H	L
Cibecue	Cibecue	L	H	L
Clifton/Morenci	Greenlee County	M	H	L
Colorado City	Colorado City Municipal	M	H	H
Coolidge	Coolidge Municipal	L	L	H
Cottonwood	Cottonwood	M	H	H
Douglas	Cochise College	M	L	L
Douglas	Douglas Municipal	H	L	H
Douglas Bisbee	Bisbee Douglas International	L	L	H
Eloy	Eloy Municipal	L	L	H
Flagstaff	Flagstaff Pulliam	H	H	H
Gila Bend	Gila Bend Municipal	L	H	H
Glendale	Glendale Municipal	H	H	L
Globe	San Carlos Apache	H	H	H
Goodyear	Phoenix Goodyear	M	H	H
Grand Canyon	Grand Canyon National Park	L	H	L
Grand Canyon	Valle	M	H	H
Holbrook	Holbrook Municipal	M	L	H
Kayenta	Kayenta	H	H	L
Kearny	Kearny	L	L	L
Kingman	Kingman	H	H	L
Lake Havasu City	Lake Havasu City	M	H	L
Marana	Marana Regional	H	L	L
Marana	Pinal Airpark	M	H	L
Marble Canyon	Marble Canyon	M	L	H
Maricopa	Estrella Sailport	L	L	L
Meadview	Pearce Ferry	L	H	L
Mesa	Falcon Field	M	H	H
Mesa	Phoenix-Mesa Gateway	H	H	H
Nogales	Nogales International	M	H	H
Page	Page Municipal	H	H	H
Parker	Avi Suquilla	H	H	L
Payson	Payson	H	H	H
Peach Springs	Grand Canyon Caverns	L	H	L
Peach Springs	Grand Canyon West	M	H	L

Figure 5-4: Role Evaluation – Safety and Security (Continued)

Associated City	*Airport Name*	*Emergency Use*	*Runway Protection Zone (RPZ) Development Controls*	*Adopted Height Zoning*
Peoria	Pleasant Valley	L	L	L
Phoenix	Phoenix Deer Valley	H	H	H
Phoenix	Phoenix Regional	L	L	L
Phoenix	Phoenix Sky Harbor International	H	H	H
Polacca	Polacca	H	H	L
Prescott	Ernest A. Love Field	H	H	L
Rimrock	Rimrock	L	L	L
Safford	Safford Regional	H	H	H
San Luis	Rolle Airfield	L	H	L
San Manuel	San Manuel	M	H	L
Scottsdale	Scottsdale	H	L	H
Sedona	Sedona	M	H	L
Seligman	Seligman	M	H	L
Sells	Sells	L	L	L
Show Low	Show Low Regional	H	H	H
Sierra Vista	Sierra Vista Municipal- Libby AAF	H	H	H
Springerville	Springerville Municipal	H	L	H
St Johns	St Johns Industrial Air Park	M	H	H
Superior	Superior Municipal	L	L	L
Taylor	Taylor	M	H	H
Temple Bar	Temple Bar	L	H	L
Tombstone	Tombstone Municipal	L	L	L
Tuba City	Tuba City	H	H	L
Tucson	La Cholla Airpark	L	L	H
Tucson	Ryan Field	M	L	H
Tucson	Tucson International	M	L	H
Whiteriver	Whiteriver	M	H	L
Whitmore	Grand Canyon Bar Ten Airstrip	L	H	L
Wickenburg	Wickenburg Municipal	M	L	H
Willcox	Cochise County	M	H	H
Williams	H.A. Clark Memorial Field	L	H	H
Window Rock	Window Rock	H	H	L
Winslow	Winslow-Lindbergh Regional	H	H	H
Yuma	Yuma MCAS/Yuma International	H	H	H

Source: Wilbur Smith Associates
Prepared: July 2008

Figure 5-5: Role Evaluation – Environmental Sensitivity and Stewardship

Associated City	*Airport Name*	*Community Support*	*Community Outreach Efforts*
Aguila	Eagle Roost	M	L
Ajo	Eric Marcus Municipal	H	L
Bagdad	Bagdad	M	L
Benson	Benson Municipal	H	L
Bisbee	Bisbee Municipal	H	L
Buckeye	Buckeye Municipal	H	H
Bullhead City	Laughlin/Bullhead International	H	L
Bullhead City	Sun Valley	H	L
Carefree	Sky Ranch at Carefree	M	H
Casa Grande	Casa Grande Municipal	H	L
Chandler	Chandler Municipal	M	H
Chandler	Memorial Airfield	M	L
Chandler	Stellar Airpark	H	L
Chinle	Chinle Municipal	H	L
Cibecue	Cibecue	H	L
Clifton/Morenci	Greenlee County	M	L
Colorado City	Colorado City Municipal	H	L
Coolidge	Coolidge Municipal	H	L
Cottonwood	Cottonwood	H	L
Douglas	Cochise College	H	H
Douglas	Douglas Municipal	H	H
Douglas Bisbee	Bisbee Douglas International	H	L
Eloy	Eloy Municipal	H	L
Flagstaff	Flagstaff Pulliam	H	H
Gila Bend	Gila Bend Municipal	H	L
Glendale	Glendale Municipal	H	H
Globe	San Carlos Apache	H	L
Goodyear	Phoenix Goodyear	H	L
Grand Canyon	Grand Canyon National Park	H	L
Grand Canyon	Valle	H	L
Holbrook	Holbrook Municipal	H	H
Kayenta	Kayenta	H	L
Kearny	Kearny	M	L
Kingman	Kingman	H	H
Lake Havasu City	Lake Havasu City	H	L
Marana	Marana Regional	H	H
Marana	Pinal Airpark	M	L
Marble Canyon	Marble Canyon	H	L
Maricopa	Estrella Sailport	H	L
Meadview	Pearce Ferry	H	L
Mesa	Falcon Field	H	H
Mesa	Phoenix-Mesa Gateway	H	L
Nogales	Nogales International	H	L
Page	Page Municipal	H	L
Parker	Avi Suquilla	H	L
Payson	Payson	M	H
Peach Springs	Grand Canyon Caverns	H	L
Peach Springs	Grand Canyon West	H	L

Figure 5-5: Role Evaluation – Environmental Sensitivity and Stewardship (Continued)

Associated City	*Airport Name*	*Community Support*	*Community Outreach Efforts*
Peoria	Pleasant Valley	M	H
Phoenix	Phoenix Deer Valley	H	H
Phoenix	Phoenix Regional	H	L
Phoenix	Phoenix Sky Harbor International	H	H
Polacca	Polacca	H	L
Prescott	Ernest A. Love Field	H	H
Rimrock	Rimrock	H	L
Safford	Safford Regional	M	L
San Luis	Rolle Airfield	H	L
San Manuel	San Manuel	H	L
Scottsdale	Scottsdale	H	H
Sedona	Sedona	M	H
Seligman	Seligman	H	L
Sells	Sells	H	L
Show Low	Show Low Regional	H	H
Sierra Vista	Sierra Vista Municipal- Libby AAF	H	H
Springerville	Springerville Municipal	H	H
St Johns	St Johns Industrial Air Park	H	L
Superior	Superior Municipal	H	L
Taylor	Taylor	H	L
Temple Bar	Temple Bar	H	L
Tombstone	Tombstone Municipal	L	L
Tuba City	Tuba City	H	L
Tucson	La Cholla Airpark	H	L
Tucson	Ryan Field	H	H
Tucson	Tucson International	H	H
Whiteriver	Whiteriver	M	L
Whitmore	Grand Canyon Bar Ten Airstrip	L	L
Wickenburg	Wickenburg Municipal	H	L
Willcox	Cochise County	H	L
Williams	H.A. Clark Memorial Field	H	L
Window Rock	Window Rock	H	L
Winslow	Winslow-Lindbergh Regional	H	L
Yuma	Yuma MCAS/Yuma International	H	L

Source: Wilbur Smith Associates
Prepared: July 2008

CHAPTER SIX: CURRENT AIR TRANSPORTATION SYSTEM PERFORMANCE

INTRODUCTION

Chapter Five, Establish Airport Roles, of the 2008 Arizona State Airports System Plan described the process used to identify roles for each airport in the Arizona airport system. Following the role classification of the state's airports, facility and service objectives were established for each airport role that allow each airport to function in its role in the entire statewide aviation system. The five airport role classifications are: Commercial Service, Reliever, GA-Community, GA-Rural, and GA-Basic. Classification of the airports into functional roles within the Arizona airport system provides a baseline for evaluating the performance of Arizona's existing airport system.

Measures are used to evaluate the system to determine its current level of performance. This evaluation provides information in three main areas: 1) where the current airport system is adequate to meet Arizona's near and long-term aviation needs; 2) where specific airport or system deficiencies exist within the state; and 3) where surpluses or duplications of service exist within the system. The adequacies, deficiencies, surpluses, and duplications will be explored future in Chapter Seven where targets for future performance will be discussed. This evaluation also provides the foundation for subsequent recommendations for the Arizona airport system, as well as for individual study airports.

This chapter provides an analysis of the existing airport system's adequacy with respect to the four general system goal categories described in Chapter One. The four goal categories established to evaluate the system include the following:

- Development – Provide a system of airports with adequate facilities and services to serve the existing and projected levels of aviation activity or demand. Provide facilities that are accessible from the ground and air to meet the demands of users.
- Economic Support – Ability of the airport system to support economic development to regional and local businesses by developing airports that allow sufficient access to the national air transportation system.
- Safety and Standards – Ability of the airport system to meet all federal safety and security requirements, providing safety to passengers, surrounding communities, and wildlife alike. Ability of the airport system to provide adequate accessibility to emergency health services.
- Environmental Sensitivity and Stewardship – Provide a system of airports meeting federal environmental standards, providing adequate flight training and aircraft maintenance, and providing educational programs to communities and schools.

The following sections of this chapter portray the existing performance of each of the goal categories according to the established measures for the Arizona airport system. These analyses are based on conditions as of May 2008, unless otherwise noted. Where applicable, measures that were evaluated in the *Arizona State Aviation Needs Study 2000 (SANS 2000)* are included in this analysis to show the change in performance over time.

GOAL CATEGORY: DEVELOPMENT

Given that Arizona has distinctly varied geographic characteristics and widely distributed population, sufficient access to airports is critical. For an airport system to adequately serve a state, it should provide the level of facilities necessary to accommodate demand from both current and future users. These users include the traveling public as well as individual aircraft operators.

Federal Aviation Administration (FAA) system planning guidelines recommend that general aviation airports be located within 30 minutes of users. ArcGIS 9, a Geographic Information System (GIS), was used to determine the ground coverage of airports and their proximity to existing and future users. Applying the 30-minute rule of thumb to Arizona's system airports using GIS, coverage or "market" areas for each airport in the Arizona airport system were developed. GIS uses map-based systems to develop drive times to and from airports based on the types of roads and posted speed limits. When the 30-minute drive times for each airport are calculated and applied to mapping that includes data such as population, the ability of Arizona's airport system to serve the state and its population can be determined.

Aircraft accessibility is also an important factor in measuring system performance. It is influenced by factors such as the type of approach available (in terms of accuracy such as precision, near-precision, non-precision, or visual), airport lighting, and the presence, or lack thereof, of on-site weather reporting equipment to support the ability of aircraft to land in all weather conditions.

Performance measures used to evaluate the system's ability to accommodate aviation development are as follows and discussed in detail below:

- Percent of population within a 30-minute drive time of each airport, by role category
- Percent of communities in the state with a population greater than 5,000 within a 60-minute drive time of a commercial service airport
- Percent of communities in the state with a population greater than 1,000 within a 30-minute drive time of a general aviation airport
- Percent of population within a 30-minute drive time of a public use airport
- Percent of population within a 30-minute drive time of a National Plan of Integrated Airport Systems (NPIAS) airport
- Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach
- Percent of licensed pilots within a 30-minute drive time of an airport
- Percent of airports capable of supporting emergency medical transport aircraft
- Percent of communities in the state with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability
- Percent of airports within a 30-minute drive time of an alternate airport with an Instrument Landing System (ILS) or Localizer Performance with Vertical Guidance (LPV) with visibility minima of 300 feet and one mile
- Percent of airports with on-site weather reporting and percent of statewide area within 30 nautical miles of an airport with on-site weather reporting
- Percent of population within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)
- Percent of airports with 24/7 fuel
- Percent of airports with jet fuel

- Percent of airports with sufficient operational capacity in 2008
- Percent of airports projected to have sufficient operational capacity in 2030
- Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion
- Percent of state population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2030
- Airports with a current (past 5 years) master plan
- Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77
- Percent of airports with surrounding municipalities that have adopted controls/ zoning to make land use in the airport environs compatible with airport operations and development
- Percent of airports with surrounding municipalities that have adopted "disclosure areas"
- Percent of airports that are recognized in local comprehensive plan
- Percent of airports included in regional transportation plans

Percent of statewide population within a 30-minute drive time of each airport, by role category

GIS analysis presented in the exhibits below shows that when all 83 system airports are considered, over 86 percent of Arizona's population is within a 30-minute drive of at least one and, in some cases, multiple system airports. The GIS analysis was then conducted for the airports in each of the five role categories to determine the percentage of the statewide population within a 30-minute drive time of the different airport roles.

Figure 6-1 shows the percentage of Arizona population that is located within a 30-minute drive time of any airport in each system role.

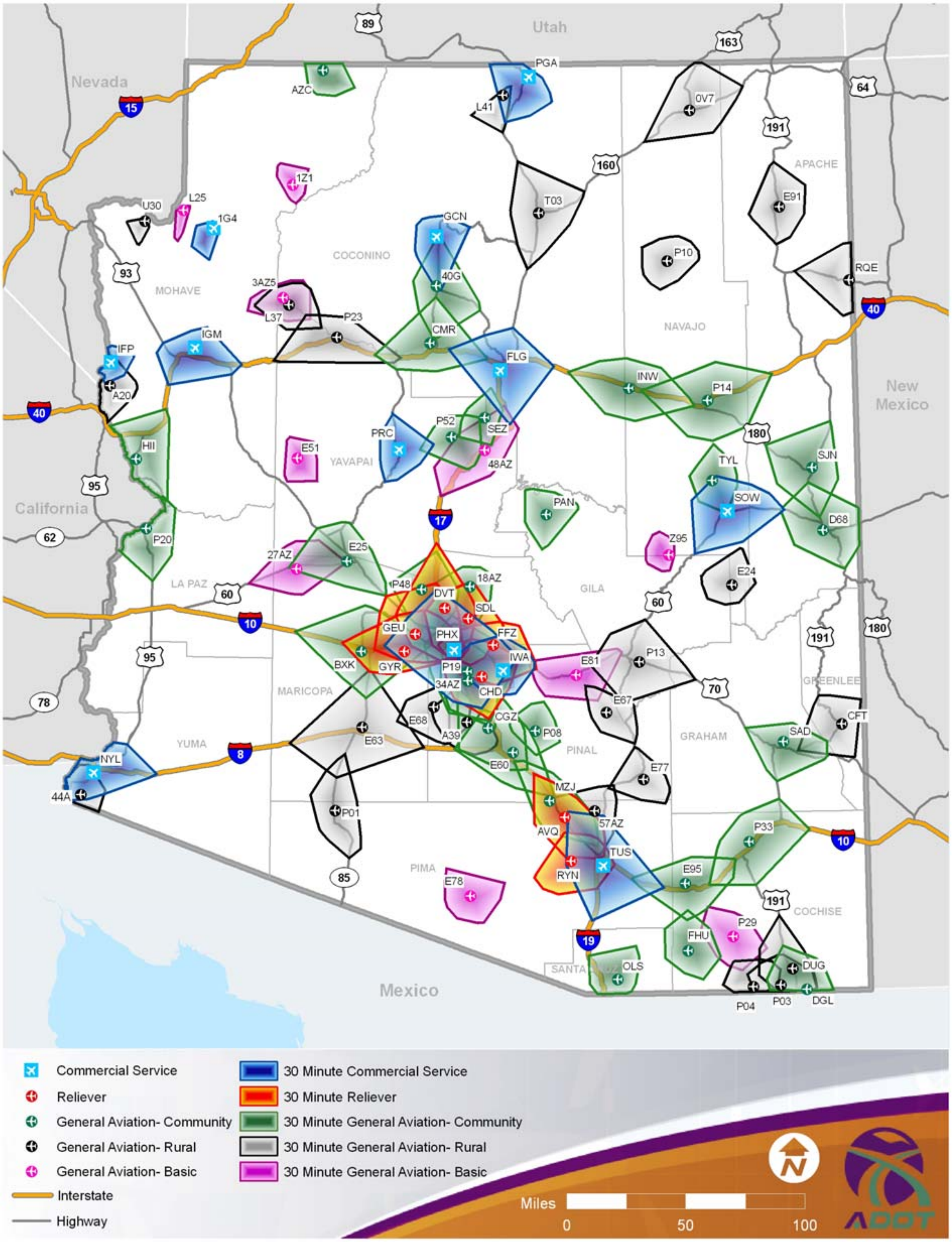
Figure 6-1: Percent of Statewide Population within a 30-Minute Drive Time of System Airports, by Role Category

Airport Role	*% of Total Population*
All System Airports	86%
Commercial Service	68%
Reliever	62%
GA-Community	58%
GA-Rural	9%
GA-Basic	1%

Source: Wilbur Smith Associates GIS Analysis

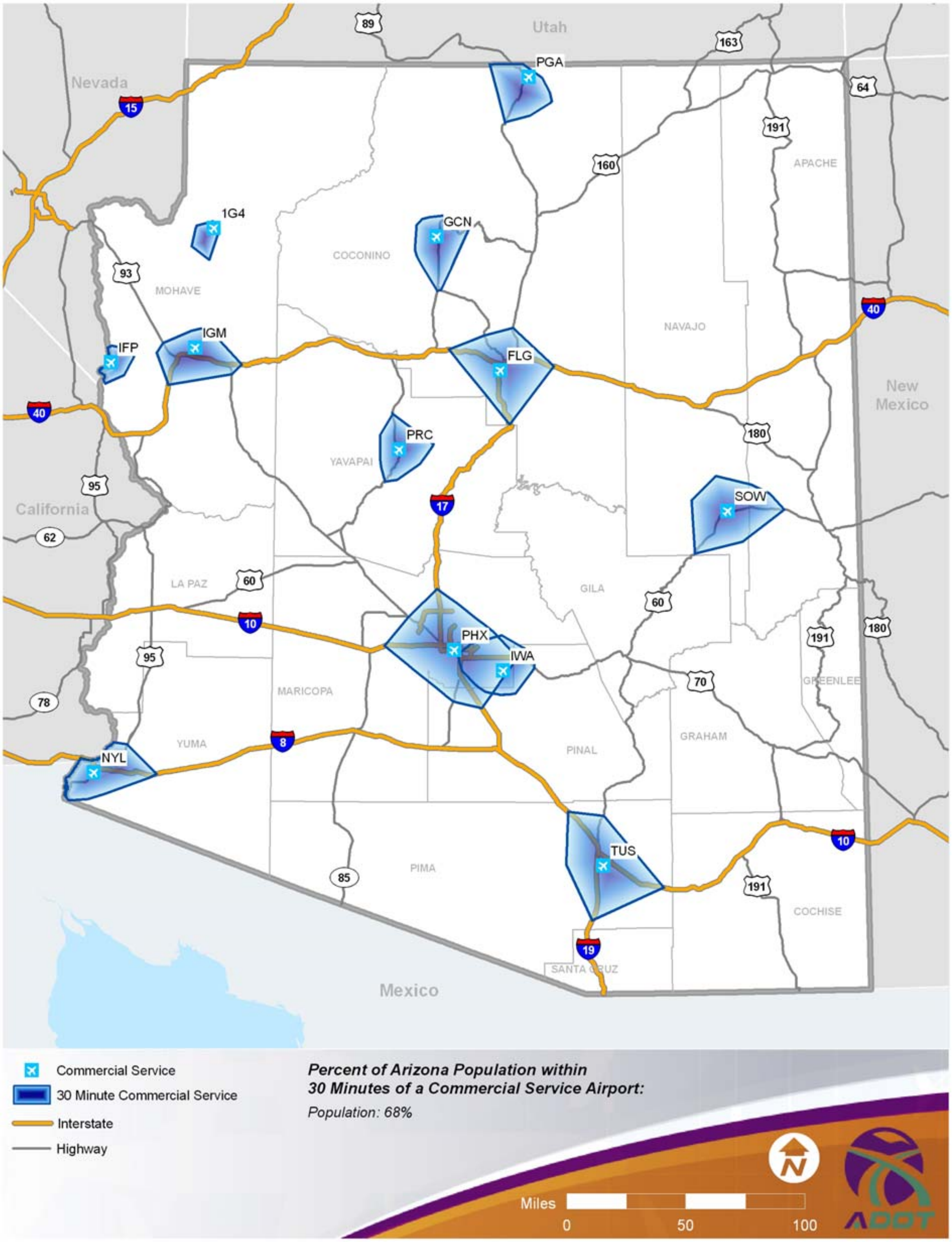
Figure 6-2 graphically depicts the 30-minute drive time coverage for all system airports. **Figures 6-3** through **6-7** map this information for the individual airport role categories. Sixty-eight percent of the total population is within a 30-minute drive time of a Commercial Service airport, followed by 62 percent for Reliever, and 58 percent for GA-Community airports. As shown in the maps, there is significant overlap of these drive-time areas for population coverage, particularly in the state's metropolitan areas and along major highways.

Figure 6-2: 30-Minute Drive Times of System Airports, by Role



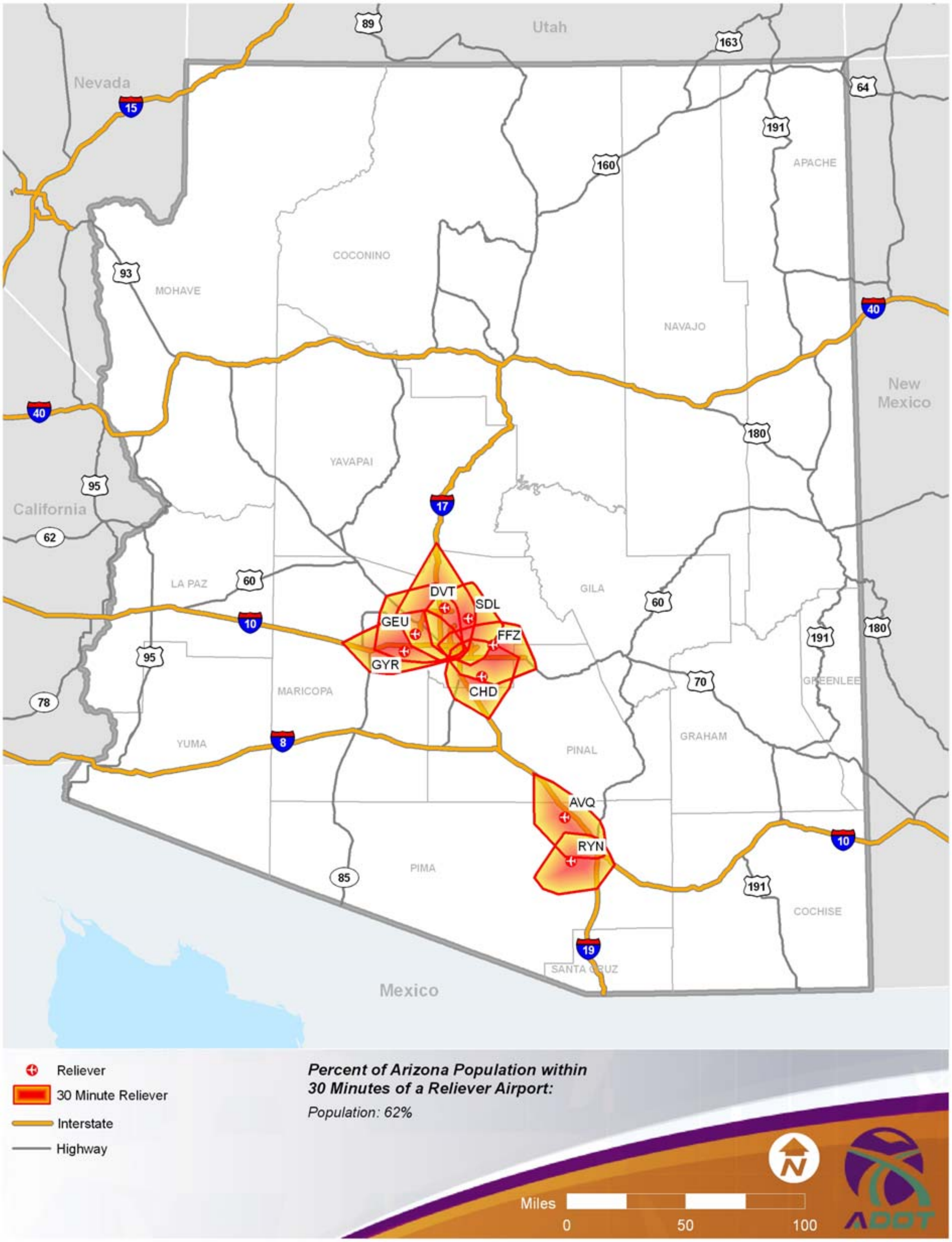
Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-3: 30-Minute Drive Times of Commercial Service Airports



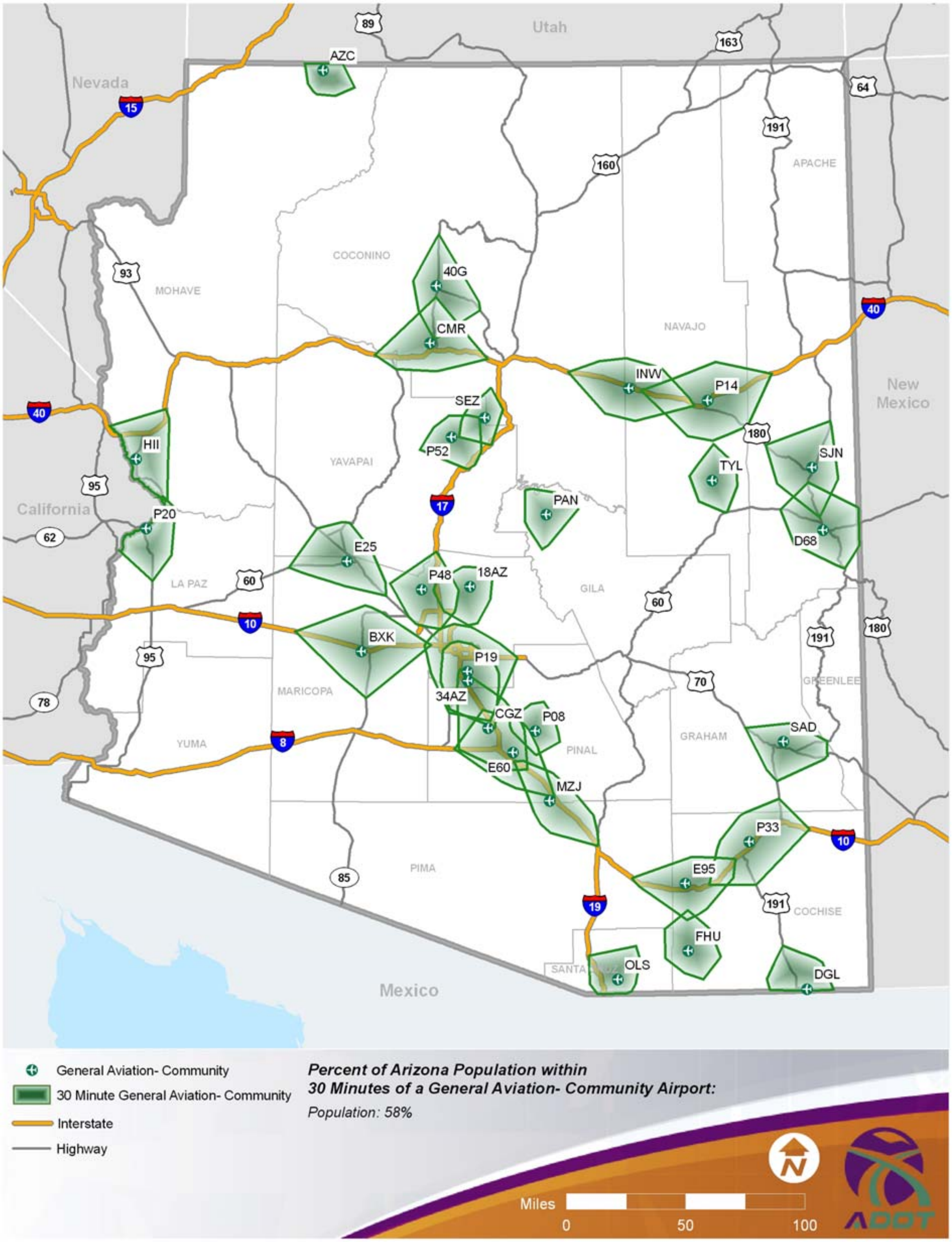
Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-4: 30-Minute Drive Times of Reliever Airports



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

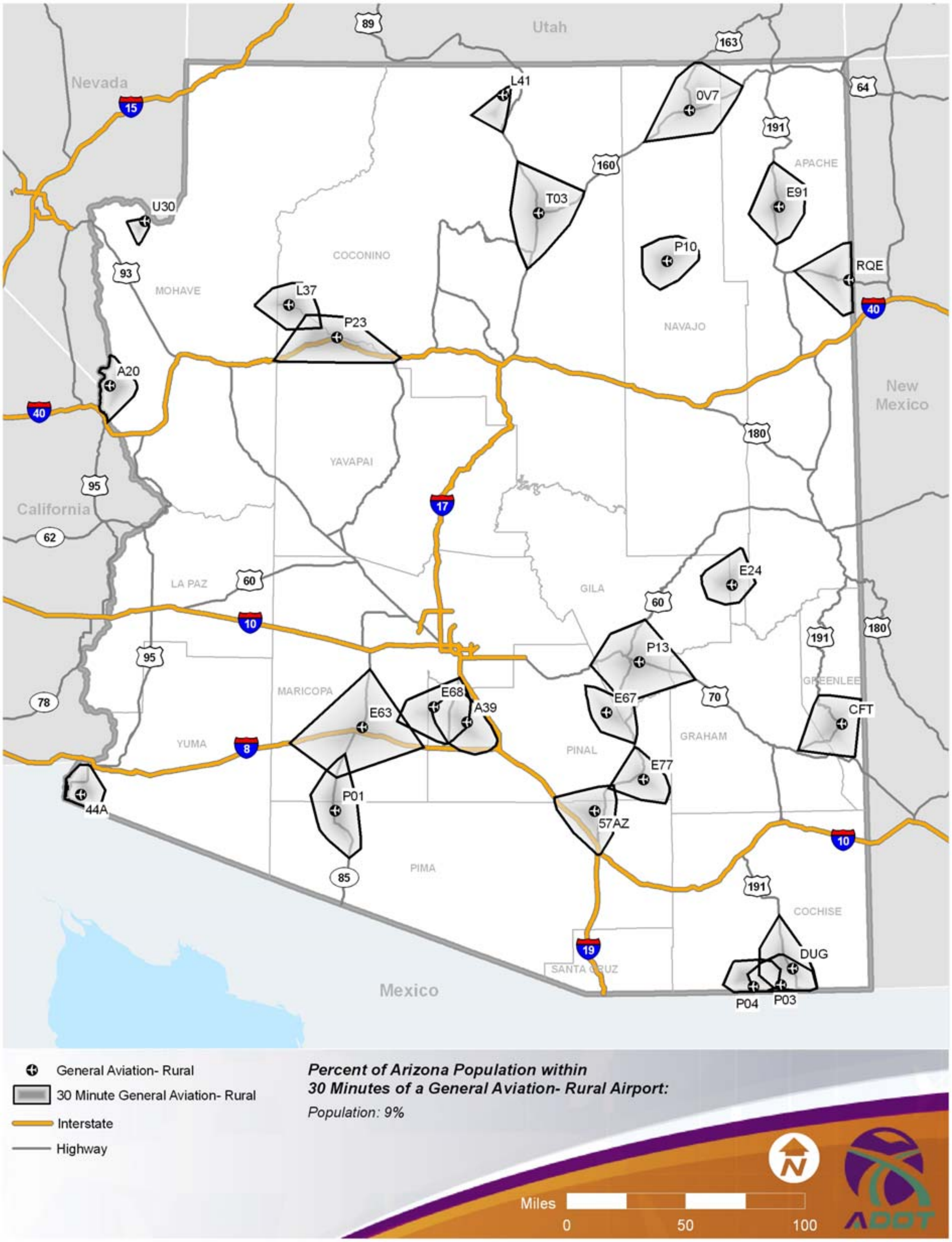
Figure 6-5: 30-Minute Drive Times of GA-Community Airports



Source: Wilbur Smith Associates

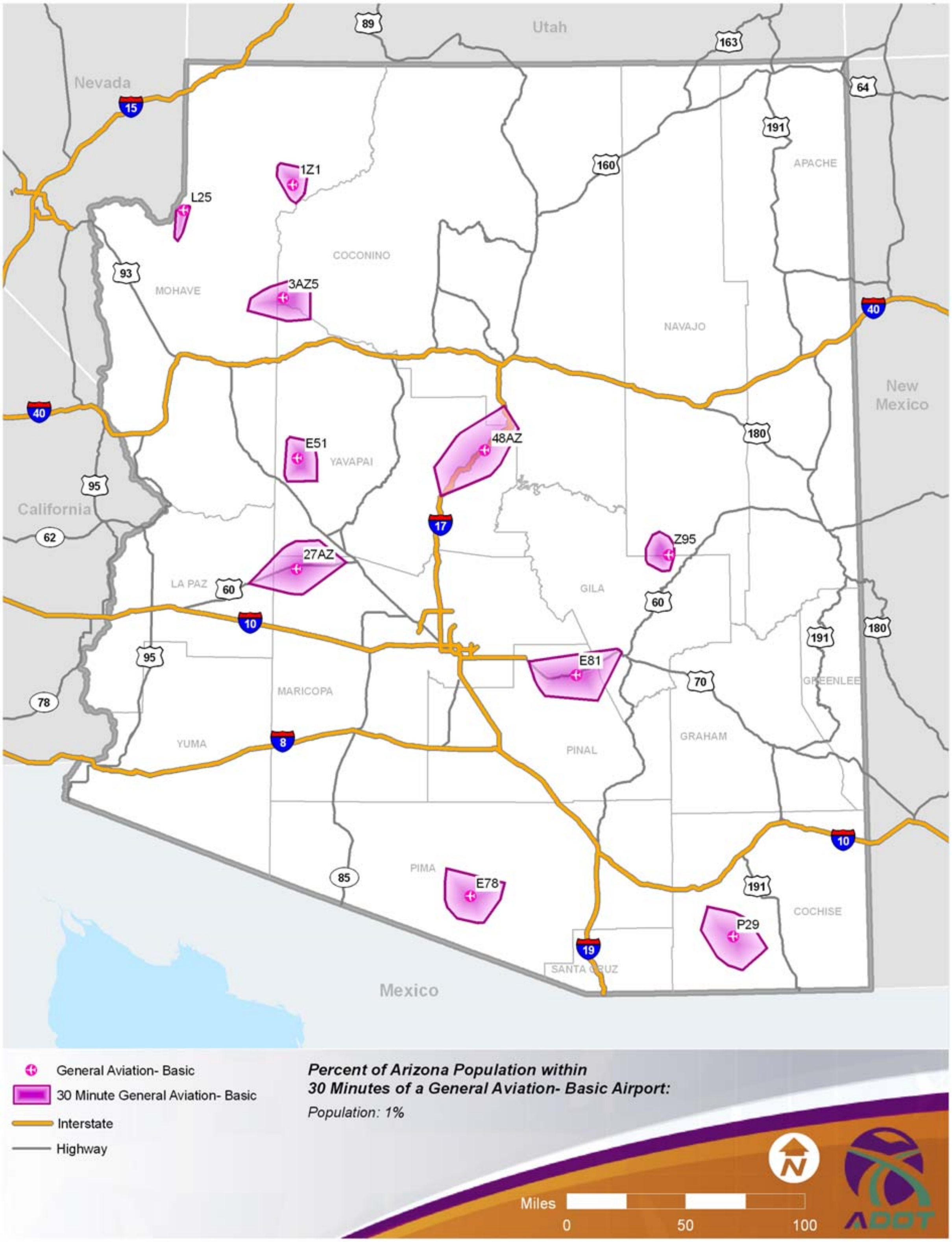
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-6: 30-Minute Drive Times of GA-Rural Airports



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-7: 30-Minute Drive Times of GA-Basic Airports



Source: Wilbur Smith Associates

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-8 presents where the remaining 14 percent of the population that is not accounted for in the drive time analysis is located throughout each Arizona county.

Figure 6-8: Percent of Statewide Population by County Not Covered by the 30-Minute Drive Time of System Airports

County	*% of Statewide Population Not Included in Analysis*	*County*	*% of Statewide Population Not Included in Analysis*
Apache	0.8%	Mohave	1.0%
Cochise	0.6%	Navajo	1.0%
Coconino	0.7%	Pima	3.5%
Gila	0.3%	Pinal	1.1%
Graham	0.3%	Santa Cruz	0.3%
Greenlee	0.1%	Yavapai	1.1%
La Paz	0.3%	Yuma	0.9%
Maricopa	2.9%	Grand Total	14.4%

Source: Wilbur Smith Associates GIS Analysis

As shown on the maps above, these 30-minute drive time areas cover a small percentage of Arizona's vast land area. In total, the 30-minute drive time areas of all 83 airports included in the SASP only cover 29 percent of the state's total area. Land ownership in Arizona is split between several categories, shown in Figure 6-9 with the percentage of total statewide land attributable to each.

Figure 6-9: Land Ownership Types and Percentage of State Total

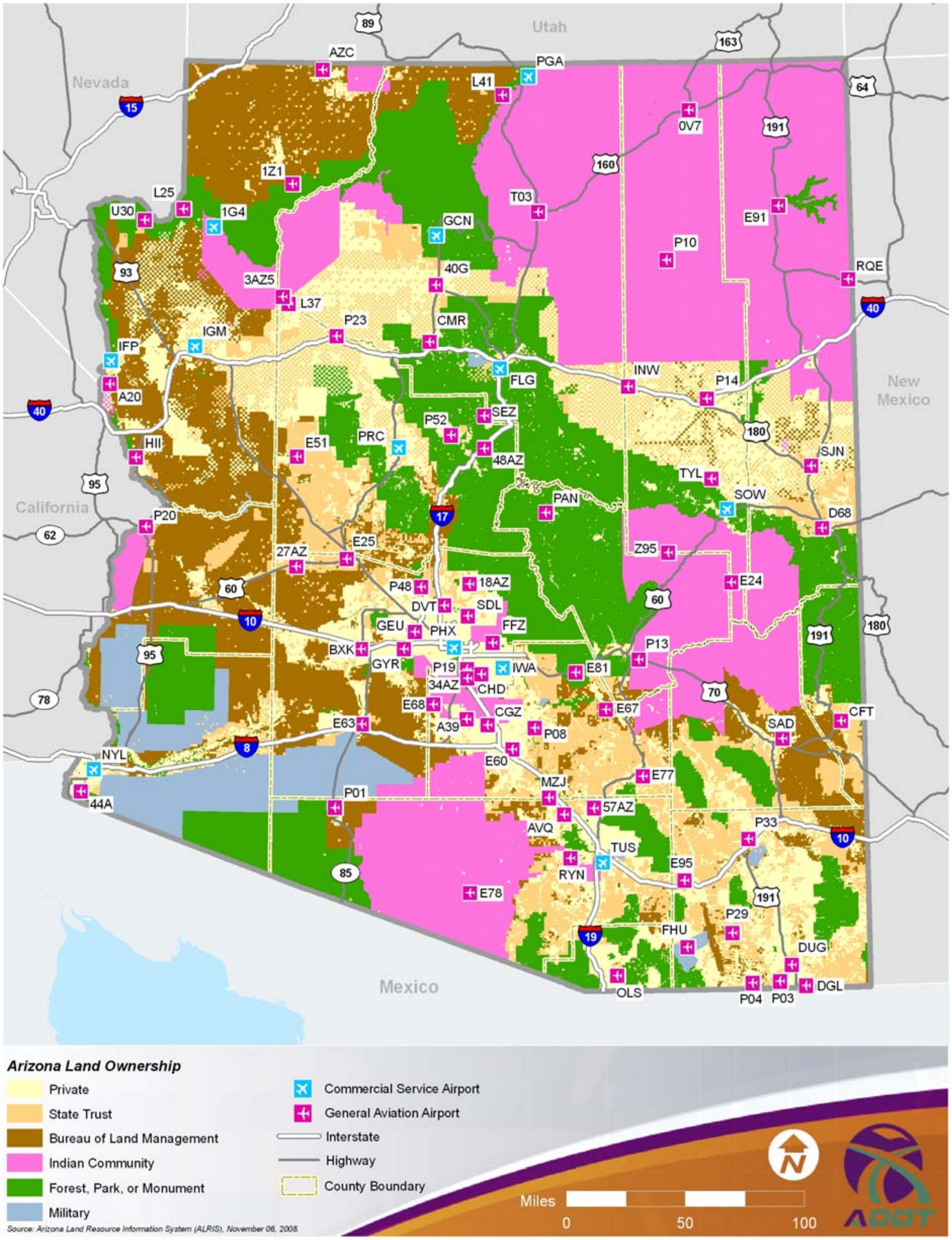
Land Ownership	*% of State*
Private	17%
State Trust	13%
Bureau of Land Management	17%
Tribal	27%
Public Forest, Park, or Monument	22%
Military	4%

Source: Arizona Land Resource Information System (ALRIS)

Figure 6-10 visually depicts this information. Private land accounts for only 17 percent of the total land area in Arizona, but encompasses 82 percent of the state population. This indicates that the remaining 83 percent of the land area is owned by other entities, yet only 18 percent of the population lives within this large, expansive area.

It is important to note that much of the land not covered by a SASP airport's 30-minute drive time area is within other areas of low population density and ownership that is other than private. Land owned under State Trust and by the Bureau of Land Management (BLM) has the potential to be developed for new airports. Together, State Trust and BLM land comprise only 30 percent of Arizona's total land area. Tribal governments may also choose to develop their land for aviation purposes. Much of the uncovered land in the northeast corner of the Arizona could be accessible by air if the governments choose to build new airports.

Figure 6-10: Land Ownership in Arizona



Source: Arizona Land Resource Information System (ALRIS)
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of communities in the state with a population greater than 5,000 within a 60-minute drive time of a Commercial Service Airport or 90 minutes of Phoenix-Sky Harbor International and Tucson International

Access to an airport with commercial air service is essential to Arizona residents, visitors, and businesses. According to the FAA definition, there are presently 12 Commercial Service airports in Arizona. Although Grand Canyon National Park and Grand Canyon West serve only air tour operators, they are included in this performance measure. Figure 6-11 maps communities in Arizona with populations of 5,000 or more as well as the 60-minute drive times of a Commercial Service airport and a 90-minute drive time of the major metropolitan airports in the state (Phoenix Sky Harbor International and Tucson International). Because their 60-minute drive time market areas go into Arizona, Las Vegas McCarran International and St. George Municipal airports were included in the GIS analysis of access to commercial service airports. However, these two airports do not provide additional coverage to Arizona communities with a population of 5,000 or greater. The two commercial airports in Grand Canyon National Park also do not provide any additional coverage of communities.

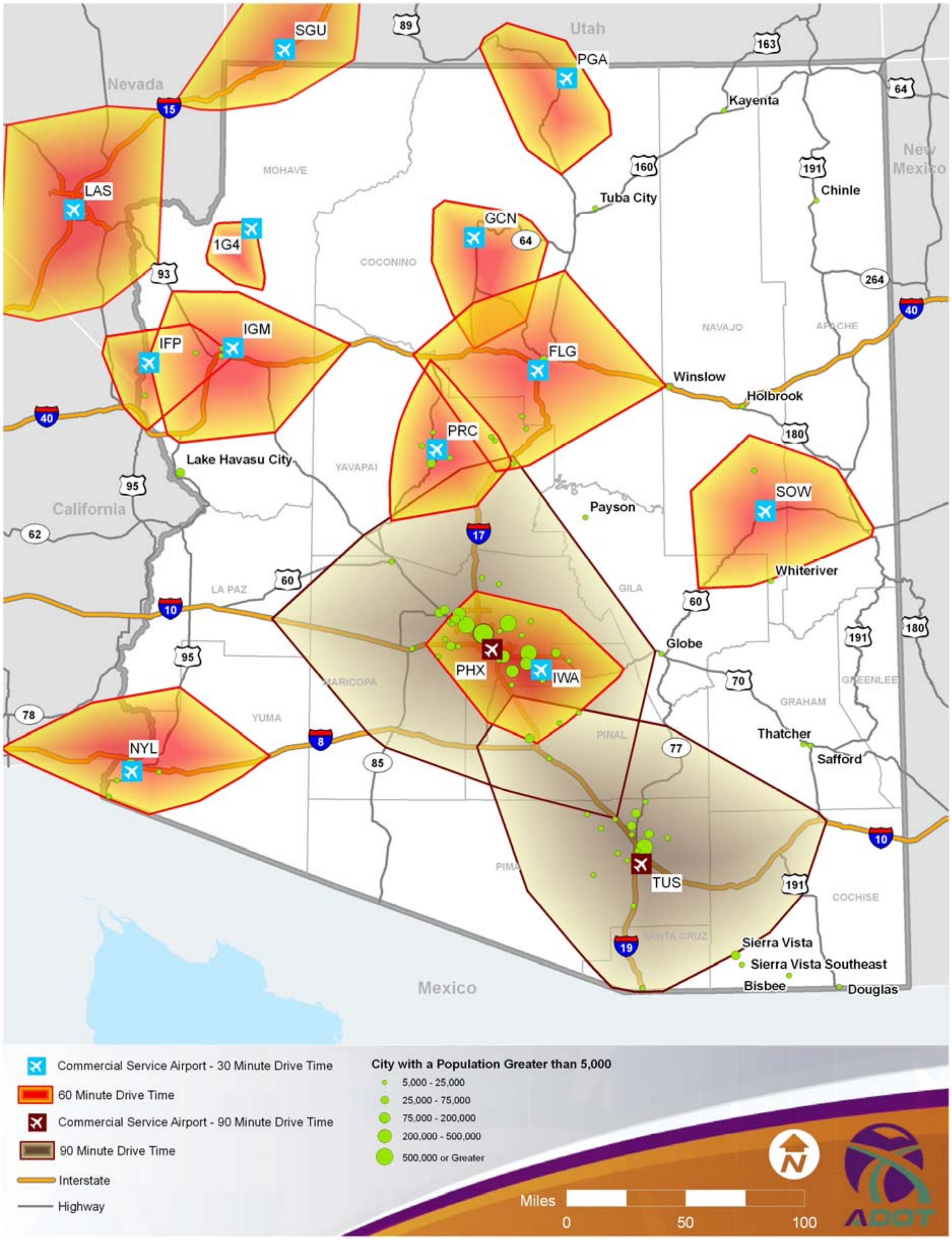
Currently, 82 percent of communities (71 of 85 communities) with a population of 5,000 or greater are within a 60-minute drive time of a Commercial Service Airport. The cities that are not located in these areas are listed below:

- Bisbee
- Chinle
- Douglas
- Globe
- Holbrook
- Lake Havasu City
- Payson
- Safford
- Sierra Vista
- Sierra Vista Southeast
- Thatcher
- Tuba City
- Whiteriver
- Winslow

It is worth noting that several of the communities appear to be just outside of a 60-minute drive time of a commercial service airport, including Whiteriver and Winslow. Someone may actually be able to drive to several of these towns in less than 60 minutes. For consistency purposes, this analysis uses the drive times derived by GIS. However, it will be noted in Chapter Seven, which communities are just outside the drive times and that the coverage of these towns is adequate.

In the SANS 2000, 94 percent of communities having a population of 5,000 or greater were within these drive times of Commercial Service Airports (or 48 of 51 communities). The reason for the loss of coverage is twofold. First, four airports no longer have scheduled commercial service including Lake Havasu City, Sierra Vista Municipal, Nogales International, and Sedona. Second, the population throughout the state has grown rapidly in many areas. At the time the SANS 2000 was completed, Arizona had only 51 cities with a population of at least 5,000. As of May 2008, there are 85 cities with at least that many residents. The three communities that were located outside of the Commercial Service Airport drive time coverage areas in the SANS 2000 were Douglas, Safford, and Winslow. These communities continue to be located outside the drive times of commercial service airports.

Figure 6-11: Communities in the State with a Population Greater than 5,000 within a 60-Minute Drive Time of a Commercial Service Airport or 90-Minute Drive Time of Phoenix Sky Harbor International and Tucson International



Source: Wilbur Smith Associates

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of communities in the state with a population greater than 1,000 within a 30-minute drive time of a general aviation airport

Reasonable access to general aviation airports is a fundamental feature of an adequate state airport system. The population and land coverage within a 30-minute drive time of Arizona general aviation airports is mapped in **Figure 6-12**. Throughout the state, 87 percent of all cities with a population of at least 1,000 (159 of 182) are located within a 30-minute drive time of an airport supporting general aviation. The towns with a population of 1,000 or more that fall outside the 30-minute drive time of an airport supporting general aviation are:

- Cordes Lake
- Dilkon
- Dewey-Humboldt
- Dolan Springs
- Ehrenberg
- Fredonia
- Ganado
- Heber-Overgaard
- Houck
- Kaibito
- Lukachukai
- Mayer
- Paulden
- Pinon
- Quartzsite
- Rio Verde
- Salome
- Spring Valley
- Strawberry
- Tanque Verde
- Teec Nos Pos
- Tsaile
- Wellton

Similar to the commercial service analysis above, several of the communities are just outside of a 30-minute drive time of a system airport according to the GIS analysis, including Strawberry, Paulden, and Mayer. It will be noted in Chapter Seven, which communities are just outside the drive times and that the coverage of theses towns is adequate.

Sixteen of the 23 communities located outside of the drive time market areas have a population of less than 2,000. The largest of these is the Census-designated place Tanque Verde, with a population of over 16,000 and located just outside of Tucson International's 30-minute drive time, according to the GIS analysis.

In the SANS 2000, all Arizona communities with a population of 1,000 or more were found to be located within a 30-minute drive time of a general aviation airport. Similar to the commercial service analysis above, there are far more communities included in this analysis than the SANS 2000; 80 communities in the SANS 2000 compared to the 182 included in this study.

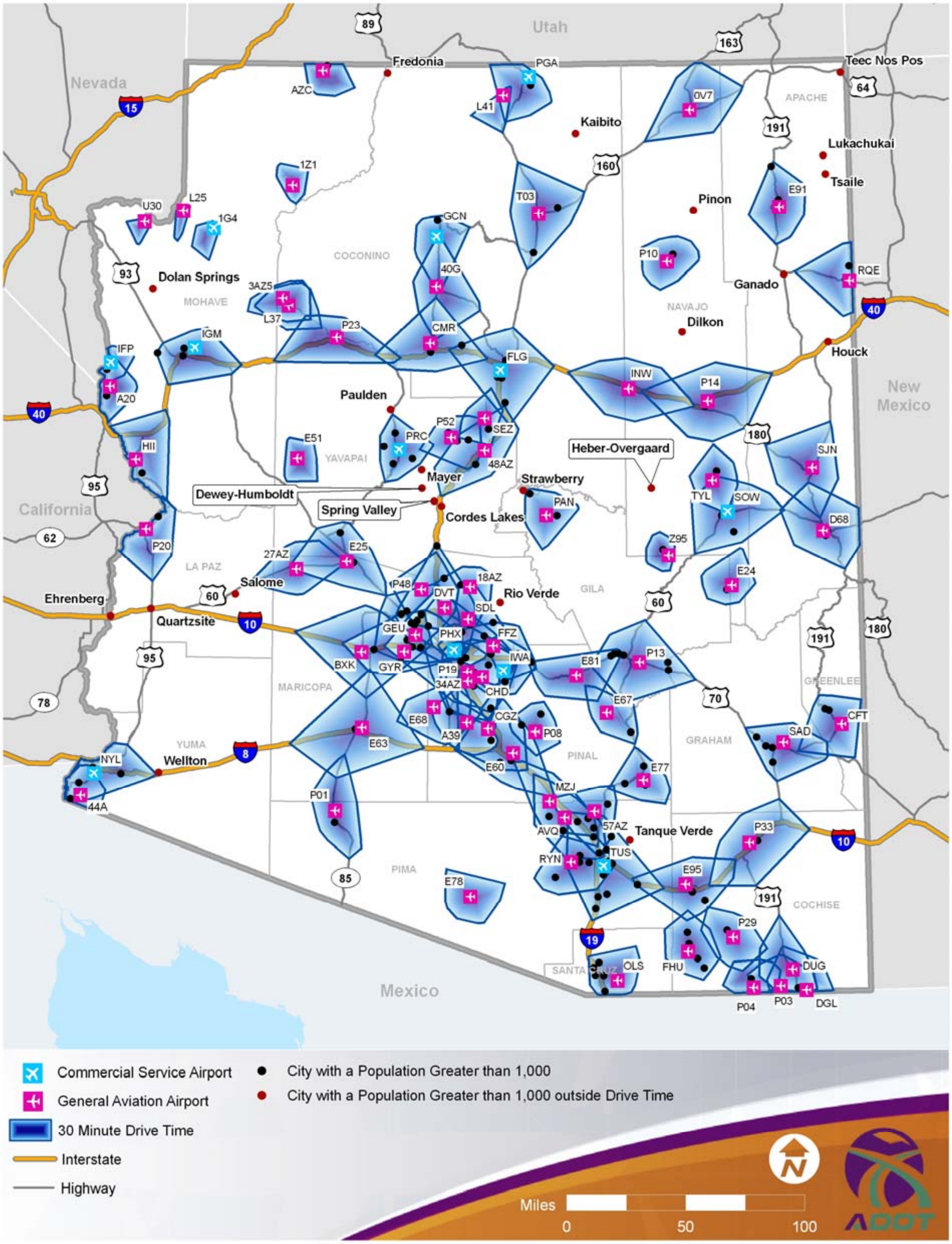
Percent of statewide population within a 30-minute drive time of a public use airport

Access to public use airports, both commercial service and general aviation, is a crucial aspect of a successful aviation system. **Figure 6-13** presents the public use airports included in the SASP and 30-minute drive time areas associated with each of these airports. Eighty-five percent of the statewide population falls within the 30-minute coverage of these public use airports. Private-use airports included in the SASP add only an additional one percent coverage of the total Arizona population.

Percent of statewide population within a 30-minute drive time of a NPIAS Airport

The National Plan of Integrated Airport Systems (NPIAS) is developed and maintained by the FAA to identify airports which are significant and essential to the national system, assess the development and condition of these airports, and to provide federal funding where most necessary. Of the 83 airports included in the SASP, 58 are included in the NPIAS. **Figure 6-14** maps these airports and their 30-minute drive time market areas. Eighty-three percent of the total statewide population is located within these areas.

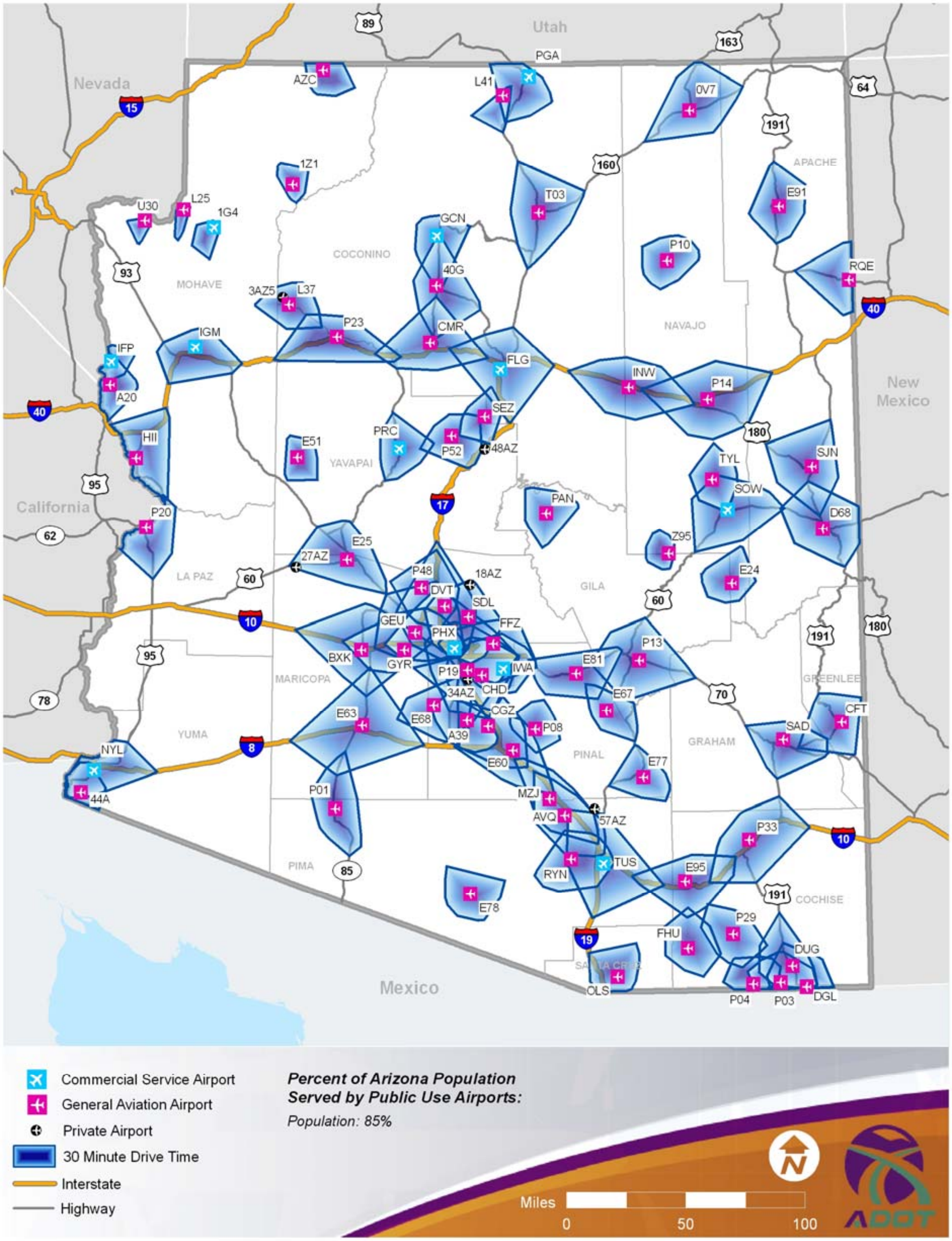
Figure 6-12: Communities in the State with a Population Greater than 1,000 within a 30-Minute Drive Time of a General Aviation Airport



Source: Wilbur Smith Associates

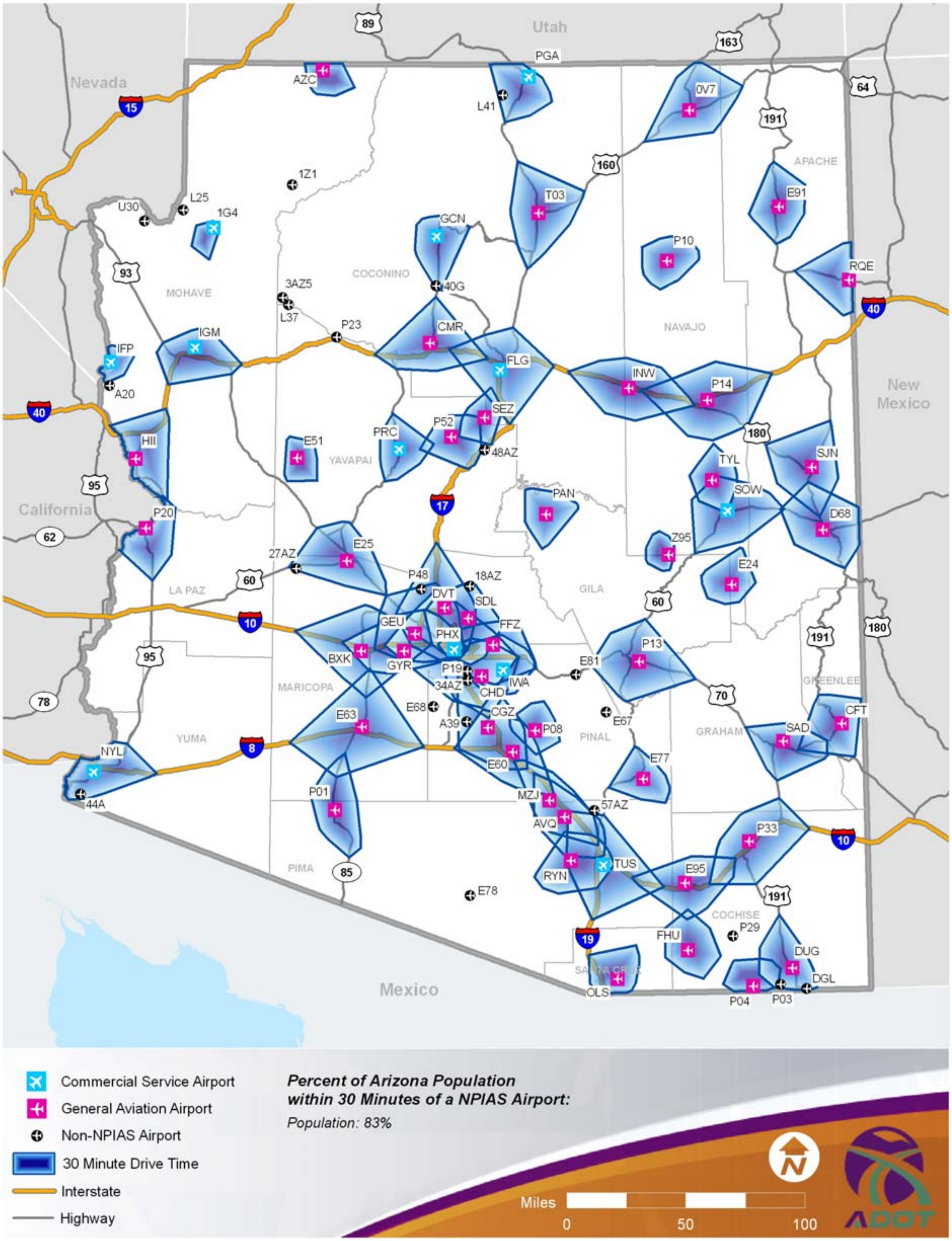
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-13: 30-Minute Drive Times of Public Use Airports in Arizona



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-14: 30-Minute Drive Times of NPIAS Airports in Arizona



Source: Wilbur Smith Associates

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of statewide population within a 30-minute drive time of an airport and the number of airports with an instrument approach

All types of instrument approaches, both precision and non-precision, provide safe access to airports during instrument meteorological conditions (IMC). The type of instrument approach found at each system airport, if available, was presented in Chapter Three, Figure 3-19. Figure 6-15 maps the 30-minute drive time of airports with an instrument approach. Thirty-nine of the 83 SASP airports have some form of instrument approach and are within a 30-minute drive time of 80 percent of the statewide population.

Percent of airports within a 30-minute drive time of an alternate airport with an Instrument Landing System (ILS) or LPV (300', 1 mile)

Precision approaches, provided by an instrument landing system (ILS), or near precision approaches, provided by lateral precision with vertical guidance (LPV), enable a pilot to fly to a lower height above the ground with lower forward visibility requirements, and with a higher accuracy than a non-precision approach. Thus, it is more likely a pilot may be able to land in IMC at an airport with precision instrument approach capabilities.

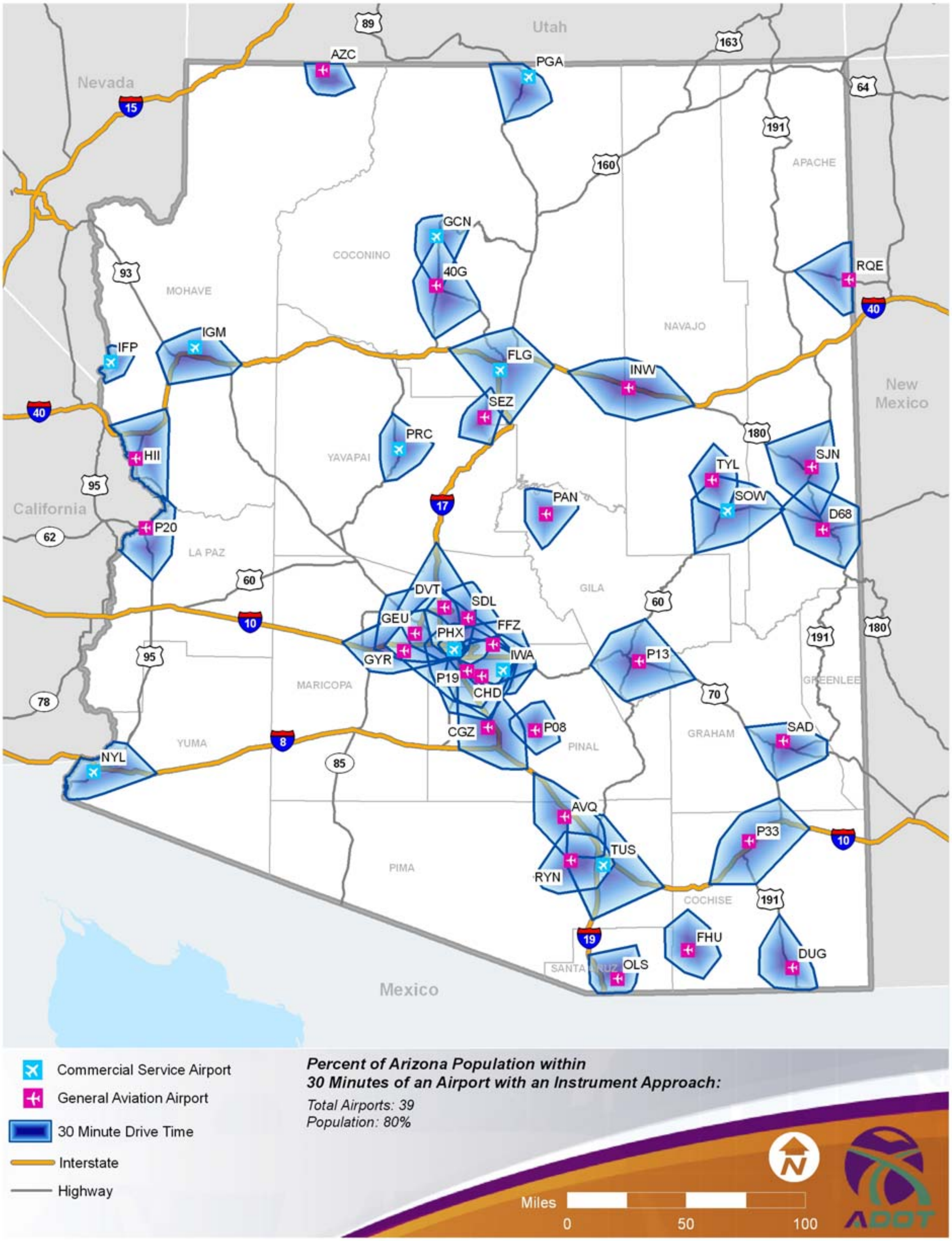
Access to an alternate airport having an ILS or LPV may be important when a pilot needs to make an emergency landing during poor weather. Figure 6-16 maps 30-minute drive time areas around Arizona airports having an ILS or LPV. As shown, 14 Arizona airports have a LPV or an ILS approach. Thirty-one percent of SASP airports (26 of 83 total airports) either have an ILS or LPV or are located within a 30-minute drive of one of these 14 airports. In other words, of the 69 airports not having an ILS or LPV, 17 percent are located within a 30-minute drive time of an airport with one of these approaches.

Percent of licensed pilots within a 30-minute drive time of a system airport

It is reasonable to assume that identifying the location of the state's registered pilots provides an indicator of the demand for aviation activity. Additionally, it is possible to see if there are pilots that are not located near an existing system airport. In order to perform this task, addresses were obtained for each pilot in the state holding a current FAA Medical Certificate. The data was obtained from AIRPAC Inc. and contained over 18,500 pilots in Arizona.

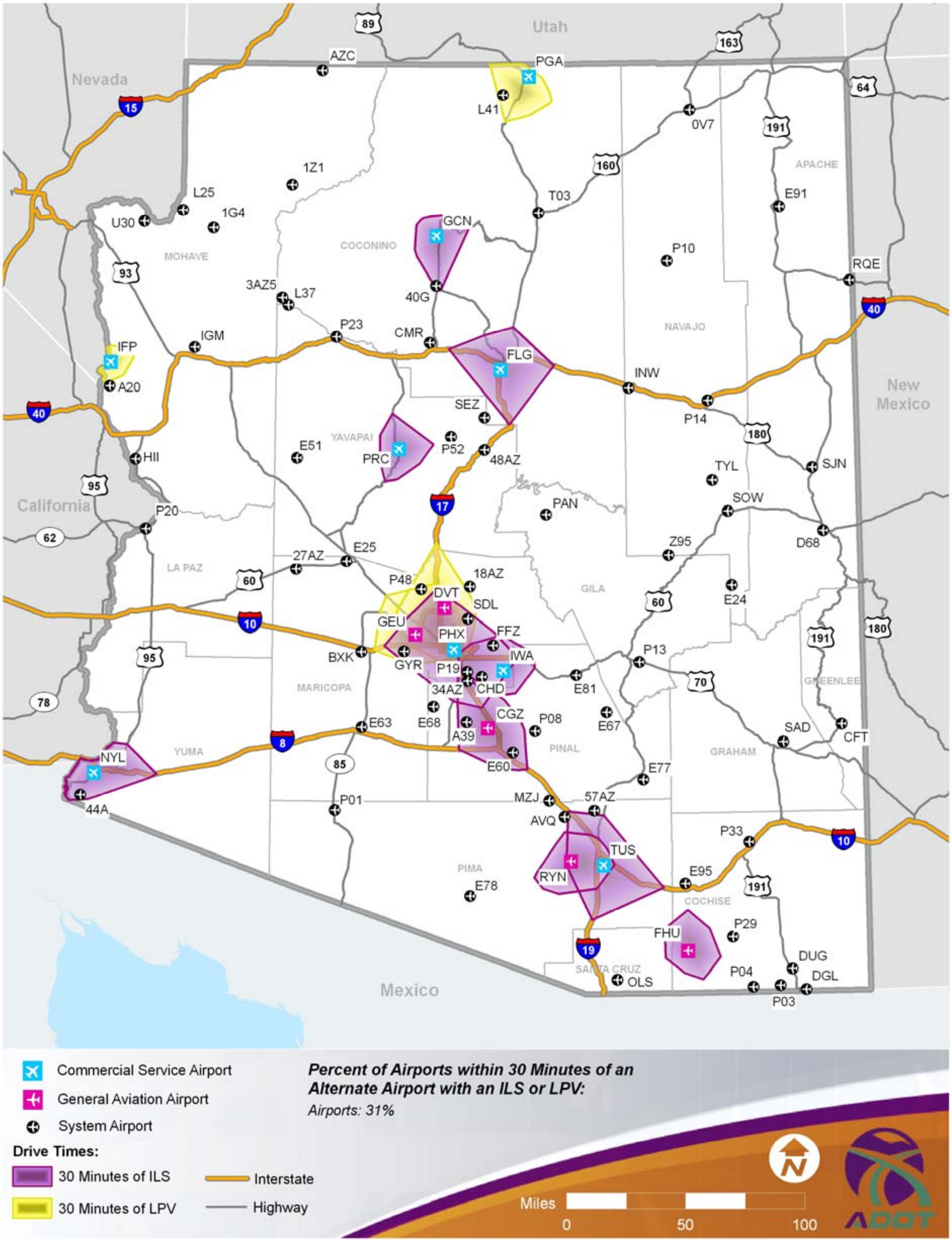
Figure 6-17 maps the licensed pilots with current medicals in Arizona and overlays 30-minute drive times for all SASP airports. The map differentiates between student pilots, those with instrument ratings, and all other pilots. In total, 94 percent of licensed pilots in Arizona live within a 30-minute drive of a system airport. Just six percent of pilots are located outside the 30-minute drive time boundaries and are spread throughout the rural, less-populated portions of the state.

Figure 6-15: 30-Minute Drive Times of System Airports with an Instrument Approach



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

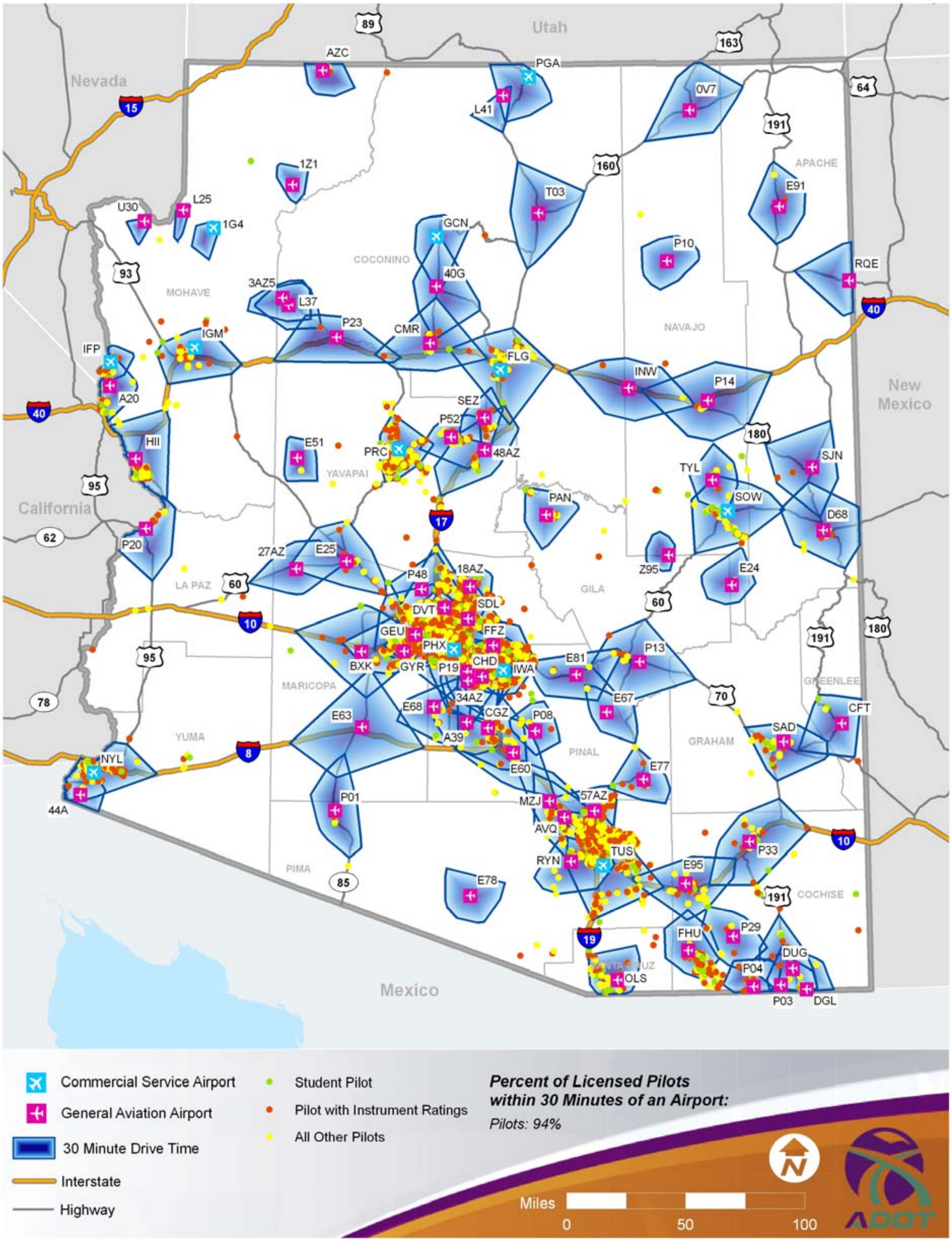
Figure 6-16: 30-Minute Drive Times of System Airports with an ILS or LPV (300', 1 mile)



Source: Wilbur Smith Associates

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Figure 6-17: Licensed Pilots within a 30-Minute Drive Time of System Airports



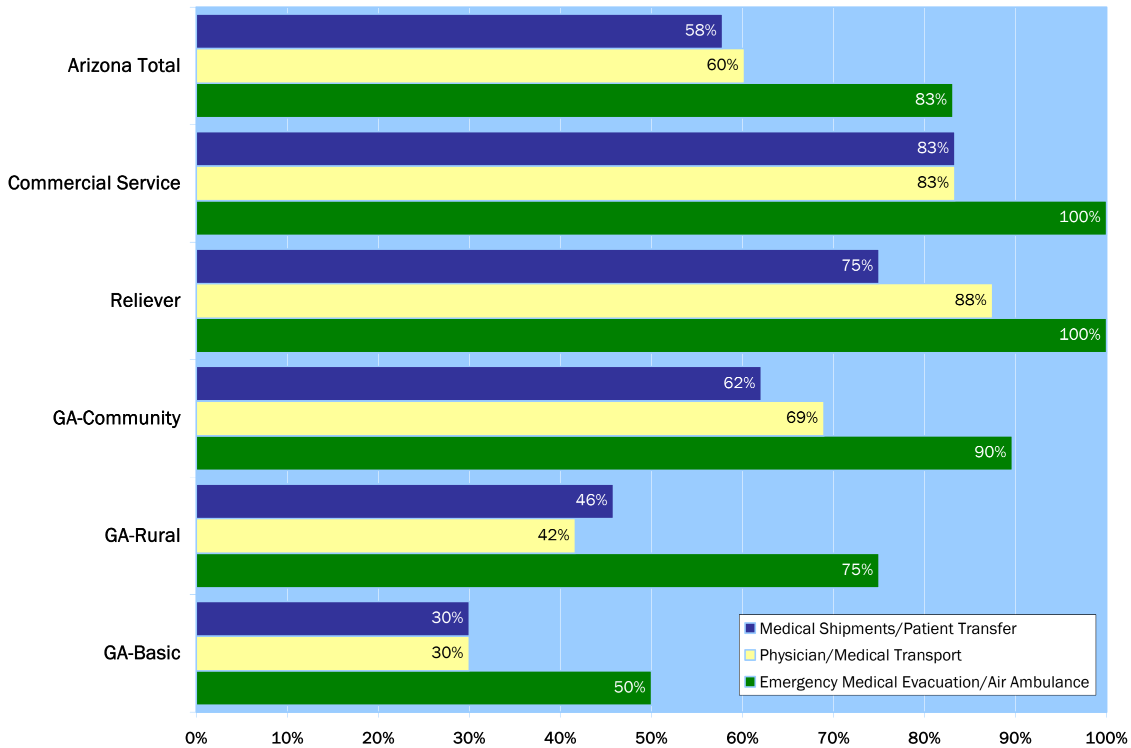
Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of airports capable of supporting emergency/physician/medical supply transport aircraft

Emergency and specialized medical care is often not available in the remote areas of Arizona, making the transport of patients, physicians, and medical supplies imperative. Medical emergency aircraft, or air ambulances, often carry modern medical equipment and professional medical staff in order to care for all types of emergencies en-route to a hospital, saving precious travel time.

During the survey effort for this study, airport managers were asked if their airports supported three types of medical activity: emergency medical evacuation or air ambulance, physician and medical transport, and medical shipments or patient transfers. Figure 6-18 shows the percentage of each airport role category that had these three types of medical flight activities. Statewide, 83 percent of SASP airports provide medical evacuation/air ambulance activity, 60 percent provide physician and medical transport, and 58 percent support medical shipments and patient transfer.

Figure 6-18: Percent of Airports by Role with Medical Activity



Source: *Airport Inventory & Data Survey* 2008

By category, 100 percent of both Commercial Service and Reliever airports support evacuation and air ambulance activities, as well as 90 percent of GA-Community and 75 percent of GA-Rural airports. Eighty-three percent of Commercial Service, 88 percent of Reliever, and 69 percent of GA-Community airports support physician and medical transfer flights. Eighty-three percent of Commercial Service airports also provide medical shipment and patient transfer flights, as do 75 percent of Relievers, and 62 percent of GA-Community facilities.

Managers were asked to report the types of aircraft used for air ambulance flights at their airports. Figure 6-19 details the types of aircraft reported. Helicopters were most common, reported to be used at 67 percent of all SASP airports, followed by King Air utilized at 43 percent of airports. Another 12 percent of SASP airports reported Lear Jet 35 aircraft flying for air ambulance activity at their airport.

Figure 6-19: Types of Aircraft used for Medical Flights at SASP Airports

Aircraft	*Number of Supporting Airports*	*% of State Total*
Helicopter	56	67%
King Air	36	43%
Lear Jet 35	10	12%
Pilatus PC-12	7	8%
Cessna Twins	4	5%
Other	4	5%

Source: *Airport Inventory & Data Survey* 2008

In addition to the types of aircraft used, airport managers were asked to identify the air ambulance operators that operate from their airports. Figure 6-20 shows that 14 operators used at least two SASP airports. Air Evac/Lifeteam was the most common, operating at 15 SASP airports, followed by Native Air at 13, and Guardian at 12 airports. Several airports reported regional hospitals or companies that offer air ambulance activity in their region.

Figure 6-20: Air Ambulance Operators at SASP Airports

Air Ambulance Operator Name	*Aircraft Type*	*Supporting Airports*
Air Evac/Lifeteam	Rotorcraft, Lear Jet 35A, Cessna 441	15
Native American Air Ambulance	Pilatus PC-12, AS 350 B2s/B3s	13
Guardian Air	King Air, Pilatus PC12, Bell 407	12
LifeNet	Rotorcraft, Cessna Twins	8
Aerocare Medical Transport	Cessna Citation 501, Cessna 421C	6
Tri-State Care Flight	Cessna 500, Rotorcraft, Beech 200	5
Eagle Air Medical	King Air C-90B	5
PHI Air Medical	Rotorcraft, King Air, Cessna Conquest	3
Mercy Air	Rotorcraft	3
Classic Lifeguard Air Ambulance	Rotorcraft	3
Medical Express International	Rotorcraft, Cessna 421, Lear Jet 35A	3
Arizona Lifeline	Rotorcraft	3
Indian Health Services	Rotorcraft	3
Critical Air	Rotorcraft	2
Life Flight	Rotorcraft	2

Source: *Airport Inventory & Data Survey* 2008

An important goal of this system plan and specific performance measure is evaluating coverage provided by airports which can fully accommodate air ambulance aircraft. Many operators utilize helicopters for emergency medical transport, but their limited range, payload and operating environments render them less practical in many circumstances than the other aircraft identified in Figure 6-19.

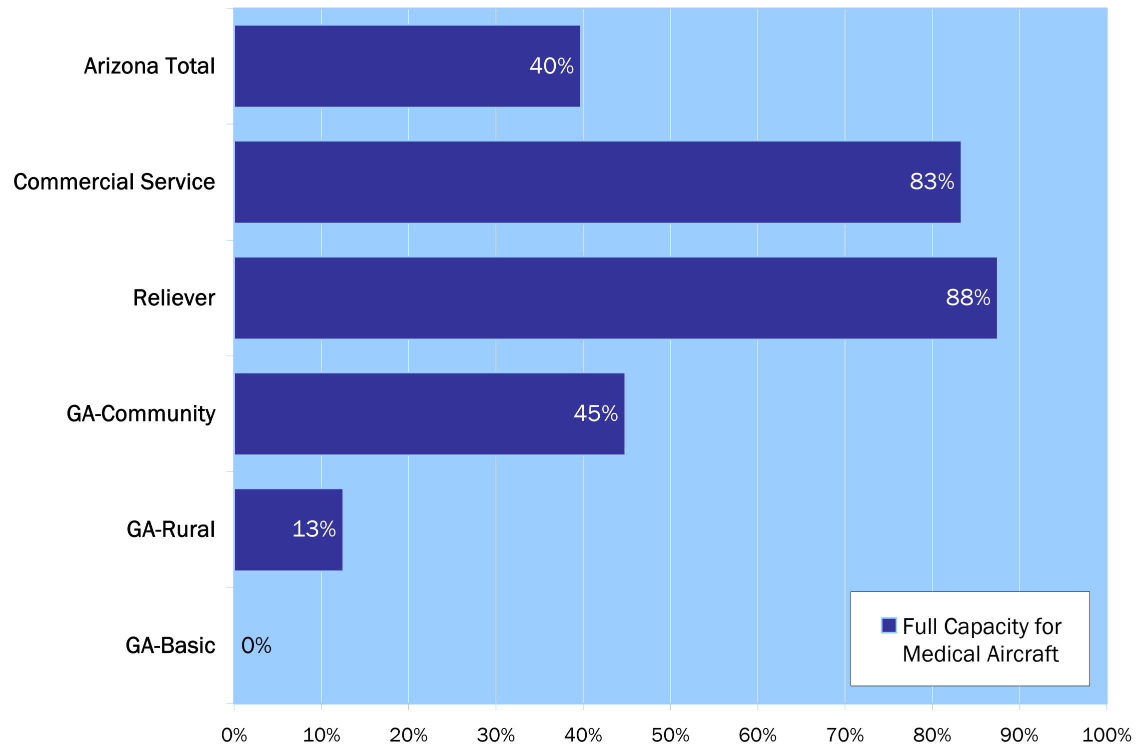
Emergency medical flight providers in Arizona including Guardian Air and Air Evac were contacted to gather information and obtain input into the airport facilities needed to operate fixed-wing aircraft safely throughout Arizona. The operators noted that the King Air and

Pilatus PC-12 are most the most frequently used fixed-wing aircraft used to service the rural airports in the state. The air ambulance operators identified the following airport facilities as important for safe emergency aircraft operations. These facilities are not necessarily required for actual operations.

- Runway length of 4,000 feet or greater (King Air or smaller fixed-wing aircraft)
- Well-maintained pavement on runways
- On-site weather reporting
- Instrument approach procedure
- Rotating beacon
- Medium or high intensity runway lighting
- Full perimeter fencing (desired)
- Approach landing system (ALS) (desired)

Figure 6-21 presents a summary of Arizona airports by role category that have the ability to accommodate King Air or smaller emergency medical aircraft based on the facility objectives noted above. Although the larger Lear Jet 35 is often used for out-of-state medical transport, the King Air is the most common aircraft used for air ambulance activities throughout the state. Forty percent of all SASP airports fit these requirements. By role, 83 percent of Commercial Service and 88 percent of Reliever airports fulfill requirements for medical aircraft. Zero GA-Basic airports meet all requirements for medical fixed-wing aircraft needs as identified by the operators.

Figure 6-21: Percent of Airports by Role Able to Support Emergency Medical Fixed Wing Aircraft



Source: *Airport Inventory & Data Survey* 2008

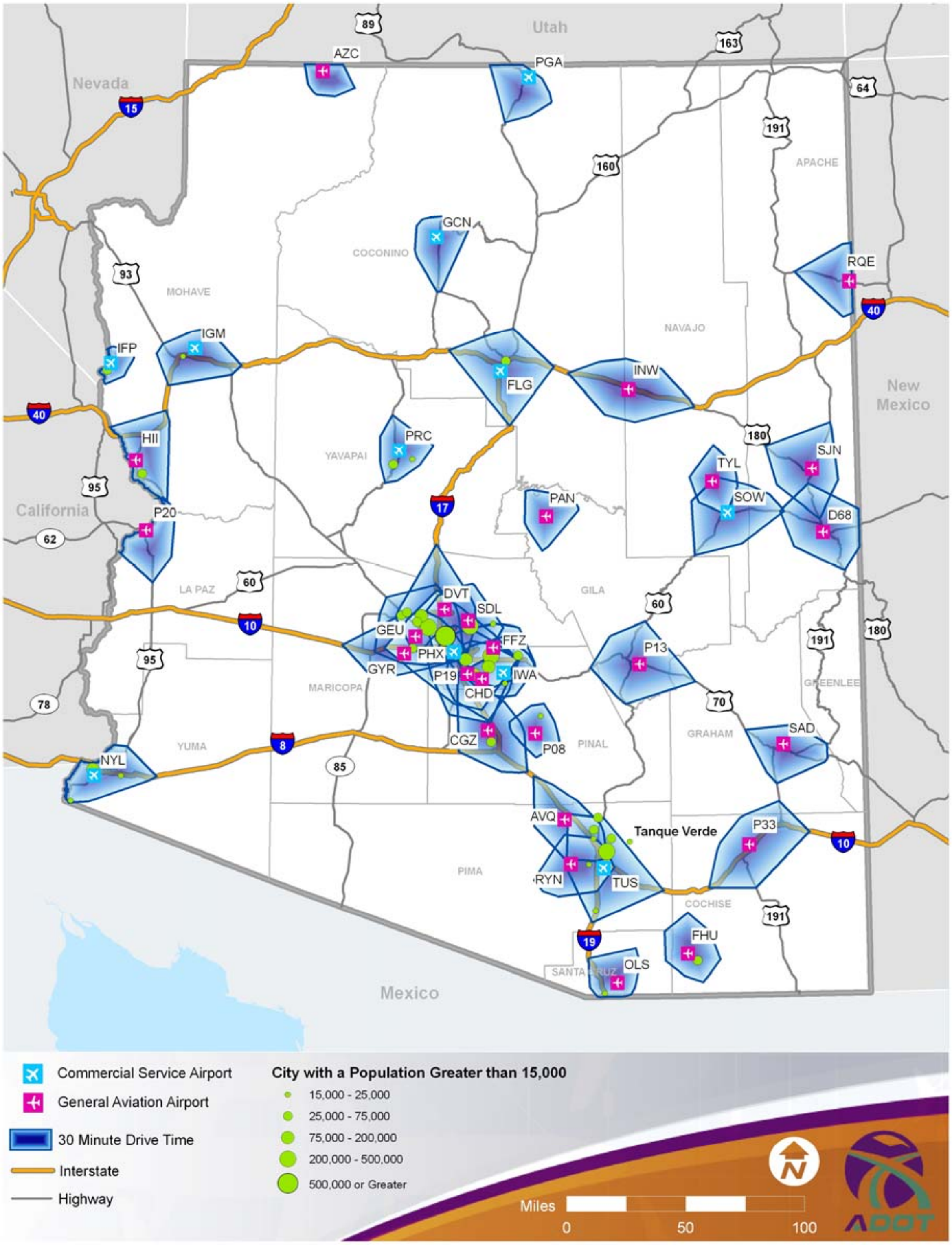
Both full perimeter fencing and approach landing systems are considered “desired” airport facilities for emergency medical aircraft operations. With full perimeter fencing taken out as an objective, the system-wide compliance with this performance measure increases from 33 percent to 40 percent of all system airports. With approach landing systems removed, compliance increases to 39 percent. When both are removed as facility objectives for this performance measure, current compliance reaches 45 percent

Percent of communities in the state with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability

Communities with a population of at least 15,000 people are more likely to demand aviation activity with more sophisticated facility needs. As portrayed in Figure 6-22, there are 37 communities that have a population of 15,000 people or more in Arizona. Of these areas, only the Census-designated place of Tanque Verde in Pima County is located outside of a 30-minute drive time of an airport capable of supporting large general aviation aircraft (ARC of at least B-II and IMC capability). Tanque Verde itself is located just outside of the 30-minute market area for Tucson International Airport. In total, 97 percent of communities with a population of at least 15,000 people are located within a 30-minute drive time of a general aviation airport capable of supporting large aircraft.

An additional 17 communities were included in this analysis compared to the SANS 2000 measurement. In the SANS 2000, 20 communities were listed with a population of at least 15,000. Of these 20 communities, 90 percent met this measure in 2000. Two fell outside of 30-minute drive times of an airport that can accommodate large general aviation aircraft and has IMC capabilities: Lake Havasu City and Globe/Miami/Central Heights. Airports within a 30-minute drive time of these two cities have since upgraded to qualify for this measure.

Figure 6-22: Communities in the State with a Population Greater than 15,000 Within 30-Minute Drive Time of a System Airport that can Accommodate Large General Aviation Aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) Capability

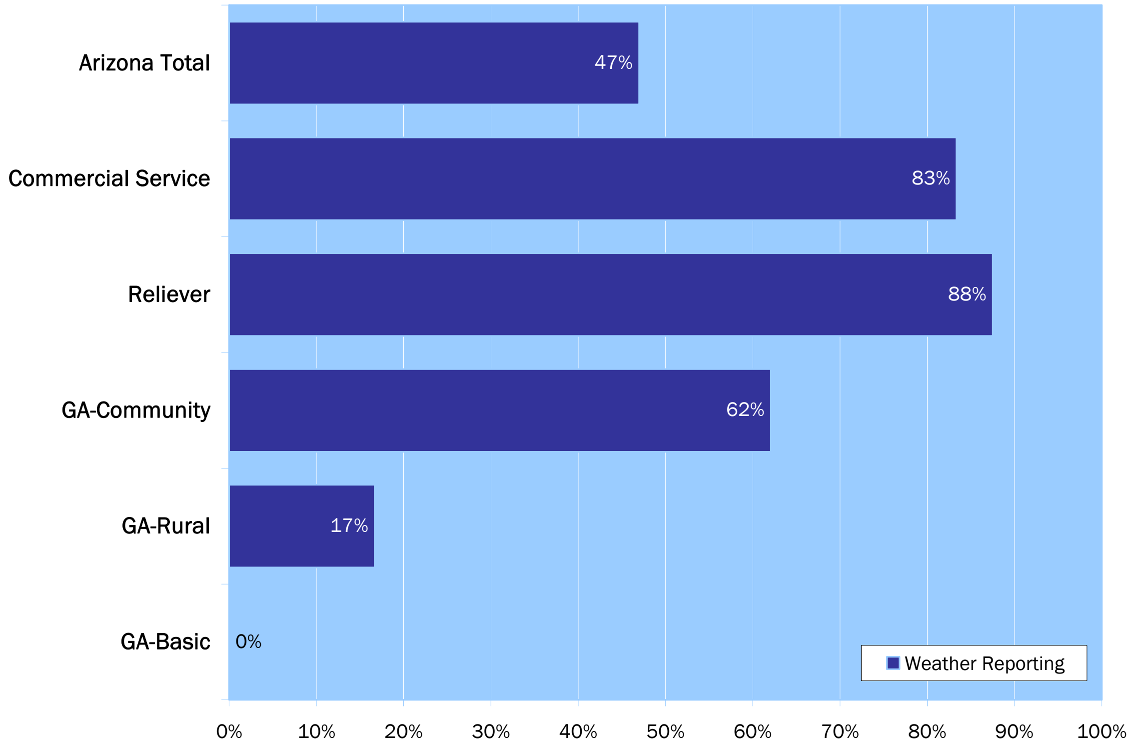


Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of airports with on-site weather reporting and percent of statewide area within 30 nautical miles of an airport with on-site weather reporting

Figure 6-23 details airports in the Arizona system having on-site weather reporting by either an AWOS or ASOS system. Statewide, 47 percent of airports in the system have either an AWOS or ASOS that reports weather conditions. By role, 83 percent of Commercial Service, 88 percent of Reliever, 62 percent of GA-Community, and 17 percent of GA-Rural airports have these systems. Zero airports in the GA-Basic role have on-site weather reporting.

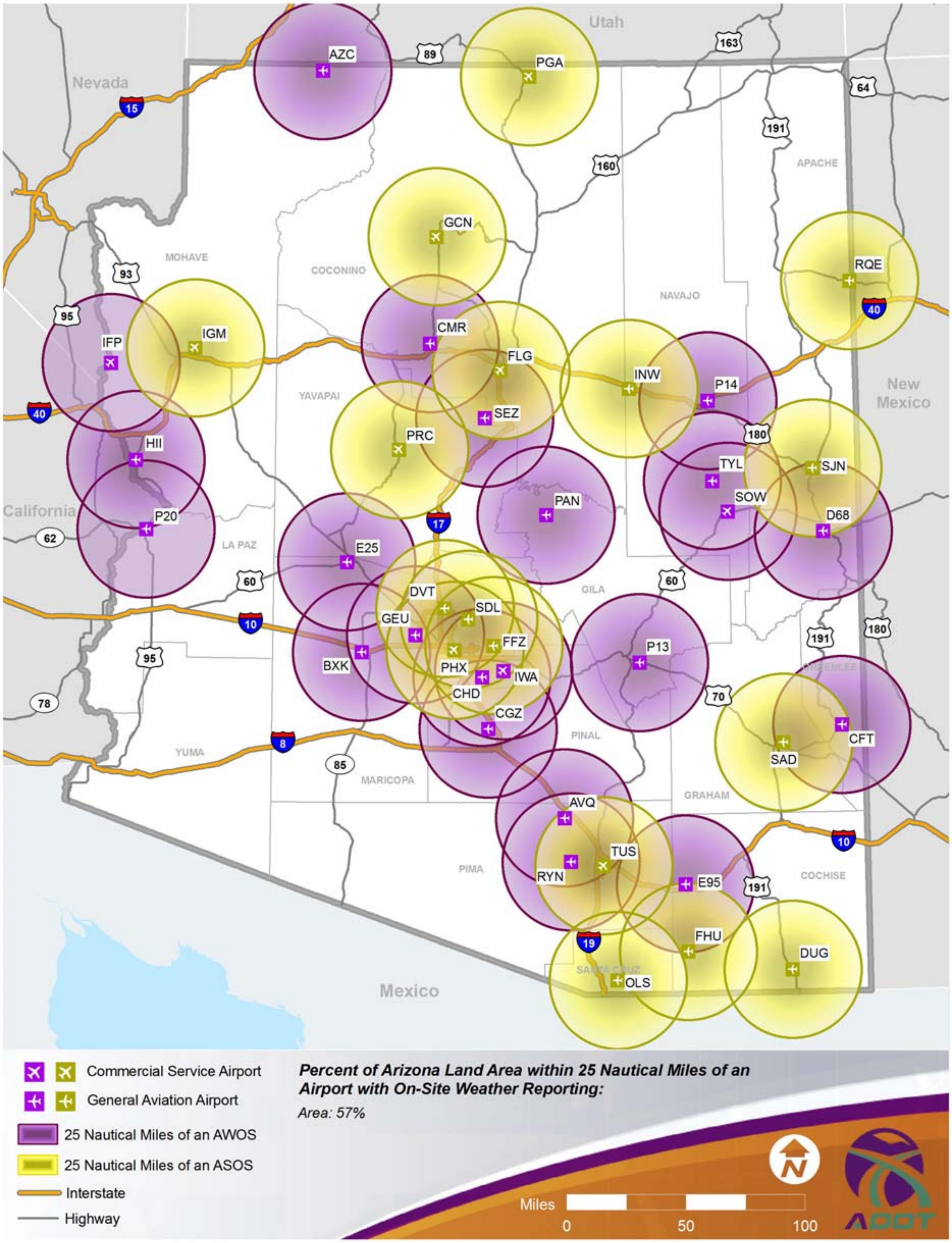
Figure 6-23: Percent of Airports by Role With On-Site Weather Reporting



Source: ADOT *AWOS Network Study* 2007

Figure 6-24 depicts airports which have these on-site weather reporting capabilities. Also shown are areas of 25 nautical miles around each airport, which is a standard air area of coverage for an AWOS or ASOS. Fifty-seven percent of Arizona's total land area falls within these areas.

Figure 6-24: 30-Minute Drive Times of a System Airport with On-Site Weather Reporting

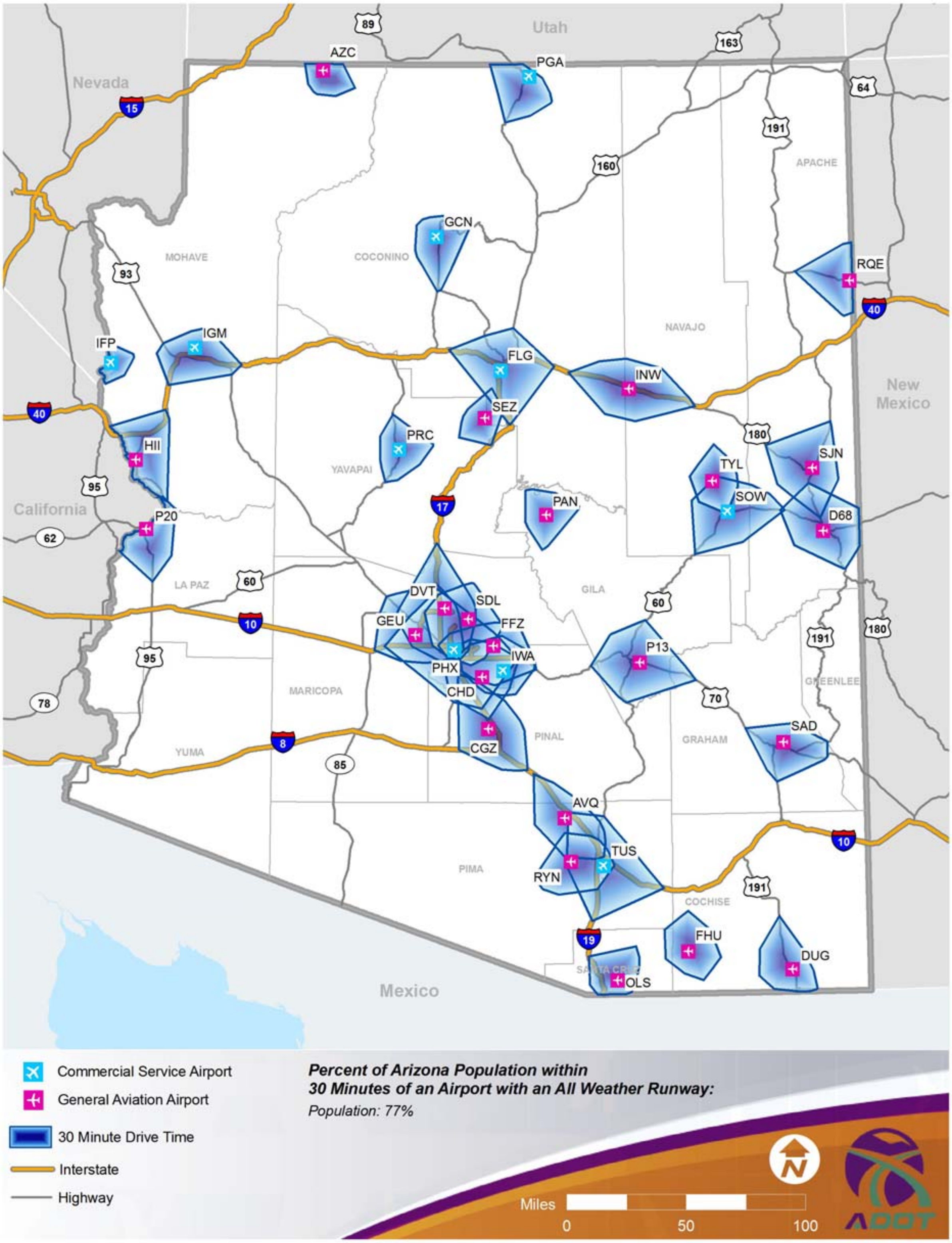


Source: ADOT *AWOS Network Study* 2007, Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of population and area within 30 minutes of an all weather runway (paved, instrument approach, AWOS)

Airports that are able to accommodate aircraft in all weather situations are particularly important to an aviation system. An all weather runway is defined as being paved, having an instrument approach, and having a weather-reporting system. Figure 6-25 (next page) shows the percent of population and land area within a 30-minute drive time of airports having an all weather runway as defined for this performance measure. Only 14 percent of Arizona's total land area is covered within a 30-minute drive time. However, due to the state's population being concentrated in certain areas, 77 percent of the total population is within a 30-minute drive time of an airport having an all weather runway.

Figure 6-25: 30-Minute Drive Times of System Airports with an All-Weather Runway (paved, instrument approach, AWOS)

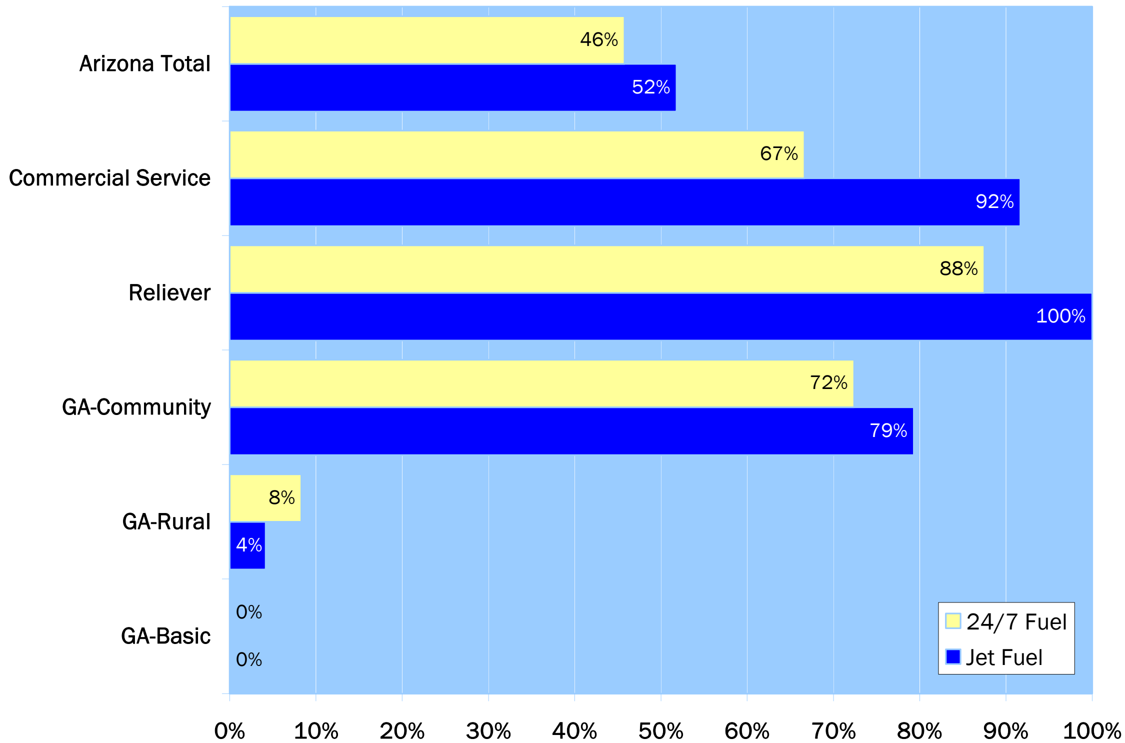


Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Percent of airports meeting aviation fuel goals

The widespread availability of fuel at Arizona airports is important to operators of based and transient aircraft. **Figure 6-26** shows Arizona system airports by role category and percentages of airports having any type of fuel available to the public 24 hours per day/7 days per week and those which provide jet fuel in addition to AvGas.

Figure 6-26: Percent of Airports by Role with 24/7 or Jet Fuel



Source: *Airport Inventory & Data Survey* 2008

Percent of airports with 24/7 fuel

The availability of fuel 24 hours a day, 7 days a week is important to general aviation pilots flying at non peak hours or those needing emergency fuel. This 24/7 fuel may be either AvGas or Jet A fuel, and the method of distribution, such as self-serve or 24-hour FBO-fueling, does not matter. A SASP airport fulfills this measure as long as it has any type of aviation fuel available at any time. Figure 6-26 displays airports with fuel available 24/7 (either 100LL or jet fuel) by system role category. In total, 46 percent of Arizona system airports have fuel available to the public 24/7. Reliever airports had the highest percentage offering 24/7 fuel, with 88 percent of their total. Sixty-seven percent of Commercial Service and 72 percent of GA-Community airports had 24/7 fuel available.

Percent of airports with jet fuel

Jet fuel is important not only to commercial aviation, but to corporate, charter, and many other types of general aviation operators. Jet aircraft operators, agricultural sprayers, rotary wing operators, and many other aircraft operators require Jet A fuel. In Arizona, it is especially crucial to the large number of charter jets flying to recreational areas such as the Grand Canyon. Figure 6-26 provides the percentages of airports having jet fuel available to the public by airport system role. Overall, 52 percent of Arizona system airports offer jet fuel. Ninety-two percent of Commercial Service[1], 100 percent of Reliever, and 79 percent of GA-Community airports offer jet fuel.

Percent of airports meeting capacity goals

The capability of Arizona's airport system to provide sufficient operational capacity to accommodate current and future activity levels is important. The system is evaluated based upon the relationship between annual operational demand and annual operational capacity. This relationship is the demand/capacity ratio. In this analysis, the demand/capacity ratio is derived by comparing each individual airport's current and projected annual operational activity with its calculated Annual Service Volume (ASV). ASV is a measure of an airport's ability to efficiently process annual operational activity, expressed as a percentage. ASVs are calculated based upon airfield configuration, fleet mix, and instrument approach facilities. Airports approaching and/or exceeding annual capacity will likely experience delays.

The following performance measures identify those Arizona airports operating below FAA targets for capacity:

- Percent of airports with sufficient operational capacity in 2007
- Percent of airports projected to have sufficient operational capacity in 2030
- Percent of state population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2030
- Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion

For long-range planning purposes, the FAA recommends that airports should begin planning for capacity enhancing projects when operational demand reaches 60 percent of annual operating capacity. When demand approaches 80 percent of airport capacity, plans to address capacity issues should be implemented.

For this analysis, each airport's ASV was either calculated or obtained from a recent airport-specific planning document such as a master plan. Figure 6-27 presents current and projected operational demand, current ASV, current and projected demand/capacity ratios by system airport, and current and projected average aircraft delay per operation.

[1] Grand Canyon West Airport does not offer fuel to the public; fuel is only available to charter and air tour companies that operate at the airport.

Figure 6-27: Airport Operational Demand/Capacity

Code	Associated City	Airport Name	Demand 2007	Demand 2030	ASV	Demand/ Capacity Ratio 2007	Demand/ Capacity Ratio 2030	Avg. Aircraft Delay/Op (minutes) 2007	Avg. Aircraft Delay/Op (minutes) 2030
Commercial Service									
IFP	Bullhead City	Laughlin/Bullhead Intl	23,678	27,200	170,000	14%	16%	0.1	0.1
FLG	Flagstaff	Flagstaff Pulliam	46,424	55,500	230,000	20%	24%	0.1	0.1
GCN	Grand Canyon	Grand Canyon National Park	100,936	162,100	210,000	48%	77%	0.3	0.9
IGM	Kingman	Kingman	59,489	105,600	195,500	30%	54%	0.1	0.4
IWA	Mesa	Phoenix-Mesa Gateway	296,676	531,300	524,000	57%	101%	0.4	2.4
PGA	Page	Page Municipal	24,000	72,500	200,000	12%	36%	0.1	0.1
1G4	Peach Springs	Grand Canyon West	138,408	187,300	131,625	105%	142%	3.2	5+
PHX	Phoenix	Phoenix Sky Harbor Intl	539,211	903,700	685,000	79%	132%	1.4	7+
PRC	Prescott	Ernest A. Love Field	227,351	269,000	355,000	64%	76%	0.5	0.8
SOW	Show Low	Show Low Regional	41,192	64,300	195,500	21%	33%	0.1	0.1
TUS	Tucson	Tucson International	257,704	307,000	318,000	81%	97%	1.0	1.9
NYL	Yuma	Yuma MCAS/Yuma Intl	198,332	271,000	299,000	66%	91%	0.6	1.4
Reliever									
CHD	Chandler	Chandler Municipal	265,212	479,400	456,000	58%	105%	0.1	1.2
GEU	Glendale	Glendale Municipal	146,208	197,100	299,000	49%	66%	0.1	0.2
GYR	Goodyear	Phoenix Goodyear	188,015	288,500	206,000	91%	140%	0.6	2+
AVQ	Marana	Marana Regional	112,000	173,900	188,000	60%	93%	0.1	0.6
FFZ	Mesa	Falcon Field	314,129	489,400	472,000	67%	104%	0.2	1.7
DVT	Phoenix	Phoenix Deer Valley	378,370	590,800	645,000	59%	92%	0.1	0.6
SDL	Scottsdale	Scottsdale	191,982	299,700	218,500	88%	137%	0.6	2+
RYN	Tucson	Ryan Field	249,425	448,900	379,000	66%	118%	0.2	2.0
GA-Community									
E95	Benson	Benson Municipal	8,200	16,100	184,000	4%	9%	0.0	0.0
BXK	Buckeye	Buckeye Municipal	28,662	51,800	236,000	12%	22%	0.0	0.0
18AZ	Carefree	Sky Ranch at Carefree	3,573	4,100	172,500	2%	2%	0.0	0.0
CGZ	Casa Grande	Casa Grande Municipal	63,980	86,200	187,000	34%	46%	0.1	0.1
P19	Chandler	Stellar Airpark	45,100	70,500	195,500	23%	36%	0.0	0.1
34AZ	Chandler	Memorial Airfield	25,500	34,200	184,000	14%	19%	0.0	0.0
AZC	Colorado City	Colorado City Municipal	3,050	3,500	184,000	2%	2%	0.0	0.0
P08	Coolidge	Coolidge Municipal	6,000	6,900	184,000	3%	4%	0.0	0.0
P52	Cottonwood	Cottonwood	19,410	26,100	184,000	11%	14%	0.0	0.0
DGL	Douglas	Douglas Municipal	11,100	14,900	165,625	7%	9%	0.0	0.0
E60	Eloy	Eloy Municipal	23,100	31,100	184,000	13%	17%	0.0	0.0
40G	Grand Canyon	Valle	800	1,100	184,000	0%	1%	0.0	0.0
P14	Holbrook	Holbrook Municipal	4,900	6,600	184,000	3%	4%	0.0	0.0
HII	Lake Havasu City	Lake Havasu City	51,654	69,500	230,000	22%	30%	0.0	0.0
MZJ	Marana	Pinal Airpark	10,628	11,800	153,900	7%	8%	0.0	0.0
OLS	Nogales	Nogales International	40,100	70,300	195,500	21%	36%	0.0	0.1
P20	Parker	Avi Suquilla	14,520	19,600	195,500	7%	10%	0.0	0.0
PAN	Payson	Payson	42,500	76,800	195,500	22%	39%	0.0	0.1
P48	Peoria	Pleasant Valley	60,000	93,700	126,500	47%	74%	0.1	0.2
SAD	Safford	Safford Regional	18,750	28,500	195,500	10%	15%	0.0	0.0
SEZ	Sedona	Sedona	50,000	75,300	195,500	26%	39%	0.0	0.1
FHU	Sierra Vista	Sierra Vista Municipal- LAA	156,237	187,400	215,000	73%	87%	0.2	0.6

Figure 6-27: Airport Operational Demand/Capacity (Continued)

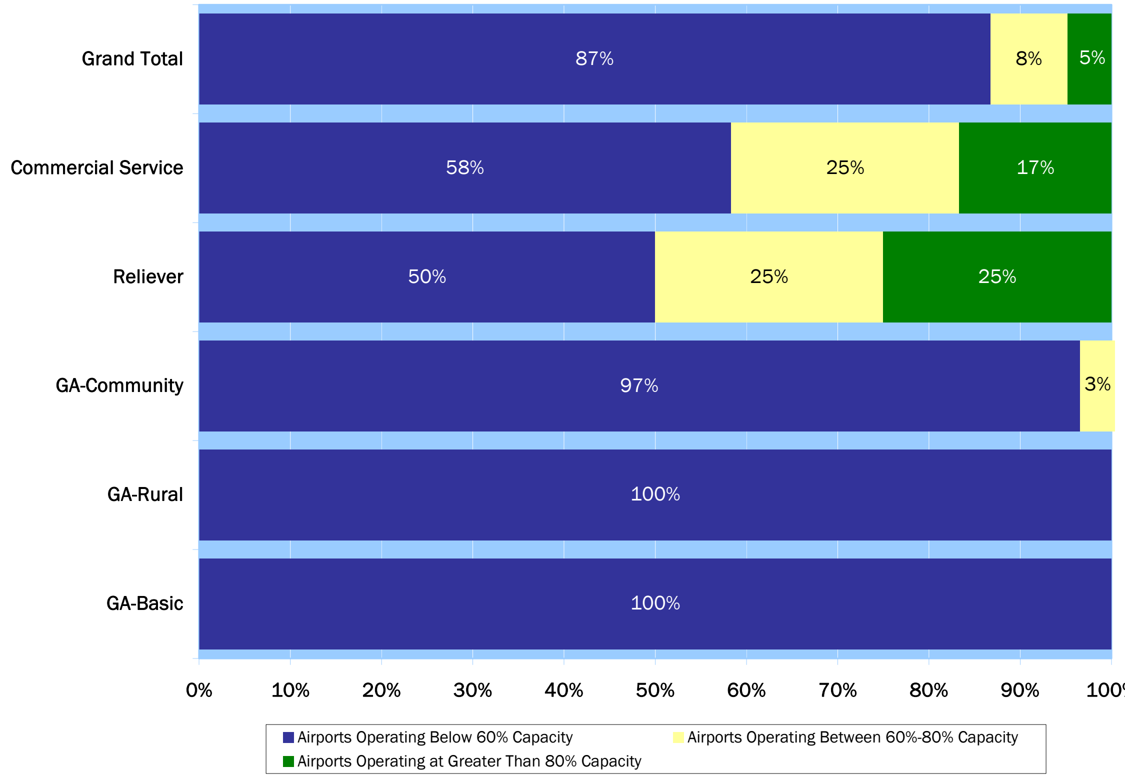
			Demand			Demand/ Capacity Ratio		Avg. Aircraft Delay/Op (minutes)	
Code	*Associated City*	*Airport Name*	*2007*	*2030*	*ASV*	*2007*	*2030*	*2007*	*2030*
D68	Springerville	Springerville Municipal	4,100	4,700	195,500	2%	2%	0.0	0.0
SJN	St Johns	St Johns Industrial Air Park	15,000	19,900	195,500	8%	10%	0.0	0.0
TYL	Taylor	Taylor	4,810	6,500	195,500	2%	3%	0.0	0.0
E25	Wickenburg	Wickenburg Municipal	18,000	37,100	184,000	10%	20%	0.0	0.0
P33	Willcox	Cochise County	7,860	10,500	195,500	4%	5%	0.0	0.0
CMR	Williams	H.A. Clark Memorial Field	3,650	4,900	184,000	2%	3%	0.0	0.0
INW	Winslow	Winslow-Lindbergh Regional	27,650	31,300	195,500	14%	16%	0.0	0.0
GA-Rural									
P01	Ajo	Eric Marcus Municipal	600	700	161,000	0%	0%	0.0	0.0
P04	Bisbee	Bisbee Municipal	4,512	9,400	184,000	2%	5%	0.0	0.0
A20	Bullhead City	Sun Valley	1,000	1,600	161,000	1%	1%	0.0	0.0
E91	Chinle	Chinle Municipal	2,400	5,000	161,000	1%	3%	0.0	0.0
CFT	Clifton/Morenci	Greenlee County	8,760	13,700	161,000	5%	9%	0.0	0.0
P03	Douglas	Cochise College	55,180	84,500	184,000	30%	46%	0.0	0.1
DUG	Douglas Bisbee	Bisbee Douglas International	5,300	5,900	184,000	3%	3%	0.0	0.0
E63	Gila Bend	Gila Bend Municipal	11,010	23,000	184,000	6%	13%	0.0	0.0
P13	Globe	San Carlos Apache	16,200	21,800	195,500	8%	11%	0.0	0.0
0V7	Kayenta	Kayenta	4,524	6,100	155,250	3%	4%	0.0	0.0
E67	Kearny	Kearny	4,200	5,700	184,000	2%	3%	0.0	0.0
L41	Marble Canyon	Marble Canyon	2,585	4,000	149,500	2%	3%	0.0	0.0
E68	Maricopa	Estrella Sailport	16,500	22,200	213,000	8%	10%	0.0	0.0
L37	Peach Springs	Grand Canyon Caverns	1,350	2,400	126,500	1%	2%	0.0	0.0
A39	Phoenix	Phoenix Regional	14,600	19,700	184,000	8%	11%	0.0	0.0
P10	Polacca	Polacca	1,000	1,200	149,500	1%	1%	0.0	0.0
44A	San Luis	Rolle Airfield	4,900	5,400	161,000	3%	3%	0.0	0.0
E77	San Manuel	San Manuel	13,080	26,300	210,000	6%	13%	0.0	0.0
P23	Seligman	Seligman	1,100	1,500	184,000	1%	1%	0.0	0.0
U30	Temple Bar	Temple Bar	1,800	2,400	161,000	1%	1%	0.0	0.0
T03	Tuba City	Tuba City	910	1,100	155,250	1%	1%	0.0	0.0
57AZ	Tucson	La Cholla Airpark	4,000	5,400	184,000	2%	3%	0.0	0.0
E24	Whiteriver	Whiteriver	3,440	4,000	172,500	2%	2%	0.0	0.0
RQE	Window Rock	Window Rock	7,000	14,700	166,750	4%	9%	0.0	0.0
GA-Basic									
27AZ	Aguila	Eagle Roost	3,500	4,700	172,500	2%	3%	0.0	0.0
E51	Bagdad	Bagdad	14,000	18,900	161,000	9%	12%	0.0	0.0
Z95	Cibecue	Cibecue	1,415	1,900	132,250	1%	1%	0.0	0.0
L25	Meadview	Pearce Ferry	1,100	1,500	132,250	1%	1%	0.0	0.0
3AZ5	Peach Springs	Hualapai	0	0	155,250	0%	0%	0.0	0.0
48AZ	Rimrock	Rimrock	600	800	149,500	0%	1%	0.0	0.0
E78	Sells	Sells	1,210	1,600	149,500	1%	1%	0.0	0.0
E81	Superior	Superior Municipal	200	200	138,000	0%	0%	0.0	0.0
P29	Tombstone	Tombstone Municipal	300	500	155,250	0%	0%	0.0	0.0
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip	1,275	1,500	126,500	1%	1%	0.0	0.0

Sources: Airport Records, Wilbur Smith Associates, September 2008

Percent of airports with sufficient operational capacity in 2007

Figure 6-28 presents Arizona system airports currently operating below target demand/capacity levels. Thirteen percent of all system airports (12 airports) in Arizona operated above 60 percent capacity in 2007 and five percent of the airports (five airports) operated above 80 percent capacity. In 2007, 58 percent of Commercial Service airports and 50 percent of Reliever airports operated below 60 percent capacity. Seventeen percent of Commercial Service Airports and 25 percent of Reliever Airports operated above 80 percent capacity in 2007. One airport, Grand Canyon West, currently is above 100 percent capacity, based on reported levels of activity and an estimated annual ASV. Just two (seven percent) GA-Community Airports operated above 60 percent capacity. All GA-Rural and GA-Basic airports operated below 60 percent of operational capacity. The next chapter of this analysis addresses potential ways to address capacity shortfalls.

Figure 6-28: Airports with Sufficient Operating Capacity, 2007



Sources: Wilbur Smith Associates, airport records

The SANS 2000 also calculated ASVs and demand/capacity ratios for 1998. According to the SANS 2000, six airports exceeded the 60 percent FAA demand/capacity threshold. These airports were Grand Canyon National Park, Phoenix Sky Harbor, Ernest A. Love Field, Tucson International, Phoenix Deer Valley, and Scottsdale.

Figure 6-29 presents the airports that exceeded 60 percent threshold in 1998, the base year used for the SANS 2000, and which airports currently exceed the 60 percent threshold. Phoenix Sky Harbor completed the construction of a third runway to improve operational capacity. Grand Canyon National Park and Phoenix Deer Valley have actually declined due to adjustments in ASV calculations. The decline in the ratio for Ernest A. Love Field is due to declines in operational levels. Tucson International and Scottsdale have continued to see an increase in their operational capacity ratios. Airports that are currently operating above the

60 percent FAA threshold that were below the threshold in 1998 include Grand Canyon West (recorded zero (0) operations in 1998), Yuma International, Phoenix Goodyear, Marana Regional, Falcon Field, Ryan Field, and Sierra Vista Municipal.

Figure 6-29: Airports Operating Above 60% Demand Capacity Ratio in 1998 and 2007

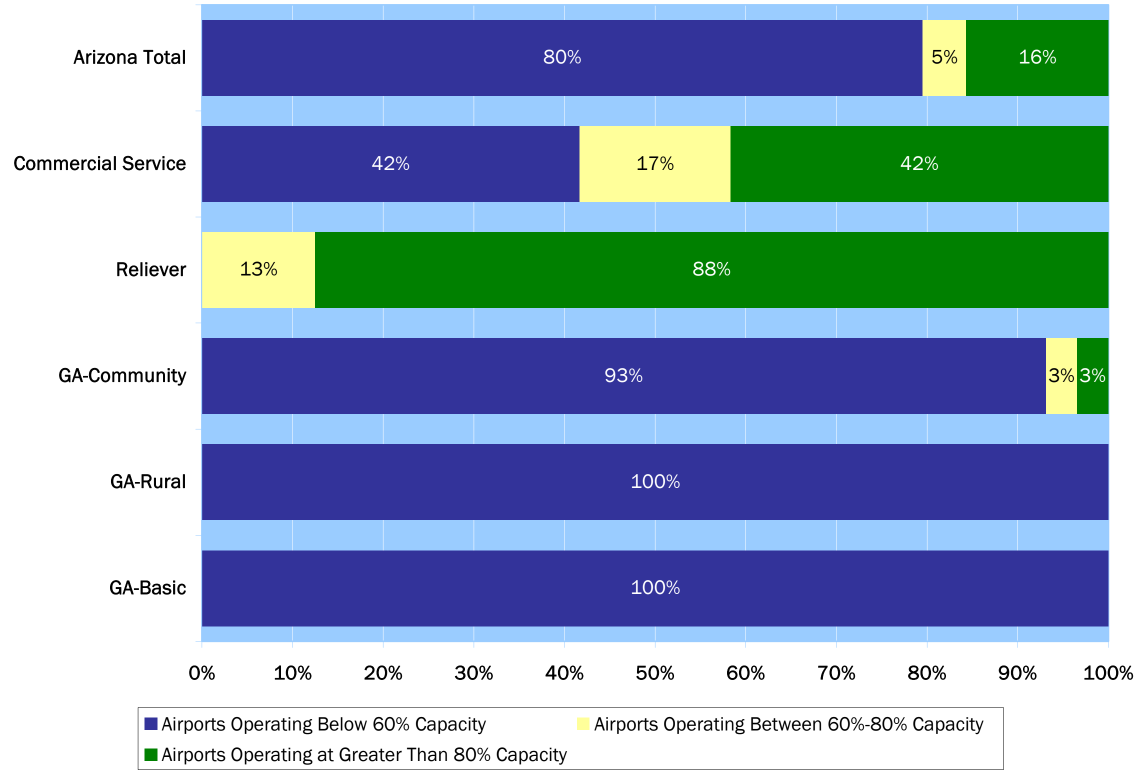
			Demand/Capacity Ratios	
Code	*Associated City*	*Airport Name*	*1998*	*2007*
Commercial Service				
GCN	Grand Canyon	Grand Canyon National Park	105%	48%
1G4	Peach Springs	Grand Canyon West	0%	105%
PHX	Phoenix	Phoenix Sky Harbor Intl	113%	79%
PRC	Prescott	Ernest A. Love Field	108%	64%
TUS	Tucson	Tucson International	70%	81%
NYL	Yuma	Yuma MCAS/Yuma Intl	50%	66%
Reliever				
GYR	Goodyear	Phoenix Goodyear	57%	91%
AVQ	Marana	Marana Regional	31%	60%
FFZ	Mesa	Falcon Field	58%	67%
DVT	Phoenix	Phoenix Deer Valley	84%	59%
SDL	Scottsdale	Scottsdale	62%	88%
RYN	Tucson	Ryan Field	44%	66%
Other				
FHU	Sierra Vista	Sierra Vista Municipal- LAA	14%	73%

Sources: SANS 2000; Wilbur Smith Associates

Percent of airports projected to have sufficient operational capacity in 2030

Figure 6-30 presents projected demand/capacity information for the 2030 forecast year using data from the SASP. In 2030, it is projected that 42 percent of Commercial Service Airports, zero percent of Reliever Airports, 93 percent of GA-Community and 100 percent of GA-Rural and GA-Basic Airports will have sufficient operational capacity. Eighty percent of all Arizona system airports are projected to be operating below 60 percent demand/capacity. Five percent are projected to be operating between 60 and 80 percent of capacity. Thirteen system airports (16 percent) are projected to surpass 80 percent of their operational capacity by 2030. Eight airports are projected to exceed 100 percent capacity by 2030.

Figure 6-30: Airports with Sufficient Operating Capacity, 2030



Sources: Wilbur Smith Associates, airport records

Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion

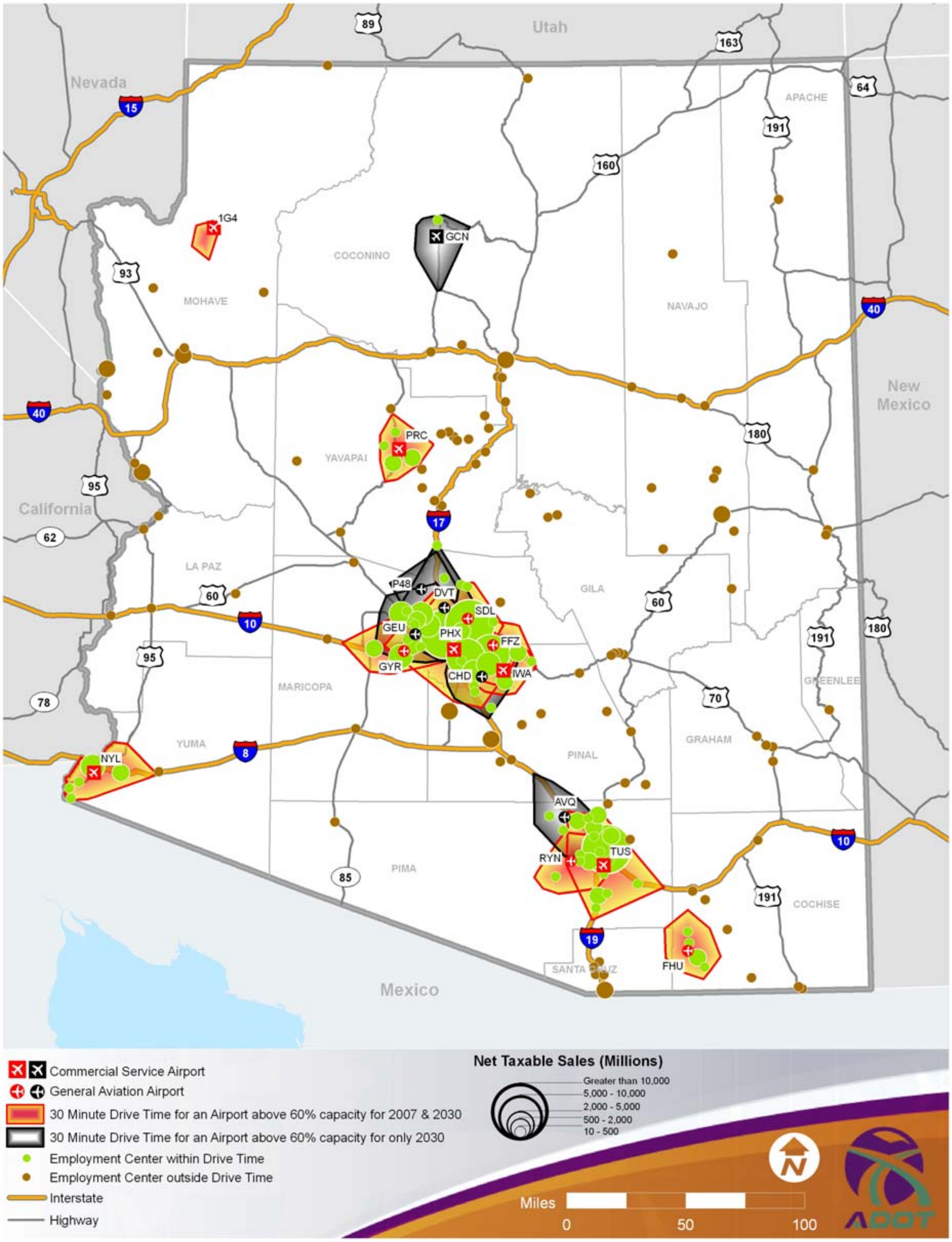
Similar to the measurement from the SANS 2000, average aircraft delay was calculated using *FAA Advisory Circular 150/5060-5, Airport Capacity and Delay* to determine the number of airports experiencing delay to aircraft operations. As shown in Figure 6-27, 23 system airports experience some level of delay. Statewide average delay for these 23 airports was 0.49 minutes per aircraft operation. The SANS 2000 also noted that 23 airports experienced some level of delay. The statewide average when the analysis was completed was 0.50 minutes per operation. By 2030, 28 system airports are projected to experience delay. The average delay of these airports is projected to be 0.72 minutes by 2030. The SANS 2000 did not determine delay based on projected operational activity.

Percent of population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2030

Figure 6-31 presents the 30-minute drive times of Arizona airports which currently or are projected to exceed 60 percent of their operational capacity. Seventy-two percent of the Arizona population is within a 30-minute drive time of one of the airports that currently experiences or is projected to experience operational delays.

Forty percent of the state's employment centers are also within a 30-minute drive time of system airports currently experiencing or projected to experience delay. Employment centers were defined as communities with greater than $10 million in net taxable sales. There are 163 employment centers in Arizona based on this definition.

Figure 6-31: Employment Centers that are within a 30-Minute Drive Time of a System Airport Exceeding 60 Percent Demand/Capacity, Current and 2030



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Airports with a current (past 5 years) master plan

A key component in the success of a system airport is ensuring that it can respond to near and long-term development needs. An airport with a current master plan has increased likelihood of cooperation from the local community and mitigation of environmental concerns during periods of growth and development. A current airport master plan is important for eligibility for federal and state funding for capital improvement projects. Current master plans, as well as airport layout plans (ALPs), help Arizona's airports document current and future facilities and requirements, determine priority for potential development projects, and identify compatible land uses for areas near the airport.

An airport's master plan should be updated regularly as increased demand necessitates, as conditions at the airport or community change, or as changes in federal planning and design standards warrant. For the purpose of this analysis, a master plan is considered current if completed or underway in the last five years, 2003 or later. Only publicly-owned airports in the SASP are included in this analysis.

Figure 6-32 details the currency of master plans at Arizona SASP airports as obtained from airport, FAA, and ADOT records. It is important to note that even though an airport may have a recently completed master plan, the plan may not necessarily be approved by the FAA or ADOT. In order to receive federal or state funding for projects included in the master plan, the projects must be approved.

Although an ALP is not a required part of this performance measure, Figure 6-32 also shows the most recent approval dates for ALPs as provided by the FAA. As shown, the number of ALPs approved by the FAA in the last five years dwarfs the number of ALPs or master plans that have been completed. Only two-thirds of the Commercial Service Airports, one-quarter of the Reliever Airports and applicable GA-Community Airports have had an ALP approved by the FAA in the last five years.

Figure 6-32: Airports by Role with Current Master Plans and ALPs and FAA Approval Dates

Associated City	*Airport Name*	*Master Plan Date*	*Current Master Plan*	*ALP Date*	*FAA Approved ALP Date*	*FAA Approval in Last 5 Years*
Commercial Service						
Bullhead City	Laughlin/Bullhead Intl	2009	Yes	2007	2007	Yes
Flagstaff	Flagstaff Pulliam	2007	Yes	2007	2002	
Grand Canyon	Grand Canyon National Park	2006	Yes	2006	2006	Yes
Kingman	Kingman	2006	Yes	2006	2006	Yes
Mesa	Phoenix-Mesa Gateway	2008	Yes	2008	2005	Yes
Page	Page	2007	Yes	2007	2001	
Peach Springs	Grand Canyon West	2007	Yes	2007	2007	Yes
Phoenix	Phoenix Sky Harbor Intl	1997		2008	2008	Yes
Prescott	Ernest A. Love Field	2008	Yes	2008	2000	
Show Low	Show Low Regional	2003	Yes	2005	2005	Yes
Tucson	Tucson International	2004	Yes	2004	2004	Yes
Yuma	Yuma International	2009	Yes	2007	2001	
Reliever						
Chandler	Chandler Municipal	2007	Yes	2007	2000	
Glendale	Glendale Municipal	2008	Yes	2008	1998	
Goodyear	Phoenix Goodyear	2008	Yes	2008	1992	
Marana	Marana Regional	2008	Yes	2007	2007	Yes
Mesa	Falcon Field	2008	Yes	2008	2007	Yes
Phoenix	Phoenix Deer Valley	2007	Yes	2008	2002	
Scottsdale	Scottsdale	2009	Yes	2009	2002	
Tucson	Ryan Field	2008	Yes	2008	2001	
GA-Community						
Benson	Benson Municipal	2007	Yes	2007	2000	
Buckeye	Buckeye Municipal	2007	Yes	2007	2007	Yes
Carefree	Sky Ranch at Carefree	Private	NA	NA	NA	NA
Casa Grande	Casa Grande Municipal	2008	Yes	2008	2001	
Chandler	Memorial Airfield	2005	Yes	2005	1984	
Chandler	Stellar Airpark	Private	NA	NA	NA	NA
Colorado City	Colorado City Municipal	2008	Yes	2008	2000	
Coolidge	Coolidge Municipal	2009	Yes	2009	2001	
Cottonwood	Cottonwood	2007	Yes	2007	2006	Yes
Douglas	Douglas Municipal	1994		2003		
Eloy	Eloy Municipal	2001		2001	2001	
Grand Canyon	Grand Canyon Valle	Private	NA	NA	NA	NA
Holbrook	Holbrook Municipal	2000		2000	2000	
Lake Havasu City	Lake Havasu City	2008	Yes	2008	2003	Yes
Marana	Pinal Airpark	2004	Yes	2004	2000	
Nogales	Nogales International	2006	Yes	2002	1993	
Parker	Avi Suquilla	2008	Yes	2008	2001	
Payson	Payson	2008	Yes	2008	2001	
Peoria	Pleasant Valley	Private	NA	NA	NA	NA
Safford	Safford Regional	2008	Yes	2008	2001	
Sedona	Sedona	1999		2006	2001	
Sierra Vista	Sierra Vista Municipal/LAA	2003	Yes	2000	2000	

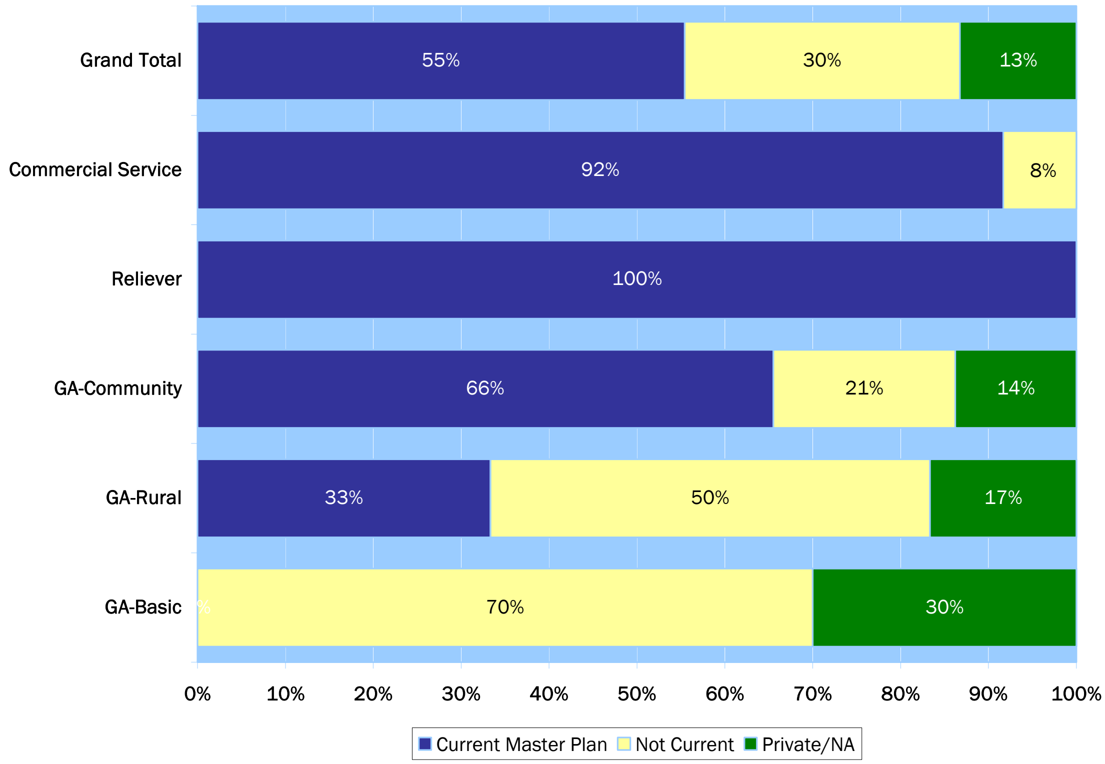
Figure 6-32: Airports by Role with Current Master Plans and ALPs and FAA Approval Dates (Continued)

Associated City	*Airport Name*	*Master Plan Date*	*Current Master Plan*	*ALP Date*	*FAA Approved ALP Date*	*FAA Approval in Last 5 Years*
GA-Community						
Springerville	Springerville Municipal	2008	Yes	2007	2007	Yes
St Johns	St Johns Industrial Air Park	1998		2008	1999	
Taylor	Taylor	2005	Yes	2005	2005	Yes
Wickenburg	Wickenburg Municipal	2003	Yes	2000	2005	Yes
Willcox	Cochise County	1997		1997	1999	
Williams	H.A. Clark Memorial Field	2008	Yes	2007	2008	Yes
Winslow	Winslow-Lindbergh Regional	2008	Yes	2002	2002	
GA-Rural						
Ajo	Eric Marcus Municipal	1999		1999	1999	
Bisbee	Bisbee Municipal	2001		2002	2001	
Bullhead City	Sun Valley	None		NA	NA	
Chinle	Chinle Municipal	None		1992	1992	
Clifton/Morenci	Greenlee County	2008	Yes	2008	2003	Yes
Douglas	Cochise College	2001		2001		
Douglas Bisbee	Bisbee Douglas International	1997		2002	1998	
Gila Bend	Gila Bend Municipal	2009	Yes	2009	2000	
Globe	San Carlos Apache	2007	Yes	2007	2007	Yes
Kayenta	Kayenta	2005	Yes	2005	2006	Yes
Kearny	Kearny	2006	Yes	2006		
Marble Canyon	Marble Canyon	Private	NA	NA	NA	
Maricopa	Estrella Sailport	Private	NA	NA	NA	
Peach Springs	Grand Canyon Caverns	Private	NA	NA	NA	
Phoenix	Phoenix Regional	None		NA		
Polacca	Polacca	1997		NA		
San Luis	Rolle Airfield	2001		2003		
San Manuel	San Manuel/Ray/Blair	2003	Yes	2007	2007	Yes
Seligman	Seligman	2005	Yes	2006		
Temple Bar	Temple Bar	None		NA	NA	
Tuba City	Tuba City	2005	Yes	2005	2001	
Tucson	La Cholla Airpark	Private	NA	NA	NA	NA
Whiteriver	Whiteriver	1998		2003	2007	Yes
Window Rock	Window Rock	1998		1998	2001	
GA-Basic						
Aguila	Eagle Roost	Private	NA	NA	NA	NA
Bagdad	Bagdad	2000		2008	2000	
Cibecue	Cibecue	None		2006	2006	Yes
Meadview	Pearce Ferry	None		NA	NA	
Peach Springs	Hualapai	None		NA	NA	
Rimrock	Rimrock	Private	NA	NA	NA	NA
Sells	Sells	None		NA	NA	
Superior	Superior Municipal	2002		2001		
Tombstone	Tombstone Municipal	1999		1999	1999	
Whitmore	Grand Canyon Bar Ten Airstrip	Private	NA	NA	NA	NA

Sources: ADOT Aeronautics Division, *Airport Inventory & Data Survey* 2008, FAA
Note: NA=not applicable

Figure 6-33 provides a summary of current master plans (by completion date, not FAA approval date) by system role. This measure does not apply to 13 percent of the airports in the system because they are owned privately and do not receive state or FAA funding for projects, in most cases. Throughout the system, 55 percent of the airports have a current master plan. When privately owned airports are removed from the analysis, 64 percent of all system airports are considered to have current plans. All airports in the Commercial Service and Reliever role categories other than Phoenix Sky Harbor International have a current (or in progress) master plan. In addition, 66 percent of GA-Community airports have a current master plan.

Figure 6-33: Percent of Airports by Role with Current Master Plans and/or Airport Layout Plans



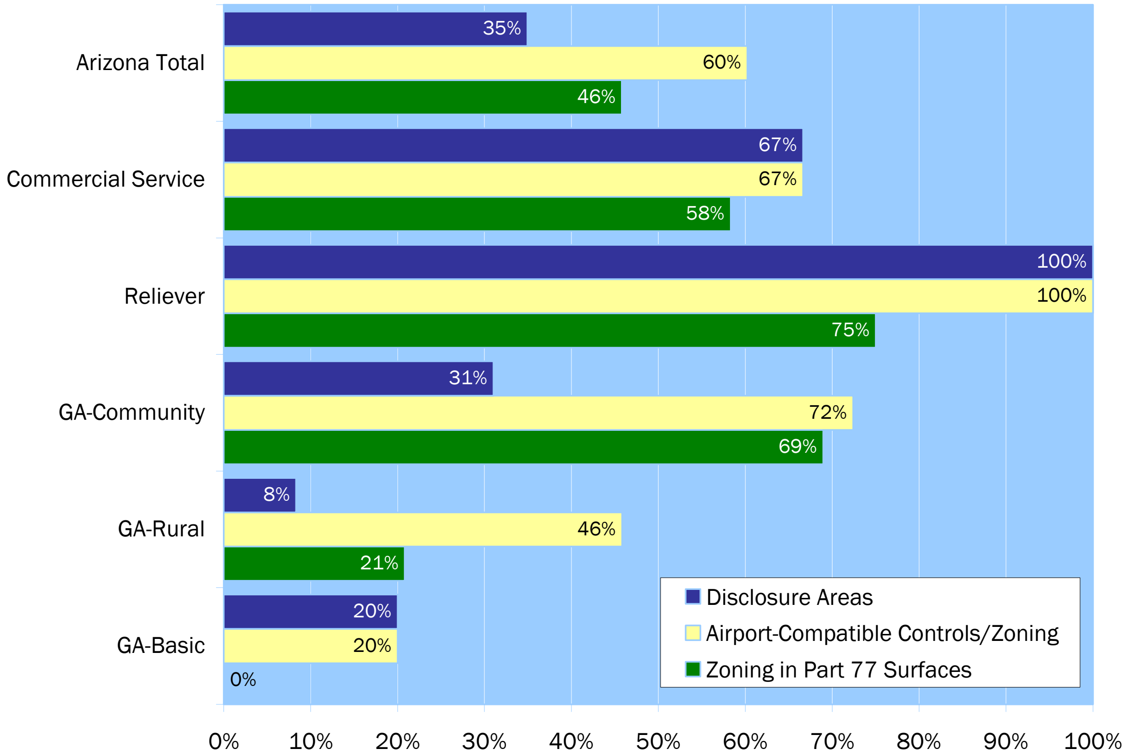
Sources: ADOT Aeronautics Division, *Airport Inventory & Data Survey* 2008

Percent of airports with zoning and land use controls

The FAA recognizes and stresses the importance of planning to increase the long-term flexibility of the nation's airport system. Proactive land use planning provides one mechanism for minimizing adverse airport-related impacts in the airport environs, thereby increasing long-term flexibility. Airports that are protected from the encroachment of activities or land use which are not compatible with their day-to-day operations and activities generally have a greater potential for future expansion to meet identified needs.

In addition to airport master plans and airport layout plans, performance measures were set for an airport's inclusion in or use of Federal Aviation Regulation (FAR) Part 77-related height zoning, airport-compatible local zoning and controls, and state-defined airport disclosure areas. **Figure 6-34** shows the percentages of airports by role category that meets these performance measures.

Figure 6-34: Percent of Airports by Role with Airport Zoning and Land Use Controls



Source: *Airport Inventory & Data Survey* 2008

Percent of airports with surrounding municipalities that have adopted "disclosure areas"

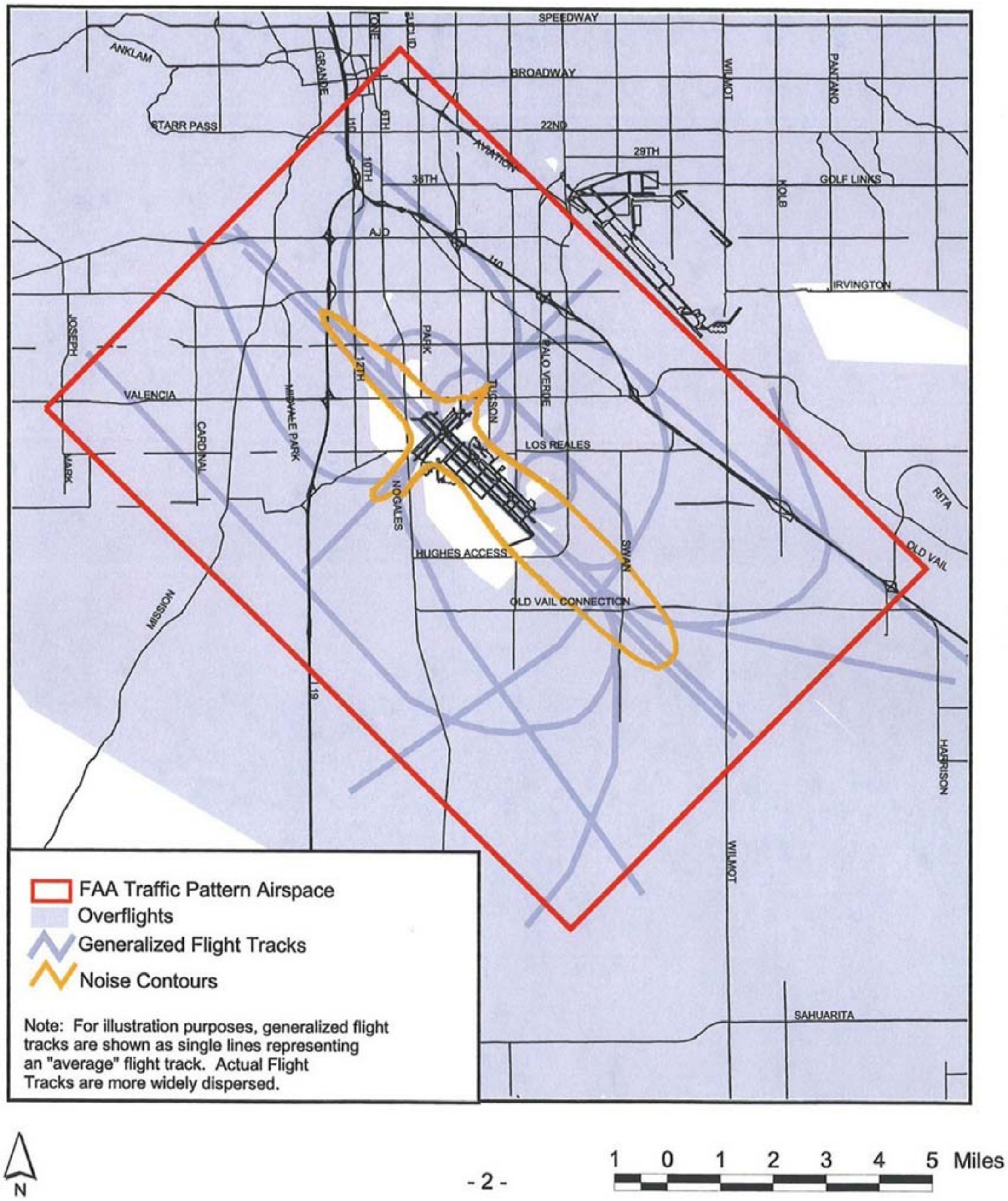
Measures which alert prospective property buyers to the existence of overflight impacts are highly appropriate to minimize airport noise complaints. Recognizing the importance of providing communities with information regarding the proximity of local airports, the state of Arizona enacted *A.R.S. §28-8485 and 8486* in 1999 to allow the governing body of a political subdivision to establish an airport influence area. These statutes are discussed in detail in Chapter Two.

In addition, the statute states that the Arizona Department of Real Estate should have "airport disclosure" maps available to the public that outline boundaries of each territory in the vicinity of a public airport. This is defined as the property that is within the FAA's "traffic pattern airspace" which is the area where traffic converges as it approaches and departs an airport. It includes property that experiences a day-night average sound level above the following levels:

- In counties with a population of more than 500,000 persons, 60 decibels or higher at airports where such an average sound level has been identified in either the airport master plan for the 20- year planning period or in a noise study prepared in accordance with airport noise compatibility planning, *14 Code of Federal Regulations Part 150*.
- In counties with a population of 500,000 persons or less, 65 decibels or higher at airports where such an average sound level has been identified in the airport master plan for the 20- year planning period.

Several system airports have provided the state with traffic pattern airspace and noise contour drawings in order to meet this statute. An example of an airport disclosure map is presented in Figure 6-35.

Figure 6-35: Example of an Airport Disclosure Map



Local municipalities have worked closely with current and prospective property owners to provide disclosure through defined noise "disclosure areas." Figure 6-34 reveals that 31 percent of Arizona system airports (26 of 83) have supplied the Department of Real Estate with information regarding "disclosure areas." This low number is largely a result of Arizona's many rural airports which have limited surrounding community or local opposition to the requirement of disclosure areas due to concerns for decreased property values. By role category, 67 percent of Commercial Service, 100 percent of Reliever, and 31 percent of GA-

Community airports have surrounding municipalities with disclosure areas. As noted in Chapter Two, there are no requirements and to implement airport influence areas or public airport disclosure, and thus no penalties for failure to implement. Because of this, encroachment is worsening around airports, limiting expansion potential and creating additional impacted areas.

Percent of airports with surrounding municipalities that have adopted controls/zoning to make land use in the airport environs compatible with airport operations and development

The long-term viability of airports in many communities may be threatened by encroachment from land uses or activities which are incompatible with airport operations. It is important for municipalities to adopt land use zoning ordinances to protect airports and the surrounding areas of potential impact from incompatible land uses. Areas in the vicinity of an airport most likely to be impacted by airport operations are often confined to the flight patterns of aircraft operating at the airport, which likely extend beyond airport property.

Figure 6-34 shows that 60 percent of all Arizona system airports are located in communities with airport-compatible land use controls and zoning according to data provided by airport managers through the SASP planning process. By role category, 67 percent of Commercial Service, 100 percent of Reliever, and 72 percent of GA-Community airports have surrounding municipalities that have implemented these types of controls and zoning.

Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77 (height zoning)

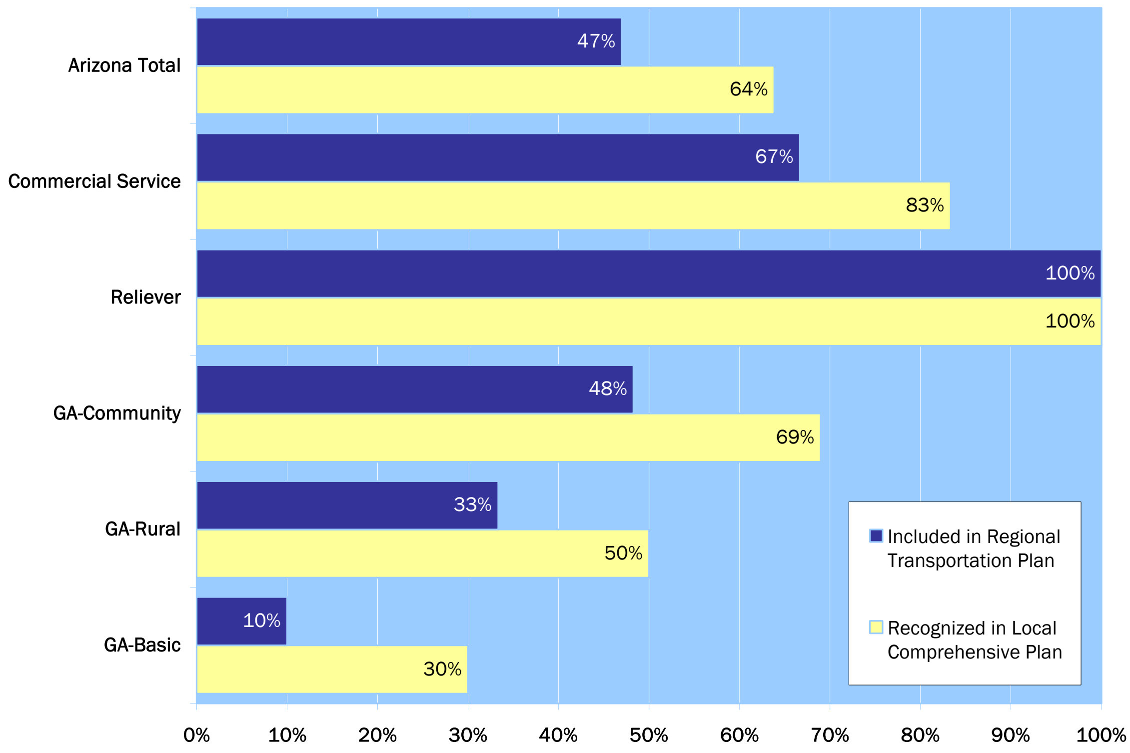
FAR Part 77 provides standards for the airspace surrounding airports and their operational areas. It describes conceptual airspace surfaces surrounding each airport relative to the runways and each runway end. These surfaces generally begin at a height 150 feet above the runway elevation and extend up and out from and around the runway ends. The dimensions of the conceptual surfaces vary, and are based upon each airport's ARC, approach and departure procedures, and FAA guidance.

Figure 6-34 reveals that 46 percent of all system airports have worked with local municipalities to enact height zoning in the affected areas. Fifty-eight percent of Commercial Service, 75 percent of Reliever, and 69 percent of GA-Community airports have adopted height zoning. It should be noted that privately-owned system airports do not receive state or federal funding, thus are not required to comply with FAR Part 77.

Percent of airports meeting local and regional planning goals

Local comprehensive and regional transportation plans are a good indication of a host community's support and compatibility with its respective airport. If the airport is identified and approved in these plans, this tends to increase the airport's long-term viability and potential to meet future needs. Figure 6-36 shows airports by role category that are included in regional transportation and local comprehensive plans.

Figure 6-36: Percent of Airports by Role Included in Local Comprehensive and Regional Transportation Plans



Source: *Airport Inventory & Data Survey* 2008

Percent of airports included in regional transportation plans

Figure 6-36 shows that 47 percent of system airports are included in a regional transportation plan as indicated through the results of the surveys conducted as part of the SASP. By role category, 67 percent of Commercial Service, 100 percent of Reliever, and 48 percent of GA-Community airports are included in these plans. Less GA-Rural and GA-Basic airports are included in transportation plans than in comprehensive plans, only 33 percent and 10 percent, respectively.

Percent of airports that are recognized in local comprehensive plan

Figure 6-36 shows that 64 percent of Arizona system airports are included in the local comprehensive plan of their community or region. Eighty-three percent of Commercial Service, 100 percent of Reliever, and 69 percent of GA-Community airports are included in local comprehensive plans. Fifty percent of GA-Rural and 30 percent of GA-Basic airports are also included in local comprehensive plans.

GOAL CATEGORY: ECONOMIC SUPPORT

Airports play a key role in supporting and promoting economic activity in Arizona. Employers nationwide consider the existence and efficiency of air transportation facilities when expanding or developing in a given geographic area. In business surveys conducted throughout the U.S. and as part of this study, employers were asked to rank the importance of commercial service and general aviation airports to other factors in selecting a new site. The following 14 factors were included in the survey:

- Convenient highway access
- Commercial service
- International flights
- General aviation
- Cost of living in the area
- Rail transportation
- Urban business district nearby
- Raw materials, natural resources
- Proximity to universities or R&D centers
- Proximity to academic or cultural centers
- Tax incentives
- Availability of a trained workforce
- Proximity of suppliers
- Historic location of the business

In the survey administered as part of this study to Arizona businesses, the proximity to a commercial service airport ranked 4th and the proximity to a general aviation airport ranked 11th among all 14 factors considered. Many top national firms use general aviation aircraft in their business to transport employees and also have customers and suppliers who visit via general aviation airports.

The presence and utility of airports lends assistance in economic growth and diversification. In addition to adequate airport facilities, market areas that airports serve must possess other characteristics that make them candidates for the attraction and retention of various economic development activities.

For this goal category, the relationship between the economic activity of the region and the demand for aviation services was examined through the following performance measures:

- Dollars of economic impact on the state from aviation
- Number of major recreational areas in the state within a 30-minute drive time of a system airport
- Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport
- Percent of population within a 30-minute drive time of a system airport meeting business user needs
- Number of airports having adequate utilities (electricity, telephone, water, sewer, and gas)
- Percent of airports with a pavement condition index (PCI) of 70 or greater
- Percent of airports meeting minimum facility and service objectives

Dollars of economic impact on the state from aviation

The economic impact of an airport is a measure of the fiscal contribution of airport operations and its users to the surrounding region and the state. Air transport and tourism, commercial aviation, general aviation, and aerospace manufacturing are all important parts of the Arizona economy. Data utilized in the analysis of this measure was obtained from *The Economic Impacts of Aviation in Arizona*, completed by SH&E, with Economic Development Research Group and Arizona State University College of Business in 2004.

Primary economic impacts are the statewide economic activities, employment, and payrolls that can be attributed directly and indirectly to the operation of system airports. They describe the importance of aviation as an industry. Direct impacts are the consequence of economic activities carried out at system airports by airlines, airport management, fixed base operators, and other aviation dependant industries. Direct impacts represent economic activities that would not have occurred in the absence of an airport system. Indirect impacts are additional off-site economic activities that occur in response to investments in the airport system. Existing firms expand their economic activity in order to meet the additional demand for services that results from the airport. These activities include services provided by travel agencies, hotels, restaurants, and retail establishments.

As the money from the primary economic impacts circulates in the local economy, it creates additional taxable economic activity. The combination of primary and induced economic impact measures the total economic impact of aviation.

Figure 6-37 presents the total jobs, payroll, and economic output (primary plus induced impacts) for the airports included in the Arizona system for 2002. Several private and tribal airports were not included in the analysis, so it is not inclusive of all system or SASP airports. In addition, there were several airports included in the analysis that are now closed or not included in the SASP.

A statewide economic impact study of aviation in Arizona was also completed in 1998. Between 1998 and 2002 (the year the data for 2003 was based on), total statewide economic activity increased 24 percent, jumping from $31.1 billion in 1998 (measured in constant 2002 dollars) to $38.5 billion in 2002. The change is presented in Figure 6-38.

Figure 6-37: Total Jobs, Payroll, and Economic Output Associated with System Airports

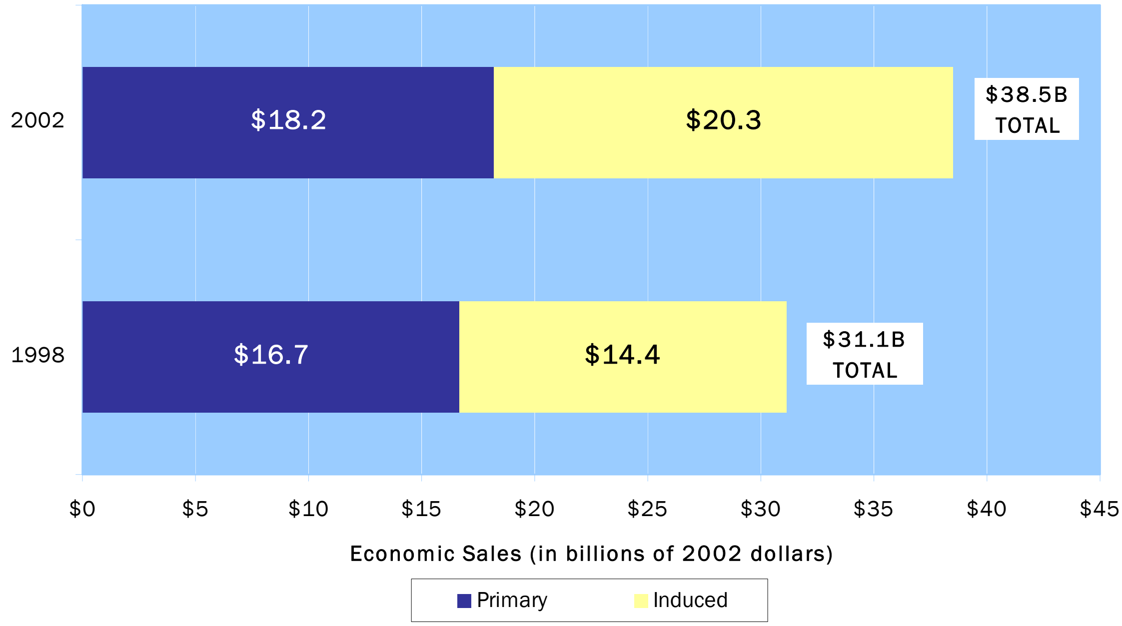
		Total Impacts (including Multiplier Effects)		
Associated City	*Airport Name*	*Employment*	*Payroll*	*Sales*
Commercial Service				
Bullhead City	Laughlin/Bullhead Intl	1,508	$40,878,676	$102,513,550
Flagstaff	Flagstaff Pulliam	1,411	$40,520,453	$117,515,084
Grand Canyon	Grand Canyon National Park	6,315	$165,351,532	$401,161,888
Kingman	Kingman	346	$9,661,718	$24,502,344
Mesa	Phoenix-Mesa Gateway	1,975	$71,107,408	$180,363,677
Page	Page	465	$13,060,568	$31,377,270
Peach Springs	Grand Canyon West	406	$10,889,062	$26,456,699
Phoenix	Phoenix Sky Harbor Intl	281,018	$8,053,735,485	$23,548,812,548
Prescott	Ernest A. Love Field	1,156	$32,260,417	$76,212,998
Show Low	Show Low Regional	140	$4,137,202	$9,730,978
Tucson	Tucson International	68,164	$2,220,159,564	$5,632,986,525
Yuma	Yuma International	1,238	$32,540,210	$79,423,209
	COMMERCIAL SERVICE TOTAL	364,142	$10,694,302,295	$30,231,056,770
Reliever				
Chandler	Chandler Municipal	778	$22,445,580	$53,877,443
Glendale	Glendale Municipal	516	$15,452,764	$36,717,702
Goodyear	Phoenix Goodyear	2,493	$108,447,852	$393,011,393
Marana	Marana Regional	257	$8,376,199	$19,369,711
Mesa	Falcon Field	17,602	$701,000,967	$2,013,412,392
Phoenix	Phoenix Deer Valley	2,035	$54,742,600	$124,787,460
Scottsdale	Scottsdale	1,909	$57,733,925	$140,131,205
Tucson	Ryan Field	497	$15,513,721	$35,769,729
	RELIEVER TOTAL	26,087	$983,713,608	$2,817,077,035
GA-Community				
Benson	Benson Municipal	20	$501,392	$1,142,492
Buckeye	Buckeye Municipal	236	$7,204,437	$19,283,538
Carefree	Sky Ranch at Carefree	N/A	N/A	N/A
Casa Grande	Casa Grande Municipal	399	$9,915,806	$23,934,485
Chandler	Memorial Airfield	N/A	N/A	N/A
Chandler	Stellar Airpark	27	$687,975	$1,613,529
Colorado City	Colorado City Municipal	18	$530,855	$1,345,823
Coolidge	Coolidge Municipal	66	$1,712,148	$3,911,998
Cottonwood	Cottonwood	157	$3,661,321	$8,905,532
Douglas	Douglas Municipal	29	$792,707	$1,745,768
Eloy	Eloy Municipal	398	$12,915,935	$30,184,006
Grand Canyon	Grand Canyon Valle	152	$4,148,201	$9,840,798
Holbrook	Holbrook Municipal	28	$722,499	$1,658,266
Lake Havasu City	Lake Havasu City	361	$10,049,239	$25,427,667
Marana	Pinal Airpark	21	$618,836	$1,339,987
Nogales	Nogales International	127	$3,606,859	$4,818,337
Parker	Avi Suquilla	59	$1,491,126	$3,716,842
Payson	Payson	211	$5,889,433	$14,531,561
Peoria	Pleasant Valley	645	$20,448,738	$49,925,968
Safford	Safford Regional	59	$1,542,496	$3,654,714
Sedona	Sedona	327	$8,614,310	$21,178,718
Sierra Vista	Sierra Vista Municipal	283	$10,366,030	$21,935,138
Springerville	Springerville Municipal	49	$1,464,896	$3,121,707
St Johns	St Johns Industrial Air Park	99	$2,829,473	$6,375,268
Taylor	Taylor	32	$937,682	$2,146,367
Wickenburg	Wickenburg Municipal	123	$3,401,620	$7,979,235
Willcox	Cochise County	26	$720,216	$1,644,554

Figure 6-37: Total Jobs, Payroll, and Economic Output Associated with SASP Airports (Continued)

		Total Impacts (including Multiplier Effects)		
Associated City	*Airport Name*	*Employment*	*Payroll*	*Sales*
Williams	H.A. Clark Memorial Field	102	$2,976,218	$6,954,110
Winslow	Winslow-Lindbergh Regional	88	$2,217,750	$544,581
	GA- COMMUNITY TOTAL	4,142	$119,968,198	$278,860,989
GA-Rural				
Ajo	Eric Marcus Municipal	7	$102,235	$227,523
Bisbee	Bisbee Municipal	21	$602,302	$1,365,779
Bullhead City	Sun Valley	3	$14,102	$76,359
Chinle	Chinle Municipal	46	$1,220,763	$2,694,210
Clifton/Morenci	Greenlee County	26	$684,419	$1,582,391
Douglas	Cochise College	25	$730,833	$1,667,825
Douglas Bisbee	Bisbee Douglas International	23	$681,066	$1,500,342
Gila Bend	Gila Bend Municipal	62	$166,149	$3,977,488
Globe	San Carlos Apache	41	$1,129,505	$2,750,630
Kayenta	Kayenta	16	$452,953	$1,014,172
Kearny	Kearny	2	$80,596	$197,784
Marble Canyon	Marble Canyon	20	$520,034	$1,219,060
Maricopa	Estrella Sailport	38	$1,281,918	$2,901,494
Peach Springs	Grand Canyon Caverns	5	$158,801	$373,202
Phoenix	Phoenix Regional	23	$601,032	$1,397,500
Polacca	Polacca	N/A	N/A	N/A
San Luis	Rolle Airfield	8	$280,643	$740,941
San Manuel	San Manuel/Ray/Blair	25	$674,218	$1,489,456
Seligman	Seligman	208	$5,283,974	$12,785,626
Temple Bar	Temple Bar	13	$350,169	$836,118
Tuba City	Tuba City	14	$375,275	$872,041
Tucson	La Cholla Airpark	N/A	N/A	N/A
Whiteriver	Whiteriver	54	$1,406,862	$3,200,752
Window Rock	Window Rock	10	$251,179	$554,228
	GA- RURAL TOTAL	739	$18,513,924	$46,546,628
GA-Basic				
Aguila	Eagle Roost	85	$2,736,838	$6,433,986
Bagdad	Bagdad	29	$755,945	$1,786,853
Cibecue	Cibecue	8	$195,315	$446,311
Meadview	Pearce Ferry	9	$211,340	$511,203
Peach Springs	Hualapai	N/A	N/A	N/A
Rimrock	Rimrock	N/A	N/A	N/A
Sells	Sells	11	$264,350	$599,121
Superior	Superior Municipal	1	$48,765	$110,585
Tombstone	Tombstone Municipal	3	$95,401	$219,320
Whitmore	Grand Canyon Bar Ten Airstrip	14	$377,133	$911,469
	GA- BASIC TOTAL	160	$4,685,087	$11,018,848
ARIZONA TOTAL		395,221	$11,819,718,216	$33,381,438,563

Source: SH&E, Economic Development Research Group, and Arizona State University College of Business
Note: N/A= not included in 2002 study

Figure 6-38: Comparison of Total Economic Activity at Arizona Airports, 1998 and 2002



Sources: ADOT, SH&E, Economic Development Research Group, and Arizona State University College of Business
Note: Includes several airports that are now closed or not part of this system plan

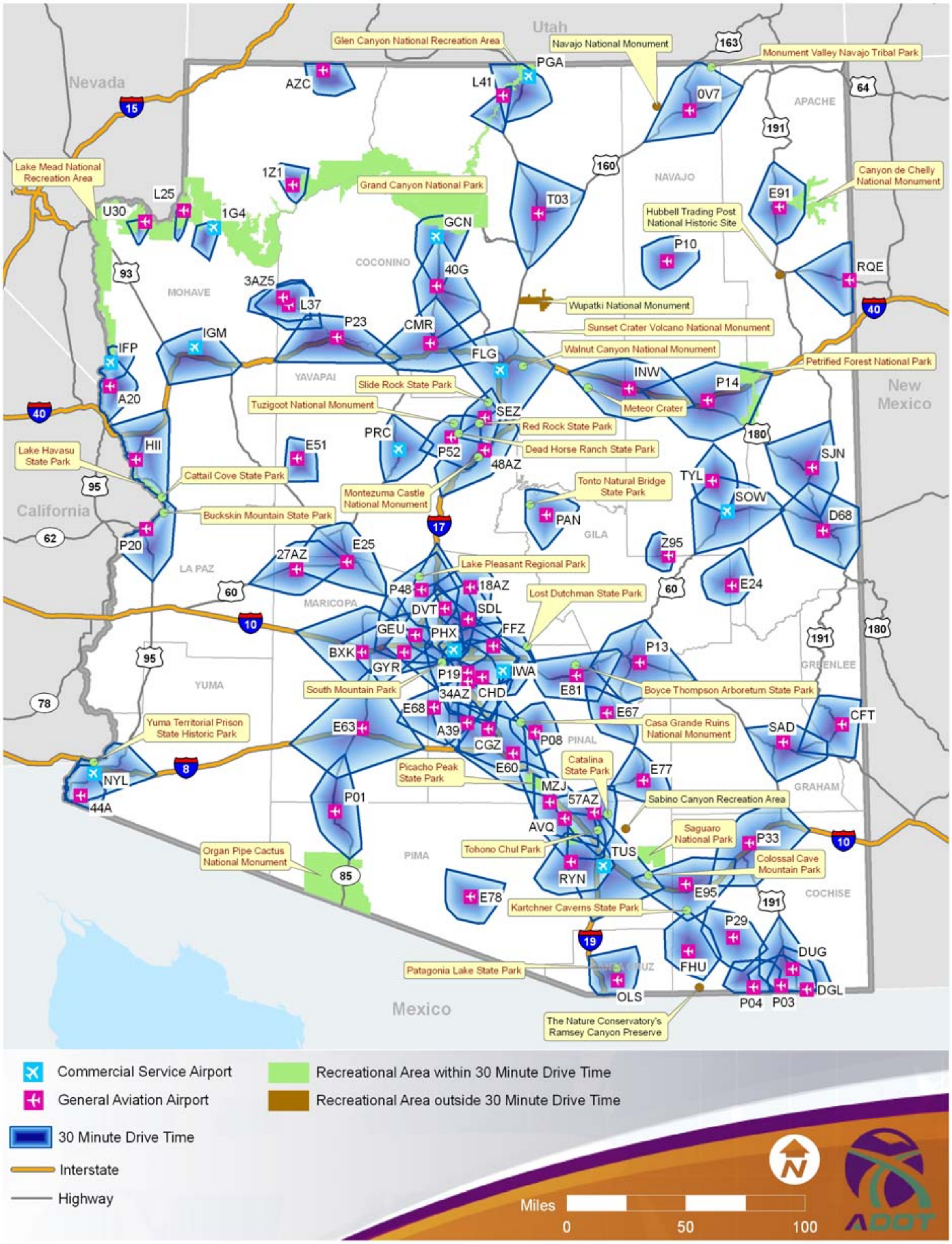
Number of major recreational areas in the state within a 30-minute drive time of a system airport

Recreational tourism plays a significant role in the overall economic health of Arizona. With over four million visitors annually, Grand Canyon National Park is one of the most visited recreational locations in the nation, and other attractions such as Glen Canyon National Recreation Area, Lake Mead National Recreation Area, Meteor Crater, and Coronado National Forest attract millions more. A list of the most highly visited parks, monuments, and recreation areas in Arizona was obtained by the Arizona Office of Tourism. **Figure 6-39** presents the proximity of the recreational areas to system airports. Of the 37 attractions noted by the Office of Tourism, 32 are within a 30-minute drive time of an Arizona system airport, accounting for 87 percent of the total. The following recreational areas fell outside of an existing airport's 30-minute drive time:

- Hubbell Trading Post National Historic Site
- The Nature Conservatory Ramsey Canyon Preserve
- Navajo National Monument
- Sabino Canyon Recreation Area
- Wupatki National Monument

This performance measure involving the proximity of recreational areas to airports was also included in the SANS 2000 study. With only 29 sites included in the previous analysis, the SANS 2000 did not include as many parks and recreational areas as this analysis. Of the 29 in the SANS 2000, it noted that 28 were within a 30-minute drive time of a general aviation airport, or 97 percent of the total. Just one area, Alamo Lake State Park in La Paz County was not within a 30-minute drive time. Recreational areas included in this study are not necessarily consistent with those in the SANS 2000. The 31 sites included in this study were specifically noted by the Office of Tourism as being the most-visited state recreation areas in the state.

Figure 6-39: Recreational Areas in the State within a 30-Mnute Drive Time of a System Airport



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport

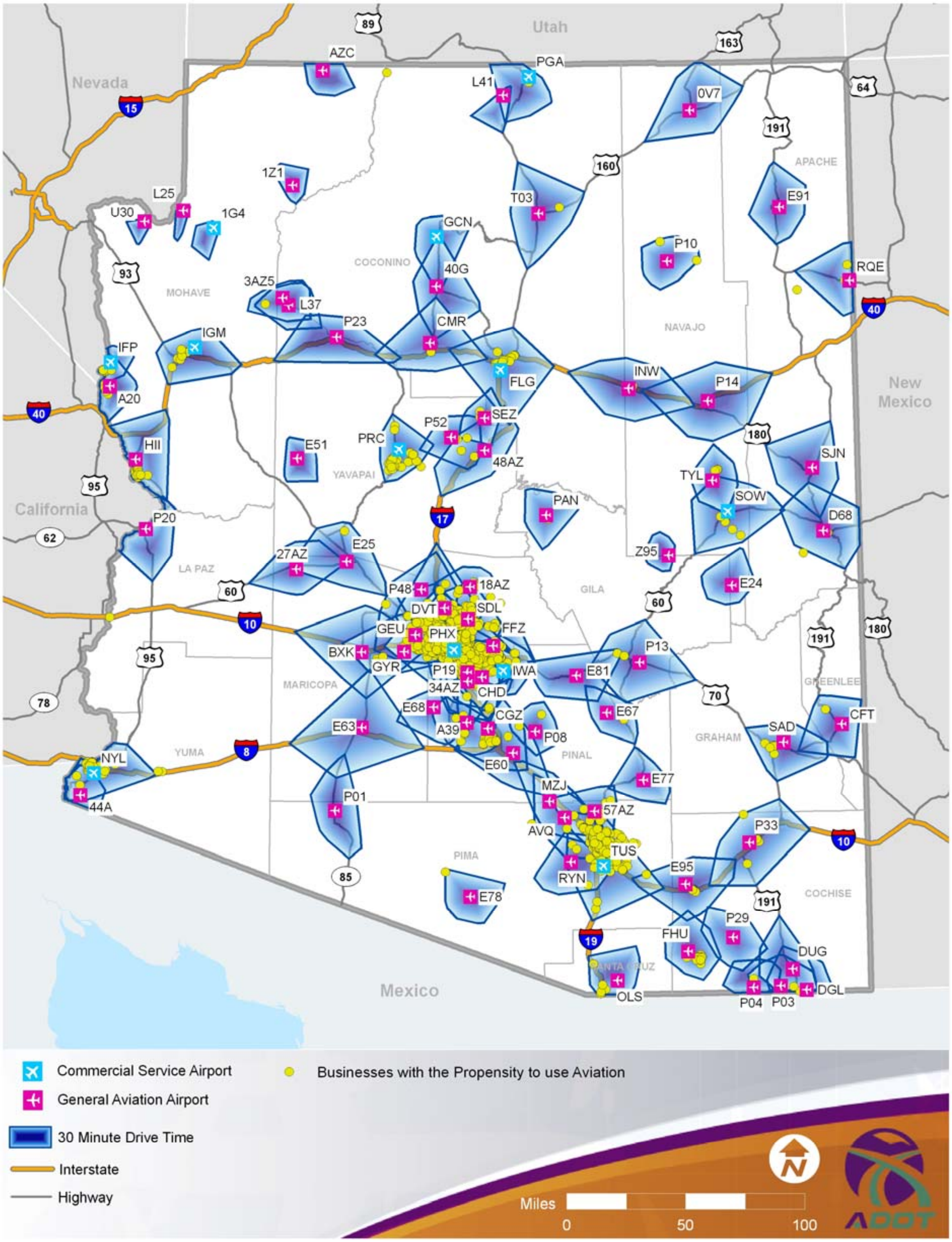
In order to assess business-related demand on Arizona's airport system, employers or businesses within the state with a propensity to utilize aviation were identified. The North American Industry Classification System (NAICS) codes of businesses utilizing aviation services were identified through thousands of business survey responses gathered by Wilbur Smith Associates while conducting airport economic impact or air service studies throughout the U.S. Businesses in these NAICS codes were obtained for Arizona to determine their locations relative to system airports.

Limiting this analysis to businesses having a minimum number of employees helps to identify businesses that are most likely to place measurable demand on Arizona's system of airports. Over 2,600 businesses within the following NAICS codes that employ at least 20 employees were identified for inclusion in this analysis:

- Mining
- Heavy Construction
- Manufacturing
- Transportation (Motor Freight)
- Wholesale
- Engineering
- Business Services
- Health Services (General Medical and Specialty)
- Legal Services
- Education (Colleges)

Figure 6-40 depicts the location of these 2,600 businesses in relation to Arizona's airports. Thirty-minute drive time market areas for the airports are also shown. As would be expected the majority of these businesses are located in the major urban areas of Arizona, including the metropolitan regions of Phoenix and Tucson. Other clusters of these businesses are located in Prescott, Flagstaff, Kingman, and Yuma. Out of these 2,600 businesses, only 17 are located outside of these 30-minute drive time areas. This accounts for less than one percent of Arizona businesses which have the propensity to use aviation.

Figure 6-40: Percent of Businesses with the Propensity to Use Aviation within a 30-Minute Drive Time of a System Airport



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of statewide population within a 30-minute drive time of a system airport meeting business user needs

Businesses which have the propensity to use aviation must not only have reasonable access to airports, but those airports must also meet the specific needs that business aviation presents. For the purpose of this study, the following business user requirements are used:

- 5,000’ runway
- Instrument approach
- Jet fuel
- Terminal
- Ground Transportation

Figure 6-41 presents Arizona airports that have each of the characteristics to meet the business user needs objective. **Figure 6-42** maps airports that meet the specific needs of business aviation, and their 30-minute drive time market areas. These areas cover 79 percent of the total statewide population.

Figure 6-41: Airport Compliance to Meeting Business User Needs

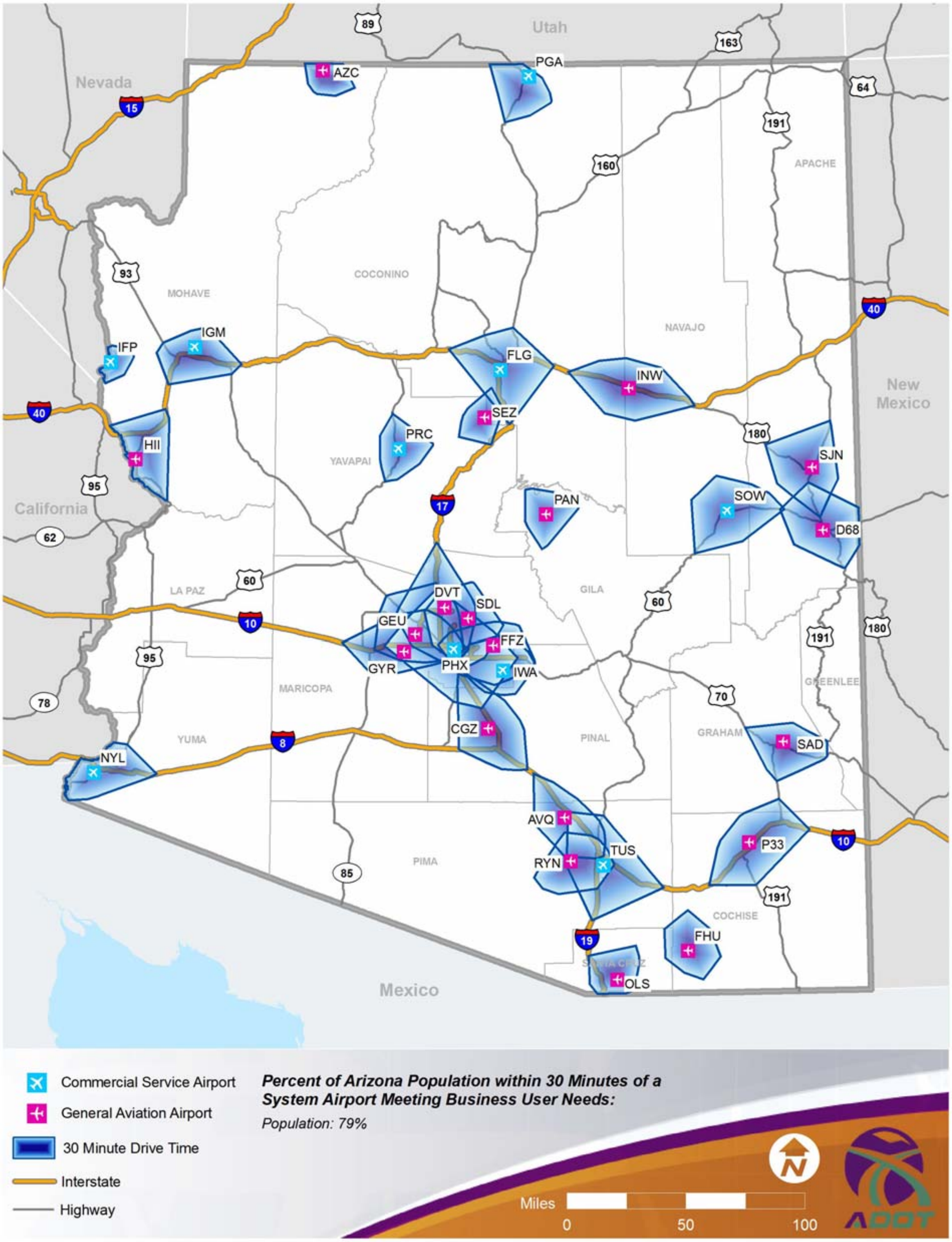
Associated City	*Airport Name*	*>5.000' Runway*	*Instrument Approach*	*Jet Fuel*	*Terminal*	*Ground Transportation*	*Compliant*
Commercial Service							
Bullhead City	Laughlin/Bullhead Intl	X	X	X	X	X	Yes
Flagstaff	Flagstaff Pulliam	X	X	X	X	X	Yes
Grand Canyon	Grand Canyon National Park	X	X	X	X		
Kingman	Kingman	X	X	X	X	X	Yes
Mesa	Phoenix-Mesa Gateway	X	X	X	X	X	Yes
Page	Page	X	X	X	X	X	Yes
Peach Springs	Grand Canyon West	X			X		
Phoenix	Phoenix Sky Harbor Intl	X	X	X	X	X	Yes
Prescott	Ernest A. Love Field	X	X	X	X	X	Yes
Show Low	Show Low Regional	X	X	X	X	X	Yes
Tucson	Tucson International	X	X	X	X	X	Yes
Yuma	Yuma International	X	X	X	X	X	Yes
Reliever							
Chandler	Chandler Municipal		X	X	X	X	
Glendale	Glendale Municipal	X	X	X	X	X	Yes
Goodyear	Phoenix Goodyear	X	X	X	X	X	Yes
Marana	Marana Regional	X	X	X	X	X	Yes
Mesa	Falcon Field	X	X	X	X	X	Yes
Phoenix	Phoenix Deer Valley	X	X	X	X	X	Yes
Scottsdale	Scottsdale	X	X	X	X	X	Yes
Tucson	Ryan Field	X	X	X	X	X	Yes
GA-Community							
Benson	Benson Municipal			X	X	X	
Buckeye	Buckeye Municipal	X		X	X		
Carefree	Sky Ranch at Carefree			X	X		
Casa Grande	Casa Grande Municipal	X	X	X	X	X	Yes
Chandler	Memorial Airfield	X			X		
Chandler	Stellar Airpark		X	X		X	
Colorado City	Colorado City Municipal	X	X	X	X	X	Yes
Coolidge	Coolidge Municipal	X	X	X	X		
Cottonwood	Cottonwood				X	X	
Douglas	Douglas Municipal	X		X	X		
Eloy	Eloy Municipal			X			
Grand Canyon	Grand Canyon Valle		X	X	X	X	
Holbrook	Holbrook Municipal	X			X	X	
Lake Havasu City	Lake Havasu City	X	X	X	X	X	Yes
Marana	Pinal Airpark	X		X		X	
Nogales	Nogales International	X	X	X	X	X	Yes
Parker	Avi Suquilla	X	X	X	X		
Payson	Payson	X	X	X	X	X	Yes
Peoria	Pleasant Valley				X		
Safford	Safford Regional	X	X	X	X	X	Yes
Sedona	Sedona	X	X	X	X	X	Yes
Sierra Vista	Sierra Vista Municipal	X	X	X	X	X	Yes
Springerville	Springerville Municipal	X	X	X	X	X	Yes

Figure 6-41: Airport Compliance to Meeting Business User Needs (Continued)

Associated City	*Airport Name*	*>5.000' Runway*	*Instrument Approach*	*Jet Fuel*	*Terminal*	*Ground Transportation*	*Compliant*
GA-Community							
St Johns	St Johns Industrial Air Park	X	X	X	X	X	Yes
Taylor	Taylor	X	X		X	X	
Wickenburg	Wickenburg Municipal	X		X	X	X	
Willcox	Cochise County	X	X	X	X	X	Yes
Williams	H.A. Clark Memorial Field	X			X		
Winslow	Winslow-Lindbergh Regional	X	X	X	X	X	Yes
GA-Rural							
Ajo	Eric Marcus Municipal						
Bisbee	Bisbee Municipal	X			X	X	
Bullhead City	Sun Valley						
Chinle	Chinle Municipal	X					
Clifton/Morenci	Greenlee County				X		
Douglas	Cochise College	X			X		
Douglas Bisbee	Bisbee Douglas Intl	X	X	X	X		
Gila Bend	Gila Bend Municipal	X			X		
Globe	San Carlos Apache	X	X			X	
Kayenta	Kayenta	X					
Kearny	Kearny						
Marble Canyon	Marble Canyon						
Maricopa	Estrella Sailport				X		
Peach Springs	Grand Canyon Caverns	X				X	
Phoenix	Phoenix Regional						
Polacca	Polacca						
San Luis	Rolle Airfield						
San Manuel	San Manuel/Ray/Blair				X	X	
Seligman	Seligman						
Temple Bar	Temple Bar						
Tuba City	Tuba City	X					
Tucson	La Cholla Airpark						
Whiteriver	Whiteriver	X				X	
Window Rock	Window Rock	X	X		X	X	
GA-Basic							
Aguila	Eagle Roost						
Bagdad	Bagdad						
Cibecue	Cibecue						
Meadview	Pearce Ferry						
Peach Springs	Hualapai						
Rimrock	Rimrock					X	
Sells	Sells	X					
Superior	Superior Municipal						
Tombstone	Tombstone Municipal					X	
Whitmore	Grand Canyon Bar Ten Airstrip						

Source: *Airport Inventory & Data Survey* 2008

Figure 6-42: 30-Minute Drive Times of System Airports Meeting Business User Needs



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

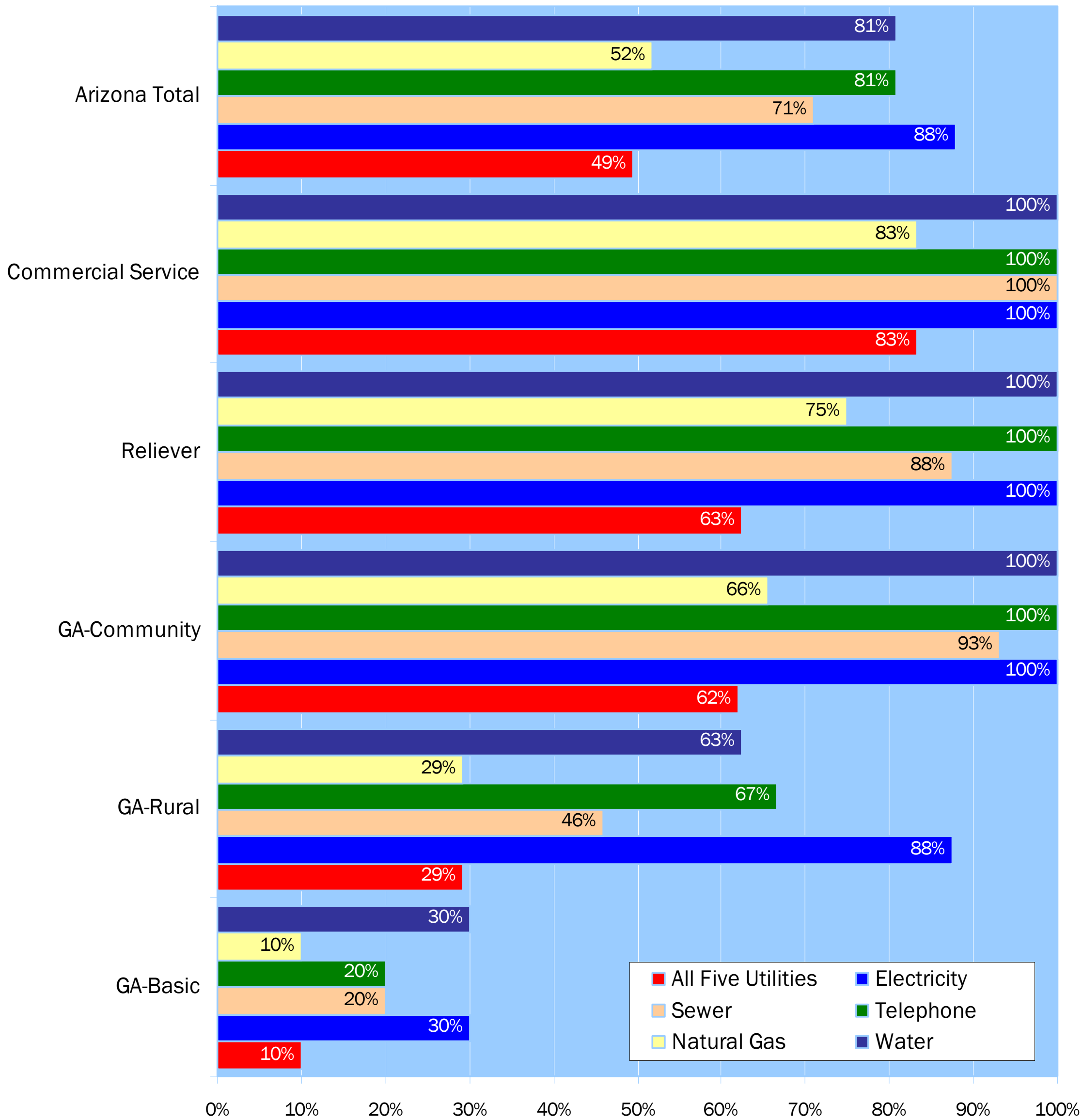
Number of airports having adequate utilities (electricity, telephone, water, sewer, and natural gas)

Having adequate utilities at an airport is important for several reasons. Commercial service and general aviation passengers rely on utilities for comfort and convenience while waiting for flights. Utilities can be a large determining factor for businesses deciding on which airport to locate. Adequate available utilities can also be a determining factor for pilots when choosing an airport at which to base their aircraft. In the *Airport Inventory and Data Survey 2008,* managers were asked the availability of five utilities at their airports: electricity, sewer (or septic), telephone, natural gas, and water.

Figure 6-43 shows the availability of these utilities at Arizona airports by role category, and also the percentage of each role that has all five utilities. With the exception of gas, all Commercial Service airports have all five of these utilities. All airports in the Commercial Service, Reliever, and GA-Community categories have water, telephone, and electricity. Statewide, 49 percent of system airports have all five of these utilities. Eighty-eight percent have electricity, 81 percent have water, 81 percent also have telephone, 71 percent have sewer, and 52 percent have natural gas.

In the SANS 2000, utilities were only shown for secondary airports. The SANS listed 29 secondary airports that did not have adequate utilities. By making the assumption that the three non-Reliever GA roles are "secondary" airports, the SASP concludes that 27 airports are without adequate utilities. However, five airports that were without adequate utilities in the SANS now meet all SASP requirements for airport utilities. These airports are Grand Canyon West, Pleasant Valley in Peoria, San Manuel/Ray/Blair, Sedona, and H.A. Clark Memorial Field in Williams.

Figure 6-43: Percent of Airports by Role Having Adequate Airport Utilities



Source: *Airport Inventory & Data Survey 2008*

Percent of airports with a PCI of 70 or greater

The development and maintenance of paved surfaces at all system airports requires significant and continual investment. ADOT has determined that maintaining runway pavements to a certain standard helps to prevent major costly runway reconstruction projects. In 2000, ADOT underwent an effort to improve and maintain aviation pavement infrastructure throughout the state. A study conducted by Applied Pavement Technology, Inc. resulted in the Arizona Airport Pavement Management System (APMS) and the on-going Arizona Pavement Preservation Program (APPP). The APMS program is designed to provide ADOT with cost-effective procedures for setting priorities and schedules, allocating resources, and providing specific recommendations to maintain acceptable pavement conditions in the airport system. The ADOT Aeronautics Division uses the APMS each year to identify necessary pavement upgrades and repairs within the airport system.

In Arizona, a pavement condition index (PCI) is available for primary runways and all pavement averages (including all runways, taxiways, and apron areas). The measure set is that runways should have a PCI grade of 70 or greater. Pavement condition indexes were available for 52 SASP airports. Five airports had unpaved runways, and thus, no PCI. Of the remaining, 10 are privately-owned airports and 13 are owned by Native American tribes. Figure 6-44 details the availability and ratings of PCIs at SASP airports. If a PCI index was not available at an airport, ownership or runway type was included in the columns. Some other airports have their own pavement management programs and therefore a PCI was not available for this study.

Figure 6-44: PCI Ratings at Individual Airports

Associated City	*Airport Name*	*ID*	*Average 2006 PCI*	*Primary Runway PCI*	*Average PCI Compliance*	*Primary Runway PCI Compliance*
Commercial Service						
Bullhead City	Laughlin/Bullhead International	IFP	77	57	Yes	No
Flagstaff	Flagstaff Pulliam	FLG	89	99	Yes	Yes
Grand Canyon	Grand Canyon National Park	GCN	94	94	Yes	Yes
Kingman	Kingman	IGM	77	82	Yes	Yes
Mesa	Phoenix-Mesa Gateway	IWA	87	83	Yes	Yes
Page	Page	PGA	80	72	Yes	Yes
Peach Springs	Grand Canyon West	1G4	Native	Native	NA	NA
Phoenix	Phoenix Sky Harbor International	PHX	87	97	Yes	Yes
Prescott	Ernest A. Love Field	PRC	89	97	Yes	Yes
Show Low	Show Low Regional	SOW	84	92	Yes	Yes
Tucson	Tucson International	TUS	NA	NA	Yes*	Yes*
Yuma	Yuma International	NYL	77	NA	Yes	Yes*
Reliever						
Chandler	Chandler Municipal	CHD	92	82	Yes	Yes
Glendale	Glendale Municipal	GEU	81	96	Yes	Yes
Goodyear	Phoenix Goodyear	GYR	76	85	Yes	Yes
Marana	Marana Regional	AVQ	82	85	Yes	Yes
Mesa	Falcon Field	FFZ	81	82	Yes	Yes
Phoenix	Phoenix Deer Valley	DVT	78	94	Yes	Yes
Scottsdale	Scottsdale	SDL	93	72	Yes	Yes
Tucson	Ryan Field	RYN	75	84	Yes	Yes
GA-Community						
Benson	Benson Municipal	E95	98	94	Yes	Yes
Buckeye	Buckeye Municipal	BXK	79	90	Yes	Yes
Carefree	Sky Ranch at Carefree	18AZ	Private	Private	NA	NA
Casa Grande	Casa Grande Municipal	CGZ	82	64	Yes	No
Chandler	Memorial Airfield	34AZ	Private	Private	NA	NA
Chandler	Stellar Airpark	P19	Private	Private	NA	NA
Colorado City	Colorado City Municipal	AZC	80	62	Yes	No
Coolidge	Coolidge Municipal	P08	74	77	Yes	Yes
Cottonwood	Cottonwood	P52	80	90	Yes	Yes
Douglas	Douglas Municipal	DGL	87	74	Yes	Yes
Eloy	Eloy Municipal	E60	91	100	Yes	Yes
Grand Canyon	Grand Canyon Valle	40G	Private	Private	NA	NA
Holbrook	Holbrook Municipal	P14	86	86	Yes	Yes
Lake Havasu City	Lake Havasu City	HII	80	80	Yes	Yes
Marana	Pinal Airpark	MZJ	58	59	No	No
Nogales	Nogales International	OLS	83	100	Yes	Yes
Parker	Avi Suquilla	P20	Native	Native	NA	NA
Payson	Payson	PAN	88	97	Yes	Yes
Peoria	Pleasant Valley	P48	Unpaved	Unpaved	-	-
Safford	Safford Regional	SAD	86	74	Yes	Yes
Sedona	Sedona	SEZ	81	99	Yes	Yes

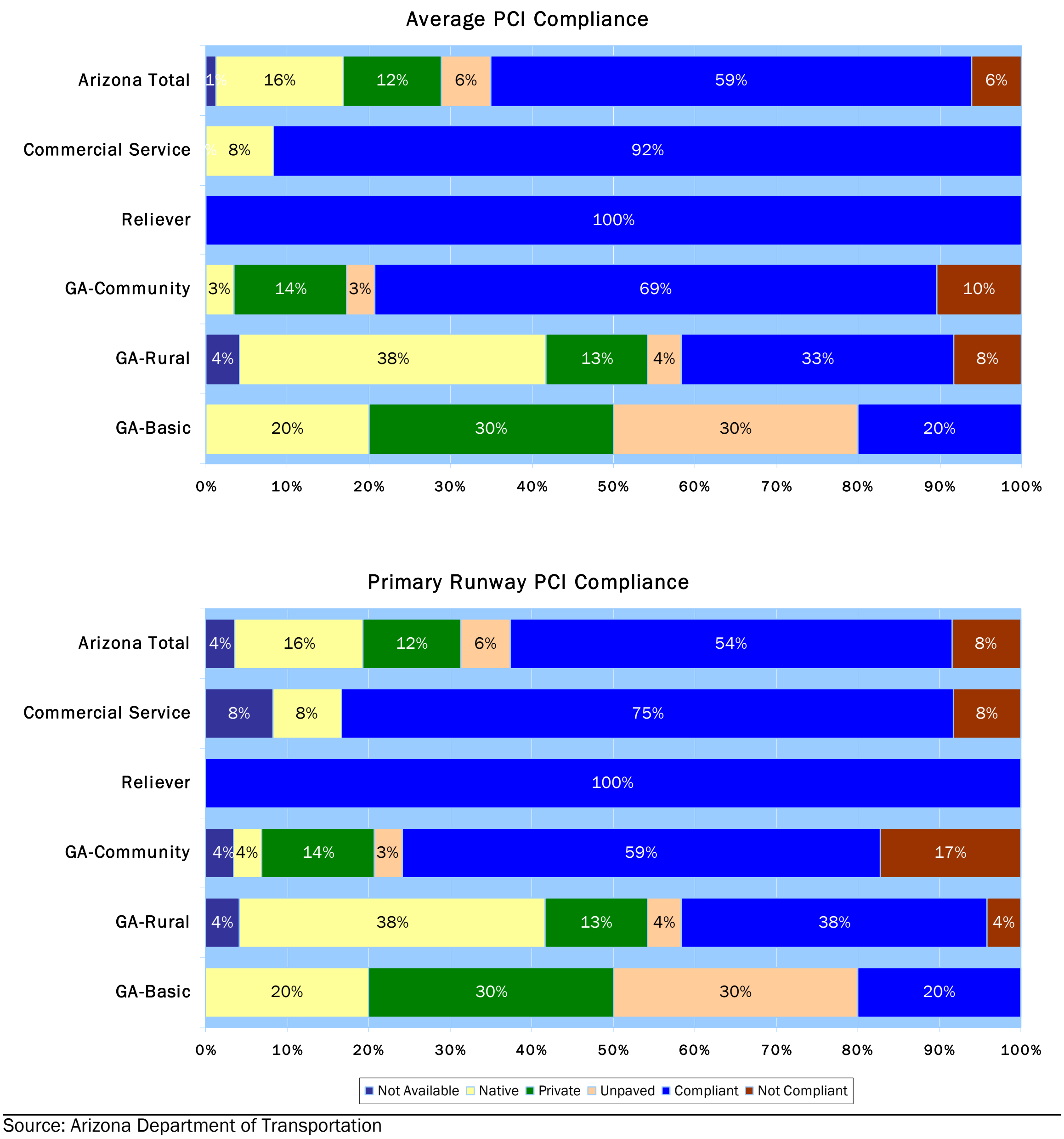
Figure 6-44: PCI Ratings at Individual Airports (Continued)

Associated City	*Airport Name*	*ID*	*Average 2006 PCI*	*Primary Runway PCI*	*Average PCI Compliance*	*Primary Runway PCI Compliance*
Sierra Vista	Sierra Vista Municipal	FHU	97	NA	Yes	NA
Springerville	Springerville Municipal	D68	77	65	Yes	No
St Johns	St Johns Industrial Air Park	SJN	70	96	Yes	Yes
Taylor	Taylor	TYL	86	82	Yes	Yes
Wickenburg	Wickenburg Municipal	E25	85	79	Yes	Yes
Willcox	Cochise County	P33	62	78	No	Yes
Williams	H.A. Clark Memorial Field	CMR	81	92	Yes	Yes
Winslow	Winslow-Lindbergh Regional	INW	69	67	No	No
GA-Rural						
Ajo	Eric Marcus Municipal	P01	79	85	Yes	Yes
Bisbee	Bisbee Municipal	P04	75	71	Yes	Yes
Bullhead City	Sun Valley	A20	Native	Native	NA	NA
Chinle	Chinle Municipal	E91	Native	Native	NA	NA
Clifton/Morenci	Greenlee County	CFT	72	83	Yes	Yes
Douglas	Cochise College	P03	59	70	No	Yes
Douglas Bisbee	Bisbee Douglas International	DUG	55	100	No	Yes
Gila Bend	Gila Bend Municipal	E63	87	73	Yes	Yes
Globe	San Carlos Apache	P13	Native	Native	NA	NA
Kayenta	Kayenta	0V7	Native	Native	NA	NA
Kearny	Kearny	E67	75	71	Yes	Yes
Marble Canyon	Marble Canyon	L41	Private	Private	NA	NA
Maricopa	Estrella Sailport	E68	Private	Private	NA	NA
Peach Springs	Grand Canyon Caverns	L37	Unpaved	Unpaved	-	-
Phoenix	Phoenix Regional	A39	Native	Native	NA	NA
Polacca	Polacca	P10	Native	Native	NA	NA
San Luis	Rolle Airfield	44A	77	67	Yes	No
San Manuel	San Manuel/Ray/Blair	E77	90	82	Yes	Yes
Seligman	Seligman	P23	85	86	Yes	Yes
Temple Bar	Temple Bar	U30	NA	NA	NA	NA
Tuba City	Tuba City	T03	Native	Native	NA	NA
Tucson	La Cholla Airpark	57AZ	Private	Private	NA	NA
Whiteriver	Whiteriver	E24	Native	Native	NA	NA
Window Rock	Window Rock	RQE	Native	Native	NA	NA
GA-Basic						
Aguila	Eagle Roost	27AZ	Private	Private	NA	NA
Bagdad	Bagdad	E51	78	99	Yes	Yes
Cibecue	Cibecue	Z95	Unpaved	Unpaved	-	-
Meadview	Pearce Ferry	L25	Unpaved	Unpaved	-	-
Peach Springs	Hualapai	3AZ5	Native	Native	NA	NA
Rimrock	Rimrock	48AZ	Private	Private	NA	NA
Sells	Sells	E78	Native	Native	NA	NA
Superior	Superior Municipal	E81	Unpaved	Unpaved	-	-
Tombstone	Tombstone Municipal	P29	87	100	Yes	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	1Z1	Private	Private	NA	NA

Sources: Arizona Department of Transportation, Phoenix Sky Harbor International Airport, Tucson International Airport
Notes: NA=not available. *Exact PCIs for Tucson International pavements and Yuma International primary runway pavement were not available. However, it was confirmed with these airports that PCIs were greater than 70.

Figure 6-45 summarizes all pavement average and primary runway PCI status and availability at all SASP airports. Fifty-four airports had an available average pavement PCI. Of these, 49 had a PCI of at least 70. Of all SASP airports, six percent of all pavement averages were listed as unpaved, 12 percent were privately-owned, 16 percent owned by Native American communities, and one percent unavailable for other reasons. Of the 52 airports for which a primary runway PCI was available, 45 had an index of at least 70. Of all SASP airports, six percent of primary runways were unpaved, 12 percent were privately-owned, 16 percent were unavailable due to being Native-owned, and four percent were unavailable for other reasons.

Figure 6-45: Percent of Airports Meeting PCI Compliance and Reasons for Unavailability of Pavement Condition



Source: Arizona Department of Transportation

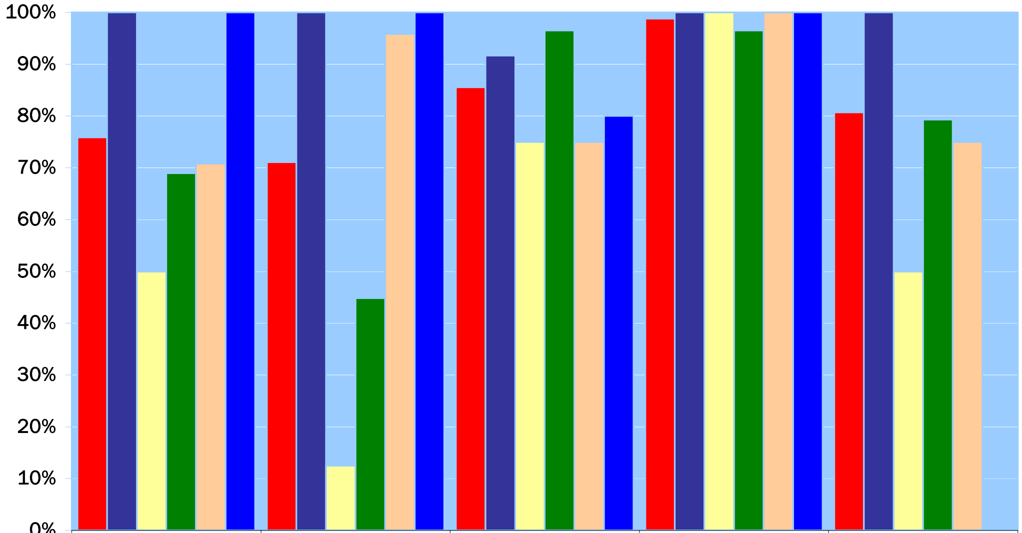
Percent of airports meeting minimum facility and service objectives

The evaluation of airports meeting minimum facility and service objectives measures the ability of each airport and airport role to satisfy the objectives determined in Chapter Five. In order for airports to completely fulfill their respective roles in the system, the established facility and service objectives should be met at a minimum but can be exceeded. The specific facilities and services needed at each airport depend on the role that the airport plays, with more extensive facilities needed at airports that serve larger, more sophisticated aircraft.

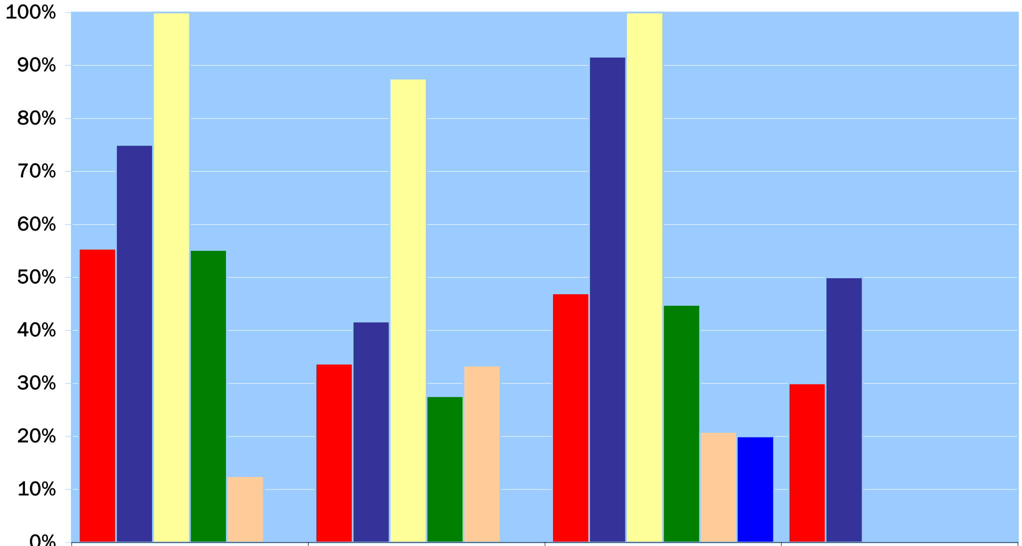
It is important to note that the purpose of the SASP is to provide ADOT Aeronautics Division with a clear assessment of airport needs in the state. Facility and service deficiencies identified in this analysis do not necessarily indicate that an airport should or must meet that objective during or beyond the planning period. From an FAA or state funding standpoint, projects must be included and justified in an airport-specific study in order to be eligible for FAA and state participation. Projects must be identified on an ALP and appropriate environmental analyses must be prepared prior to consideration for funding. While the SASP analysis is considered in the overall context of FAA review, justification for airport-specific projects must be provided to gain FAA and state funding approval.

Figure 6-46 summarizes the current compliance within each role category for facility and service objectives as well as the overall system. In the instance where no specific objective has been established for a role category, the corresponding data has been left blank. A complete, detailed analysis has been performed and is included in Appendix B. In some cases airports in a given role may not currently meet their objectives. These facility and service objectives serve as guidelines for the airport system as a whole to strive for when the means for compliance exists.

Figure 6-46: Summary of Facility and Service Objectives Compliance

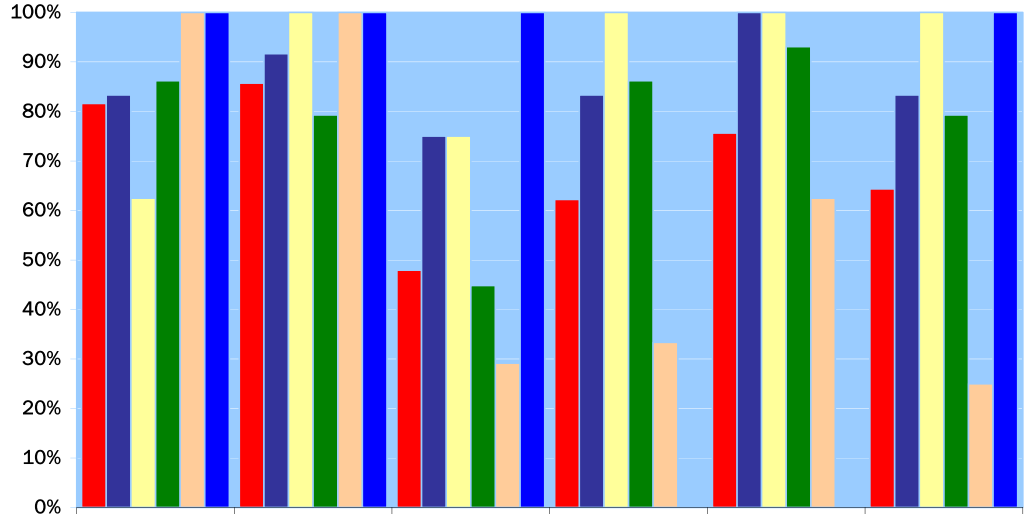


	ARC	Primary Runway Length	Primary Runway Width	Runway Surface	Taxiway
Arizona Total	76%	71%	86%	99%	81%
Commercial Service	100%	100%	92%	100%	100%
Reliever	50%	13%	75%	100%	50%
GA-Community	69%	45%	97%	97%	79%
GA-Rural	71%	96%	75%	100%	75%
GA-Basic	100%	100%	80%	100%	

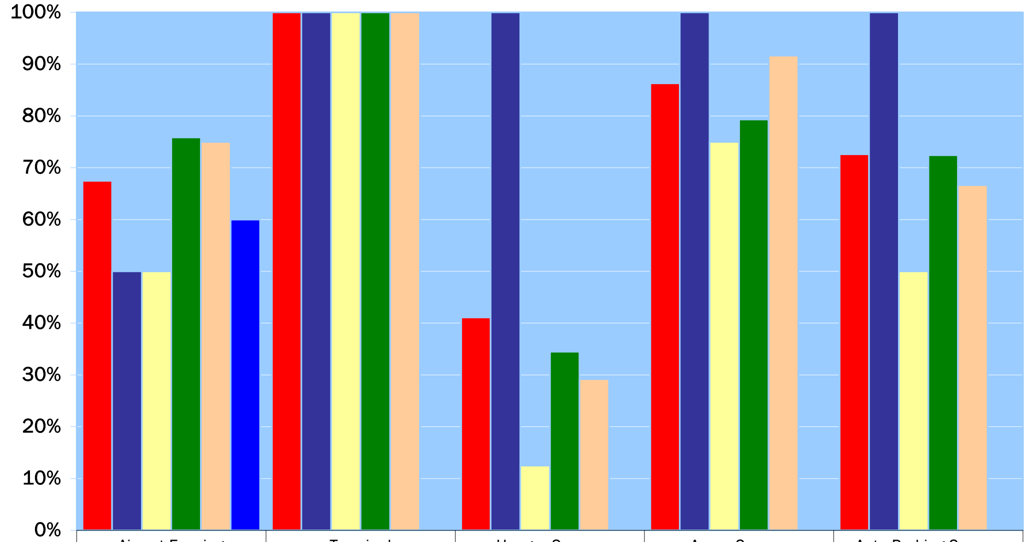


	Approach	Visual Aids	Lighting	ALS
Arizona Total	55%	34%	47%	30%
Commercial Service	75%	42%	92%	50%
Reliever	100%	88%	100%	0%
GA-Community	55%	28%	45%	
GA-Rural	13%	33%	21%	
GA-Basic		0%	20%	

Figure 6-46: Summary of Facility and Service Objectives Compliance (Continued)



	FBO	Maintenance	Ground Transportation	Phone	Restroom	Fuel
Arizona Total	82%	86%	48%	62%	76%	64%
Commercial Service	83%	92%	75%	83%	100%	83%
Reliever	63%	100%	75%	100%	100%	100%
GA-Community	86%	79%	45%	86%	93%	79%
GA-Rural	100%	100%	29%	33%	63%	25%
GA-Basic	100%	100%	100%	0%	0%	100%



	Airport Fencing	Terminal	Hangar Spaces	Apron Spaces	Auto Parking Spaces
Arizona Total	67%	100%	41%	86%	73%
Commercial Service	50%	100%	100%	100%	100%
Reliever	50%	100%	13%	75%	50%
GA-Community	76%	100%	34%	79%	72%
GA-Rural	75%	100%	29%	92%	67%
GA-Basic	60%				

Sources: *Airport Inventory & Data Survey* 2008, Arizona Department of Transportation, Wilbur Smith Associates

GOAL CATEGORY: SAFETY AND STANDARDS

One of the most important characteristics of a good airport system is the system's ability to meet applicable design and safety standards. Generally speaking, when airports in any system comply with such standards, this helps to promote a system of safe and efficient airports. While each airport's ability to meet standards is primarily a master planning issue, it is important for the SASP to provide at least a general overview of the system's ability to conform to appropriate standards. The following performance measures are used to evaluate the system:

- Percent of airports with clear approaches to primary runway ends
- Percent of airports that have a written emergency response plan
- Percent of airports with adopted Security Plans
- Percent of airports with adopted Wildlife Management Plans
- Airports controlling runway end Runway Protection Zones (RPZs) on their primary runway
- Percent of airports that meet runway/taxiway separation criteria for their current ARC
- Percent of airports that have procedures in place to conduct self-inspections on a regular basis
- Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability
- Percent of airports that support search and rescue operations
- Percent of airports that support aerial fire fighting operations
- Percent of airports that support life flight activities

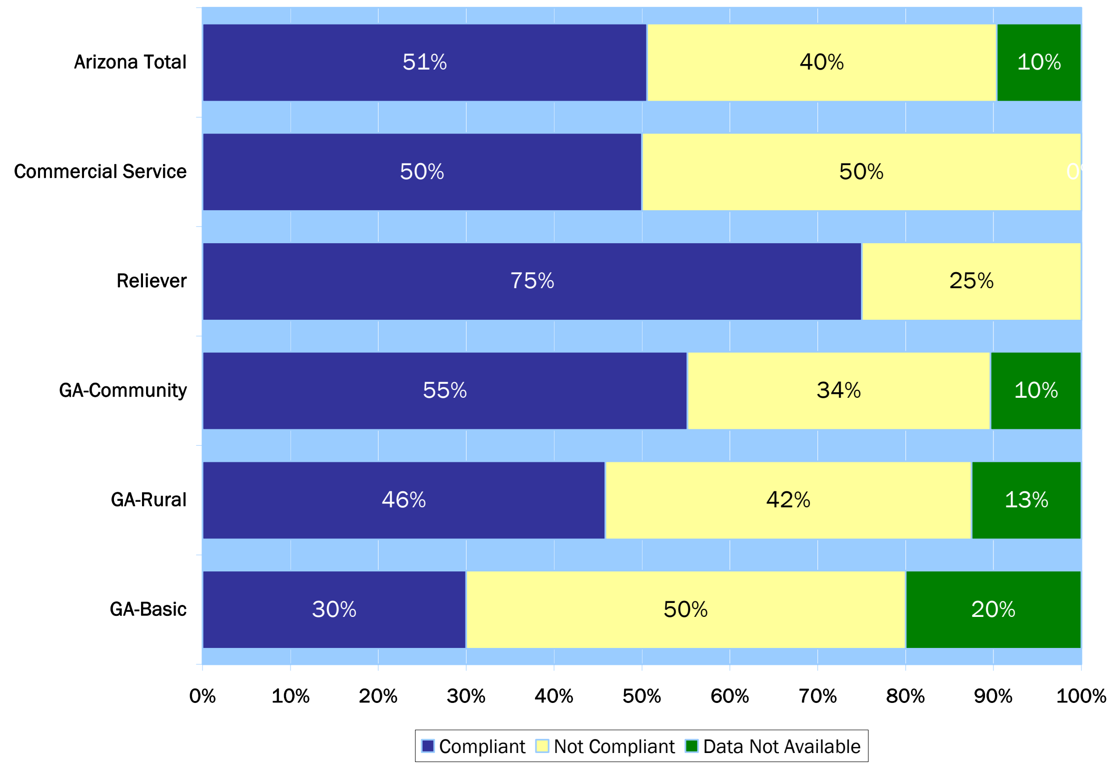
The results of the system evaluation for these performance measures related to the standards/safety performance measure are discussed in the following sections.

Percent of airports with clear approaches to primary runway ends

FAA Form 5010, the Airport Master Record, maintains records of approach slopes and obstructions at airports throughout the country. An optimal and actual glide slope is given, as well as details on existing obstructions. Figure 6-47 displays the percent of airports by role category that meet their optimal approach slope as defined in Form 5010. In total, 46 percent of all SASP airports meet optimal approaches and are free of obstructions. By role, 50 percent of Commercial Service, 75 percent of Reliever, 48 percent of GA-Community, 46 percent of GA-Rural, and 10 percent of GA-Basic meet their optimal approach slope. This data was not available for 11 percent of SASP airports, and in the GA-Basic category alone it was not available for 40 percent. Chapter Seven will provide more detail concerning the obstructions at specific airports, and which airports may be capable of reaching the optimal approach slope identified for the airports.

One way airports can ensure that their runway approaches remain clear is by creating programs or plans designed to remove or keep vegetation and other obstructions from becoming a problem in the runway approach. Airspace is defined and delineated by a set of geometric surfaces referred to as "imaginary surfaces." These surfaces extend outward and upward from airport runways. Imaginary surfaces identify the maximum acceptable height of objects beneath and within surface boundaries. While manmade and terrain obstructions cannot always be removed, obstructions in runway approaches related to vegetation (particularly trees) can usually be resolved if the airport has and adheres to a vegetation management plan. Airport managers were asked if their airport had adopted a vegetation management plan or any other obstruction removal plan. Fourteen percent of airports in the system reported an active obstruction or vegetation management plan.

Figure 6-47: Percent of Airports by Role Meeting Optimal Approach Slopes on their Primary Runways



Source: FAA Form 5010, Airport Master Record

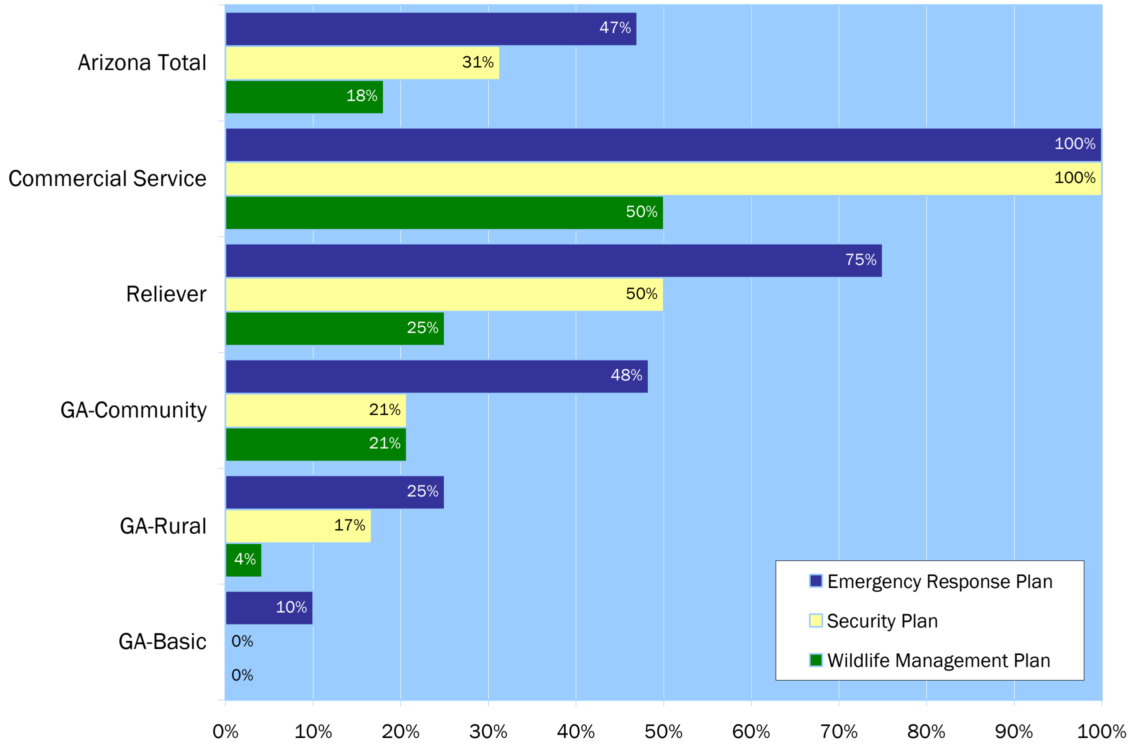
Percent of airports with adopted Safety and Security Planning

Figure 6-48 displays the percentages of airports in each role category that have adopted security plans, wildlife management plans, and emergency response plans. The following sections discuss each plan in more detail.

Percent of airports that have a written emergency response plan

An emergency response plan at an airport is developed to facilitate the efficient and appropriate response to natural or man-made emergencies occurring on or near an airport. Each plan lists potential emergencies at specific airports, and creates response scenarios for each. Figure 6-48 shows the percentage of airports by role category that has adopted an emergency response plan. Statewide, 47 percent of SASP airports have an emergency response plan. All Commercial Service, 75 percent of Reliever, and 48 percent of GA-Community airports have adopted an emergency response plan.

Figure 6-48: Percent of Airports by Role Having Safety and Security Planning



Source: *Airport Inventory & Data Survey* 2008

Percent of airports with adopted Security Plans

An airport security plan is an important document in maintaining security for the airport, the surrounding community, as well as the region, state, and world. A security plan organizes communication between airport tenants and managers, and local law enforcement. The plan also creates a list of suspicious activities that should be reported, and increases awareness of security issues at individual airports. In the entire system, 31 percent of airports have an adopted security plan. All Commercial Service airports reported having a security plan, as did 50 percent of Relievers. Less than 25 percent in each general aviation role category (non-Reliever) reported having an adopted security plan in place.

Percent of airports with adopted Wildlife Management Plans

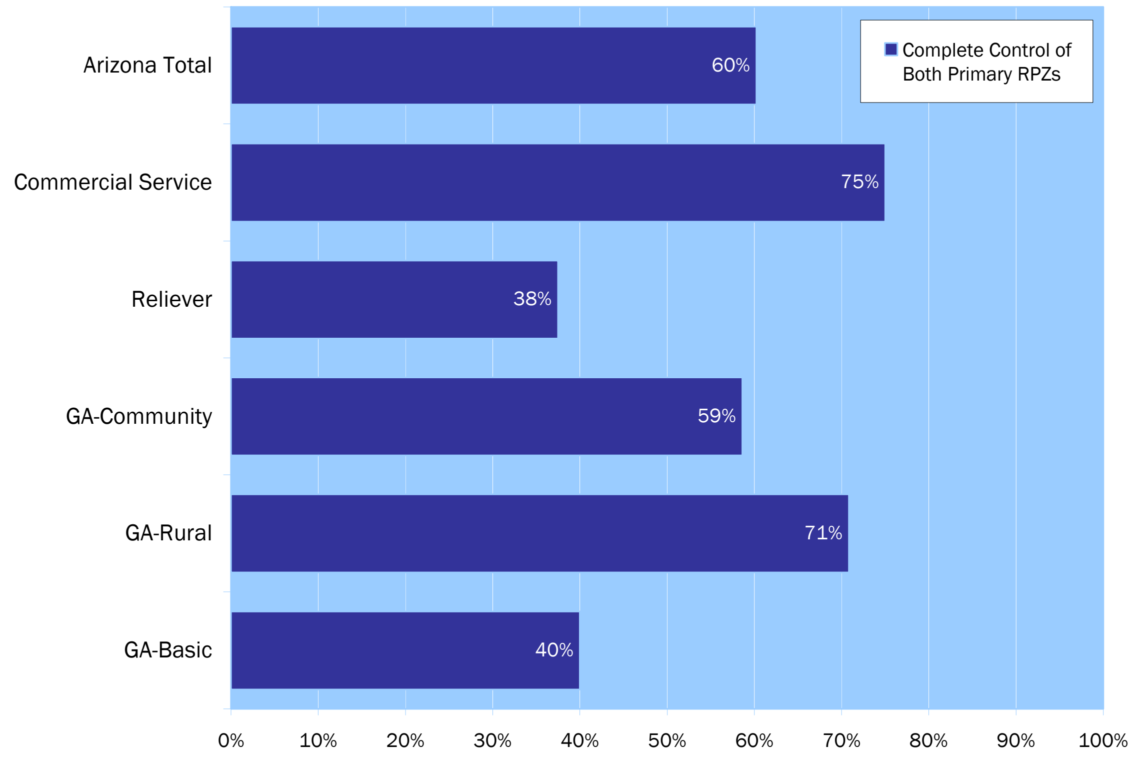
Various animals can often appear on an active airport runway, endangering aircraft, their occupants, and the wildlife. Given the rural nature of many of Arizona's airports, this is a frequent concern. An airport wildlife management plan focuses on assessing the risks that local wildlife may present to the airport, and vice versa, as well as creating a plan to mitigate these risks. Statewide, only 18 percent of airports included in the SASP have a wildlife management plan. Fifty percent of Commercial Service airports, 25 percent of Relievers, and 21 percent of GA-Community airports have an adopted wildlife management plan.

Airports controlling Runway Protection Zones (RPZs) on their primary runways

The FAA defines the RPZ as a trapezoidal area that is centered on the extended runway centerline. The function of the RPZ is to enhance the protection of people and property on the ground. Having control of the RPZ is critical to ensuring inappropriate development does not take place in the runway approaches. Airport managers were asked if they controlled their airport RPZs through either fee simple (ownership) or by means of an avigation easement. Having either of these control mechanisms at all runway ends fulfills this performance measure.

Figure 6-49 presents SASP airports by role categories that have complete control of the RPZs on both ends of their primary runway as identified by the airports. If an airport controls 100 percent of the RPZ through either fee simple or easement, it is considered complete control. Statewide, 60 percent of SASP airports control both ends by either fee simple or easement. Seventy-five percent of Commercial Service airports have complete control of their primary RPZs. Only 38 percent of Reliever airports have complete control, whereas 59 percent of GA-Community and 71 percent of GA-Rural airports have complete control of their RPZs.

Figure 6-49: Percent of Airports by Role Having Complete Control of Both Primary Runway Protection Zones



Source: *Airport Inventory & Data Survey* 2008

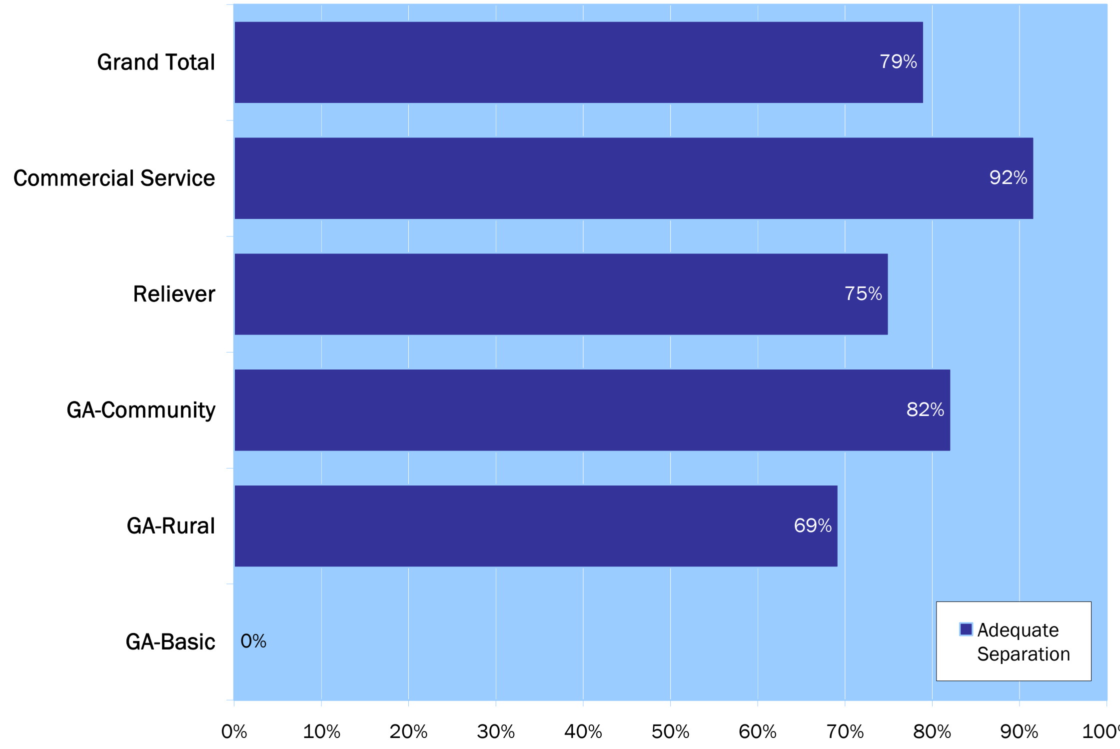
Percent of airports that meet runway/taxiway separation criteria for their current ARC

Airports in the NPIAS are encouraged by the FAA to meet all applicable design and development standards. In its advisory circulars, the FAA provides specific guidance on which standards are applicable to each airport. The most demanding aircraft that operates at the airport on a regular basis (500 operations per year) determines each airport's individual design. This aircraft is known as the airport's critical aircraft.

Once an airport's critical aircraft is established during the development of an airport master plan or ALP, applicable design standards are identified. Each airport's design standards are related to the approach speed and wingspan of its critical aircraft. Within FAA's planning guidelines, these two parameters are used to determine each airport's reference code (ARC). Each system airport's ARC was presented in Chapter Three, Figure 3-7.

Figure 6-50 summarizes airports by role category that meet runway/taxiway separation criteria for their current ARC. These compliance percentages include only the 62 SASP airports which have at least a partial parallel taxiway. Of these, 79 percent of the airports have adequate runway to taxiway separation. By role, this includes 92 percent of Commercial Service, 75 percent of Reliever, 82 percent of GA-Community, and 69 percent of GA-Rural airports.

Figure 6-50: Percent of Airports by Role that Meet Runway/Taxiway Separation Criteria for their Current ARC



Source: *Airport Inventory & Data Survey* 2008

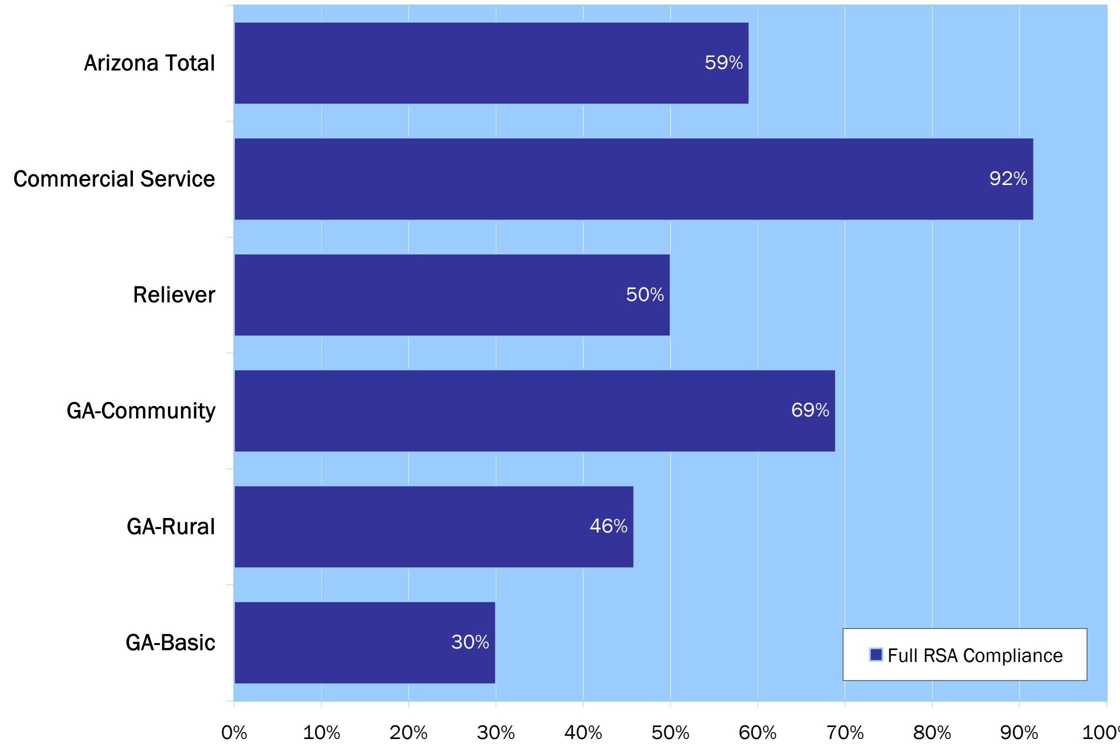
Percent of airports that have Runway Safety Areas (RSAs) on their primary runway that meet standards for their current ARC

As with the separation from runway to taxiway centerline, the dimensions for the runway safety area (RSA) are determined by each airport's ARC. The RSA is the area off each runway end that, in accordance with FAA standards, should be free and clear of any obstructions. The RSA should also be graded. The dimensions of the RSA vary based on applicable design standards. The RSA is designed to promote and increase airport safety. As with all FAA planning standards and guidelines, only federally eligible airports are required to meet FAA standards, however the guidance provided by FAA is considered to be applicable to all airports to promote safety. RSA information for this performance measure was not available for the 13 privately-owned system airports and 10 publicly-owned non-NPIAS and Native

American system airports. Therefore, this performance measure was applicable to only 60 system airports.

As shown in Figure 6-51, 59 percent of the applicable system airports meet RSA standards. By role, 92 percent of Commercial Service, 50 percent of Reliever, 69 percent of GA-Community, 46 percent of GA-Rural, and 30 percent of GA-Basic meet FAA-defined RSA safety area standards.

Figure 6-51: Percent of Airports by Role that Meet FAA RSA Standards



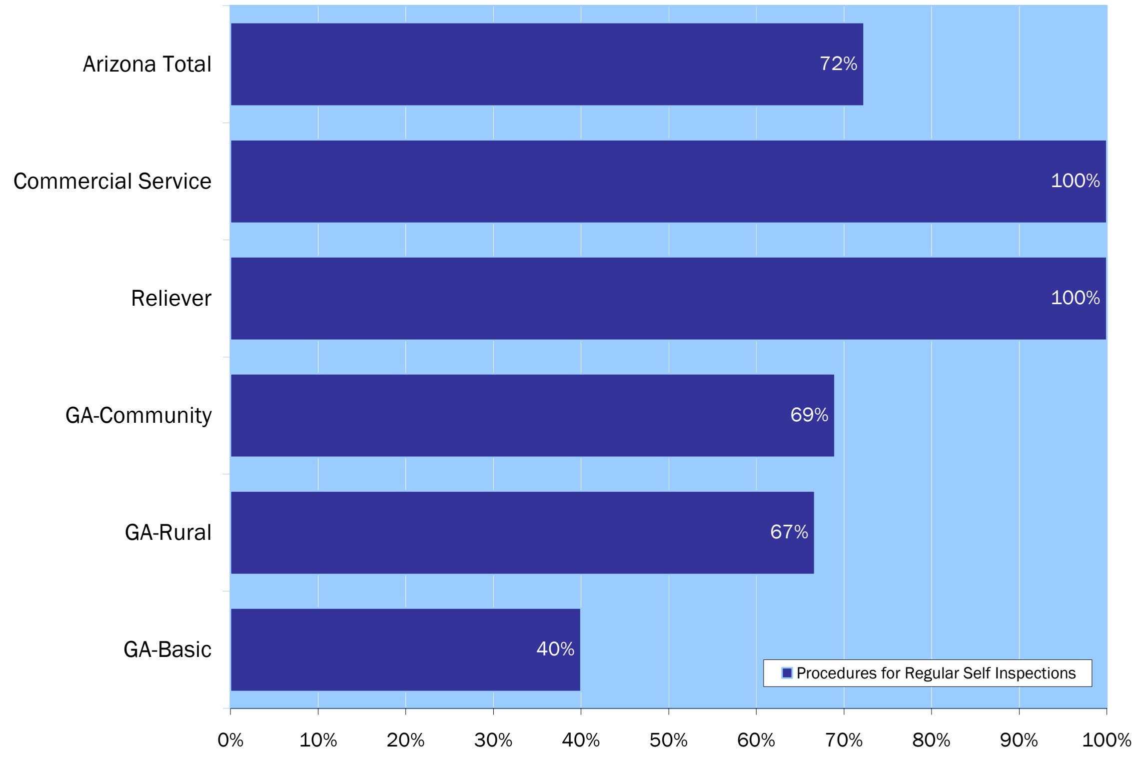
Source: *Airport Inventory & Data Survey* 2008

Percent of airports that have procedures in place to conduct self-inspections on a regular basis

For airports to operate in a safe and efficient manner, it is recommended that they have set and regular routines of self-inspection. By so doing, airports can identify any circumstances or conditions that could jeopardize the safety of aircraft operations. In its advisory circular on inspections, the FAA provides guidance on how to conduct these inspections.

In the *Airport Inventory and Data Survey* managers were asked if their airports had procedures in place to conduct self-inspections on a regular basis. Figure 6-52 shows that 72 percent of all SASP airports answered "Yes" to this question. By role, 100 percent of both Commercial Service and Reliever Airports conduct self-inspections on a regular basis, as do 69 percent of GA-Community, 67 percent of GA-Rural airports, and 40 percent of GA-Basic.

Figure 6-52: Percent of Airports by Role Having Procedures for Regular Self-Inspections



Source: *Airport Inventory & Data Survey* 2008

Figure 6-53 details these last four performance measures by individual airports.

Figure 6-53: Details of RPZ, Runway/Taxiway Separation, RSA, and Self-Inspection Performance Measures

		Runway Protection Zones					*Runway/Taxiway Separation*			
Associated City	*Airport Name*	*RWY End*	*Control*	*RWY End*	*Control*	*RPZ Compliance*	*ARC*	*Separation Compliance*	*RSA Meets ARC*	*Regular Self-Inspections*
Commercial Service										
Bullhead City	Laughlin/Bullhead International	16	BLM	34	BLM	N	C-III	Y	Y	Y
Flagstaff	Flagstaff Pulliam	3	Easement	21	Easement	Y	C-III	Y	Y	Y
Grand Canyon	Grand Canyon National Park	3	FAA-Controlled	21	FAA-Controlled	Y	C-III	Y	Y	Y
Kingman	Kingman	3	None	21	F.S.	N	C-III	Y	Y	Y
Mesa	Phoenix-Mesa Gateway	12R	F.S.	30L	F.S.	Y	D-V	Y	Y	Y
Page	Page	15	F.S.	33	F.S.	Y	B-II	Y	Y	Y
Peach Springs	Grand Canyon West	17	F.S.	35	F.S.	Y	B-II	N	Y	Y
Phoenix	Phoenix Sky Harbor International	8	F.S.	26	F.S.	Y	D-V	Y	Y	Y
Prescott	Ernest A. Love Field	12	Easement	30	F.S.	Y	C-III	Y	Y	Y
Show Low	Show Low Regional	6	F.S.	24	None	N	C-III	Y	N	Y
Tucson	Tucson International	11L	F.S.	29R	F.S.	Y	D-IV	Y	Y	Y
Yuma	Yuma International	35	F.S.	17	F.S.	Y	E-VI	Y	Y	Y
Reliever										
Chandler	Chandler Municipal	4L	Partial F.S.	4R	F.S.	N	B-II	Y	Y	Y
Glendale	Glendale Municipal	1	F.S.	19	None	N	C-II	N	N	Y
Goodyear	Phoenix Goodyear	3	F.S.	21	Partial F.S.	N	D-IV	Y	N	Y
Marana	Marana Regional	12	Partial F.S.	30	Partial F.S.	N	C-III	Y	N	Y
Mesa	Falcon Field	4R	F.S.	4L	F.S.	Y	B-II	Y	Y	Y
Phoenix	Phoenix Deer Valley	25L	F.S.	7R	F.S. & Easement	Y	C-II	Y	N	Y
Scottsdale	Scottsdale	3	Partial F.S.	21	F.S.	N	B-II	N	Y	Y
Tucson	Ryan Field	6R	F.S.	24L	F.S.	Y	B-II	Y	Y	Y
GA-Community										
Benson	Benson Municipal	10	F.S.	28	F.S.	Y	B-I	Y	Y	Y
Buckeye	Buckeye Municipal	17	F.S.	35	F.S.	Y	B-II	Y	Y	Y
Carefree	Sky Ranch at Carefree	6	F.S.	24	Displ.Threshold	Y	B-I	Y	N	Y
Casa Grande	Casa Grande Municipal	23	None	5	F.S.	N	B-II	Y	Y	Y

Figure 6-53: Details of RPZ, Runway/Taxiway Separation, RSA, and Self-Inspection Performance Measures (Continued)

		Runway Protection Zones					Runway/Taxiway Separation			
Associated City	*Airport Name*	*RWY End*	*Control*	*RWY End*	*Control*	*RPZ Compliance*	*ARC*	*Separation Compliance*	*RSA Meets ARC*	*Regular Self-Inspections*
GA-Community										
Chandler	Memorial Airfield	12	F.S.	30	F.S.	Y	D-IV	Y	N	N
Chandler	Stellar Airpark	17	None	35	None	N	B-I	N	N	Y
Colorado City	Colorado City Municipal	11	F.S.	29	F.S.	Y	B-II	Y	Y	N
Coolidge	Coolidge Municipal	5	Partial F.S.	23	Partial F.S.	N	C-II	Y	Y	N
Cottonwood	Cottonwood	14	F.S.	32	F.S.	Y	B-I	Y	Y	Y
Douglas	Douglas Municipal	21	F.S.	3	Partial F.S.	N	B-II	Y	Y	N
Eloy	Eloy Municipal	2	F.S. & Easement	20	F.S. & Easement	Y	B-II	N	Y	N
Grand Canyon	Grand Canyon Valle	19	Easement	1	Easement	Y	A-I	Y	N	Y
Holbrook	Holbrook Municipal	3	F.S.	21	None	N	B-II	N	Y	Y
Lake Havasu City	Lake Havasu City	32	F.S.	14	F.S.	Y	C-III	Y	Y	Y
Marana	Pinal Airpark	12	F.S.	30	F.S.	Y	D-V	Y	Y	Y
Nogales	Nogales International	3	F.S.	21	F.S. & Easement	Y	C-II	Y	Y	N
Parker	Avi Suquilla	1	Easement	19	F.S.	Y	C-II	Y	N	N
Payson	Payson	24	Easement	6	Easement	Y	B-II	N	Y	Y
Peoria	Pleasant Valley	05C	None	23C	None	N	A-II	NA	N	Y
Safford	Safford Regional	8	F.S.	26	Perpetual ROW	Y	B-II	Y	Y	N
Sedona	Sedona	3	None	21	None	N	B-II	Y	N	Y
Sierra Vista	Sierra Vista Municipal	8	Easement	26	Easement	Y	D-IV	Y	Y	Y
Springerville	Springerville Municipal	21	Partial F.S.	3	F.S.	N	B-II	Y	N	Y
St Johns	St Johns Industrial Air Park	32	F.S.	14	Easement	Y	B-II	N	Y	Y
Taylor	Taylor	3	None	21	F.S.	N	B-II	Y	Y	Y
Wickenburg	Wickenburg Municipal	5	None	23	None	N	B-II	Y	N	Y
Willcox	Cochise County	3	F.S.	21	Partial F.S.	N	B-II	Y	Y	Y
Williams	H.A. Clark Memorial Field	36	F.S.	18	F.S.	Y	B-II	Y	Y	N
Winslow	Winslow-Lindbergh Regional	4	Partial F.S.	22	Easement	N	C-II	Y	Y	Y

Figure 6-53: Details of RPZ, Runway/Taxiway Separation, RSA, and Self-Inspection Performance Measures (Continued)

		Runway Protection Zones					Runway/Taxiway Separation			
Associated City	*Airport Name*	*RWY End*	*Control*	*RWY End*	*Control*	*RPZ Compliance*	*ARC*	*Separation Compliance*	*RSA Meets ARC*	*Regular Self-Inspections*
GA-Rural										
Ajo	Eric Marcus Municipal	5	F.S.	32	F.S.	Y	B-I	NA	Y	Y
Bisbee	Bisbee Municipal	35	Partial F.S.	17	Easement	N	B-I	Y	Y	N
Bullhead City	Sun Valley	18	F.S.	36	F.S.	Y	A-I	N	N	Y
Chinle	Chinle Municipal	18	Easement	36	Easement	Y	B-I	NA	N	Y
Clifton/Morenci	Greenlee County	7	Easement	25	F.S.	Y	B-II	Y	Y	Y
Douglas	Cochise College	5	Partial F.S.	23	None	N	B-I	Y	Y	Y
Douglas Bisbee	Bisbee Douglas International	17	F.S.	35	F.S.	Y	B-I	Y	Y	Y
Gila Bend	Gila Bend Municipal	4	F.S. & Easement	22	F.S. & Easement	Y	B-II	Y	Y	Y
Globe	San Carlos Apache	9	Easement	27	Easement	Y	C-II	Y	Y	Y
Kayenta	Kayenta	5	Easement	23	Easement	Y	B-II	NA	Y	Y
Kearny	Kearny	26	Partial F.S.	8	Partial F.S.	N	A-I	NA	N	Y
Marble Canyon	Marble Canyon	3	None	21	None	N	A-I	N	N	Y
Maricopa	Estrella Sailport	6R	Partial F.S.	24L	Partial F.S.	N	A-I	NA	N	Y
Peach Springs	Grand Canyon Caverns	5	F.S.	23	F.S.	Y	A-I	NA	N	Y
Phoenix	Phoenix Regional	3	None	21	None	N	B-I	Y	N	N
Polacca	Polacca	4	Easement	22	Easement	Y	A-I	NA	N	N
San Luis	Rolle Airfield	17	F.S.	35	F.S.	Y	B-I	NA	Y	Y
San Manuel	San Manuel/Ray/Blair	11	F.S.	29	F.S.	Y	B-II	Y	N	Y
Seligman	Seligman	4	F.S. & Easement	22	F.S. & Easement	Y	B-I	Y	Y	Y
Temple Bar	Temple Bar	18	F.S.	36	F.S.	Y	A-I	NA	N	N
Tuba City	Tuba City	15	Easement	33	Easement	Y	B-II	NA	N	N
Tucson	La Cholla Airpark	1	None	19	None	N	B-I	N	N	N
Whiteriver	Whiteriver	1	Easement	19	Easement	Y	B-II	N	Y	N
Window Rock	Window Rock	2	Easement	20	Easement	Y	B-II	NA	N	Y

Figure 6-53: Details of RPZ, Runway/Taxiway Separation, RSA, and Self-Inspection Performance Measures (Continued)

		Runway Protection Zones					*Runway/Taxiway Separation*		*RSA*	*Regular*
Associated City	*Airport Name*	*RWY End*	*Control*	*RWY End*	*Control*	*RPZ Compliance*	*ARC*	*Separation Compliance*	*Meets ARC*	*Self-Inspections*
GA-Basic										
Aguila	Eagle Roost	17	Easement	35	Easement	Y	A-I	NA	N	N
Bagdad	Bagdad	5	F.S.	23	Easement	Y	B-I	NA	Y	Y
Cibecue	Cibecue	7	Easement	25	Easement	Y	B-II	NA	N	N
Meadview	Pearce Ferry	1	F.S.	19	F.S.	N	A-I	NA	N	N
Peach Springs	Hualapai	7	F.S.	25	F.S.	Y	A-I	NA	N	N
Rimrock	Rimrock	5	None	23	None	N	A-I	N	N	N
Sells	Sells	4	None	22	None	N	A-I	NA	N	N
Superior	Superior Municipal	22	Partial F.S.	4	Partial F.S.	N	A-I	NA	Y	Y
Tombstone	Tombstone Municipal	24	Partial F.S.	6	Partial F.S.	N	A-I	NA	Y	Y
Whitmore	Grand Canyon Bar Ten Airstrip	16	None	34	None	N	A-I	NA	N	N

Source: *Airport Inventory & Data Survey* 2008
Note: NA=not applicable

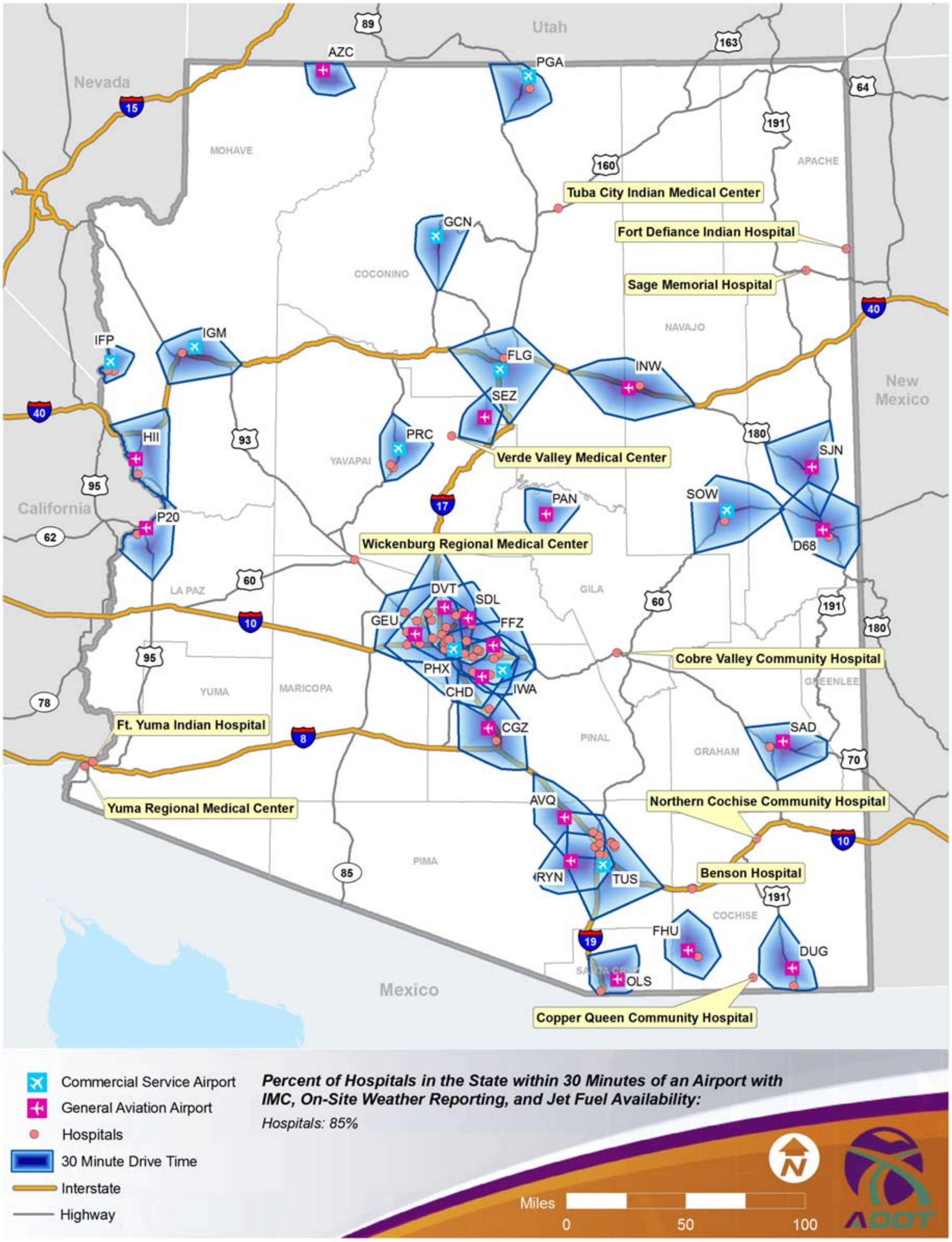
Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability

As stated previously, emergency and specialized medical care is sparse in the less densely populated areas of Arizona. It is important for emergency medical flights coming from these airports to easily access a hospital. Figure 6-54 shows airports that have IMC capability, on-site weather reporting, and the availability of jet fuel, factors considered important to medical aircraft. Statewide, 85 percent of all hospitals fall within a 30-minute drive time of at least one airport that meets these criteria. The following hospitals do not fall within a 30-minue drive of a system airport meeting this performance measure:

- Benson Hospital
- Cobre Valley Community Hospital
- Copper Queen Community Hospital
- Fort Defiance Indian Hospital
- Fort Yuma Indian Hospital
- Northern Cochise Community College
- Sage Memorial Hospital
- Tuba City Indian Medical Facility
- Verde Valley Medical Center
- Wickenburg Regional Medical Center
- Yuma Regional Medical Center

This measure was also included in the SANS 2000. In that analysis, it was stated that 82 percent of hospitals were located within a 30-minute drive time of an airport having IMC capability, on-site weather reporting, and jet fuel availability. Therefore, the performance of this measure has declined just slightly since 2000.

Figure 6-54: Hospitals in the State within 30-Minute Drive Time of a System Airport with Instrument Meteorological Conditions (IMC) Capability, On-Site Weather Reporting, and Jet Fuel Availability

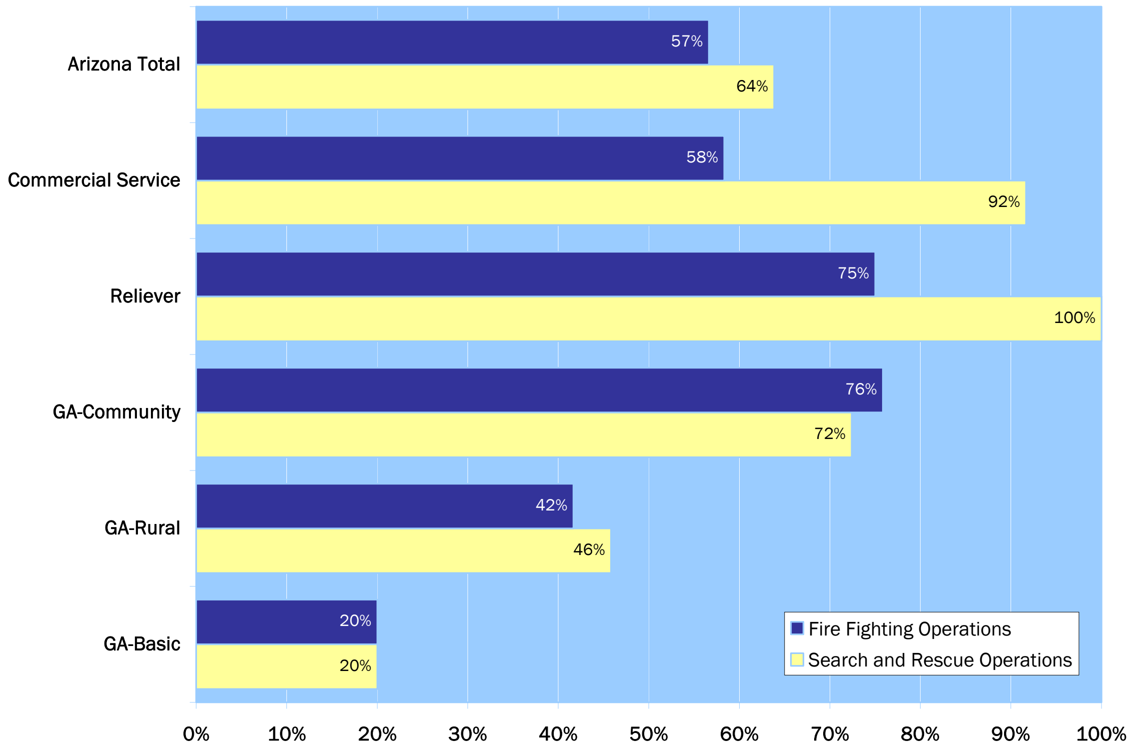


Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of airports that support emergency operations

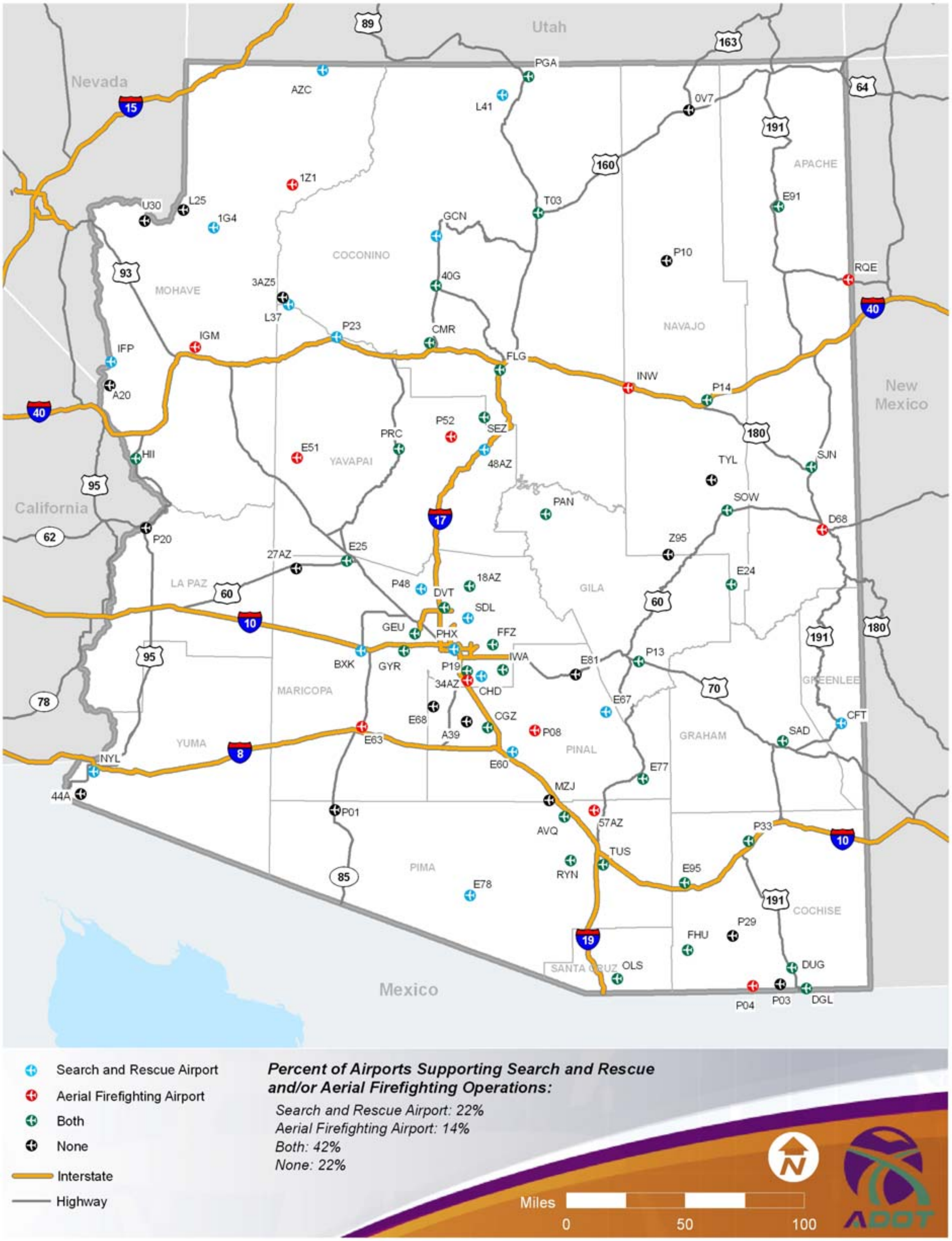
Airports in Arizona play an important role in supporting emergency operations. Because of the sprawling rural character of much of the state, these aviation activities are crucial to the state's population and environment alike. In the *Airport Inventory and Data Survey* effort, airport managers were asked if their airports supported regular or occasional search and rescue or aerial firefighting. **Figure 6-55** details the percentage of each system role that supports these activities on at least an occasional basis. A description of the specific performance in each of these areas is provided below. **Figure 6-56** depicts system airports supporting these activities.

Figure 6-55: Percent of Airports by Role Category Supporting Emergency Operations



Source: *Airport Inventory & Data Survey* 2008

Figure 6-56: Percent of Airports Supporting Search and Rescue and Aerial Firefighting Operations



Source: *Airport Inventory & Data Survey* 2008
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of airports that support search and rescue operations

In Arizona's vast deserts or recreational areas such as Grand Canyon National Park, search and rescue operations are often necessary. Figure 6-55 reveals that, statewide, 64 percent of SASP airports accommodate frequent or occasional search and rescue activities. By role, 82 percent of Commercial Service, 100 percent of Reliever, and 72 percent of GA-Community airports support search and rescue operations.

Percent of airports that support aerial fire fighting operations

Because of Arizona's arid climate and the wide separation of firefighting facilities, aerial firefighting in Arizona is crucial to the safety of Arizona's six National Forests and many rangeland areas, and to protect remote communities. Thus, forest and rangeland firefighting is another emergency operation that airports in Arizona must be ready to accommodate. As depicted in Figure 6-55, 57 percent of SASP airports support aerial firefighting operations. By role, aerial firefighting takes place at 58 percent of Commercial Service, 75 percent of Reliever, and 78 percent of GA-Community airports.

GOAL CATEGORY: ENVIRONMENTAL SENSITIVITY AND STEWARDSHIP

As expressed in the economic section of this chapter, airports in Arizona are important resources for many reasons. Because of this, and the nature of airports in general, it is important for airports in Arizona to be compatible with both the human and natural environment. Noise, water, and air pollution are all possible environmental issues arising from airport operations. Working toward continued environmental sensitivity helps to sustain the aviation industry.

Aviation stewardship is also extremely important to maintaining the future viability of the aviation industry in Arizona. System airports can be valuable learning resources and centers, as there are many careers in the aviation industry. Traditional education programs and curricula typically do not prepare students for the wide variety of careers that exist in the field of aviation. Arizona recognized that its system airports also act as aviation classrooms. As more people learn about and understand airports and aviation, as well as the role that each plays in the state's transportation and economic infrastructures, the more equipped these individuals will be to understand the development and expansion needs of airports throughout the state.

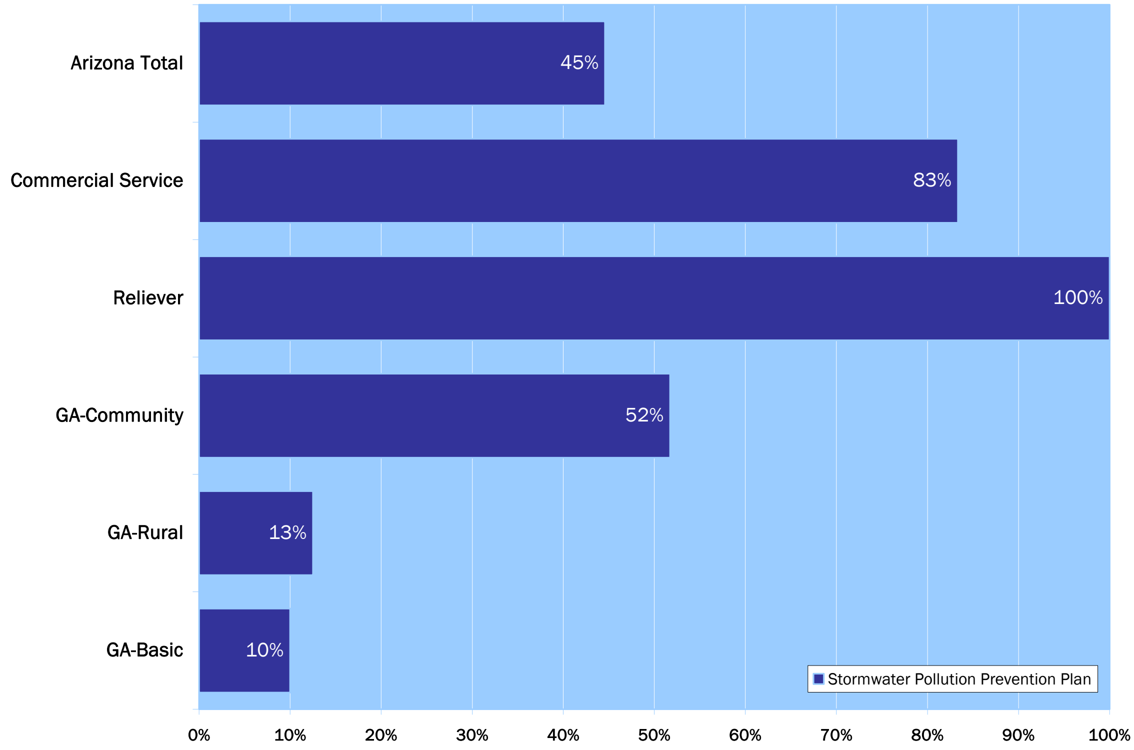
The following performance measures deal with the ability of Arizona's airport system to maintain both environmental sensitivity and aviation outreach and stewardship:

- Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)
- Percent of the population within a 30-minute drive time of a system airport with a full-time flight school/flight instructor
- Percent of system airports supporting airframe and power plant (A&P) programs
- Percent of system airports that have aviation maintenance and repair
- Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools

Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)

A Storm Water Pollution Prevention Plan (SWPPP) is an important part of an airport's environmental sensitivity. The plan identifies controls used by the airport to minimize the amount of runoff pollution, sediment runoff, and erosion. While not required specifically by the FAA, FAA requires that airports comply with federal and state environmental regulations that address stormwater issues. One way of addressing these issues is through the development of a SWPPP. Airport managers were asked to report whether or not their airport had an adopted SWPPP. Figure 6-57 reveals that, statewide, 45 percent of SASP airports have an adopted SWPPP. Eighty-three percent of Commercial Service, 100 percent of Reliever, and 52 percent of GA-Community airports have active plans to deal with storm water pollution.

Figure 6-57: Percent of Airports by Role Having Storm Water Pollution Prevention Plans



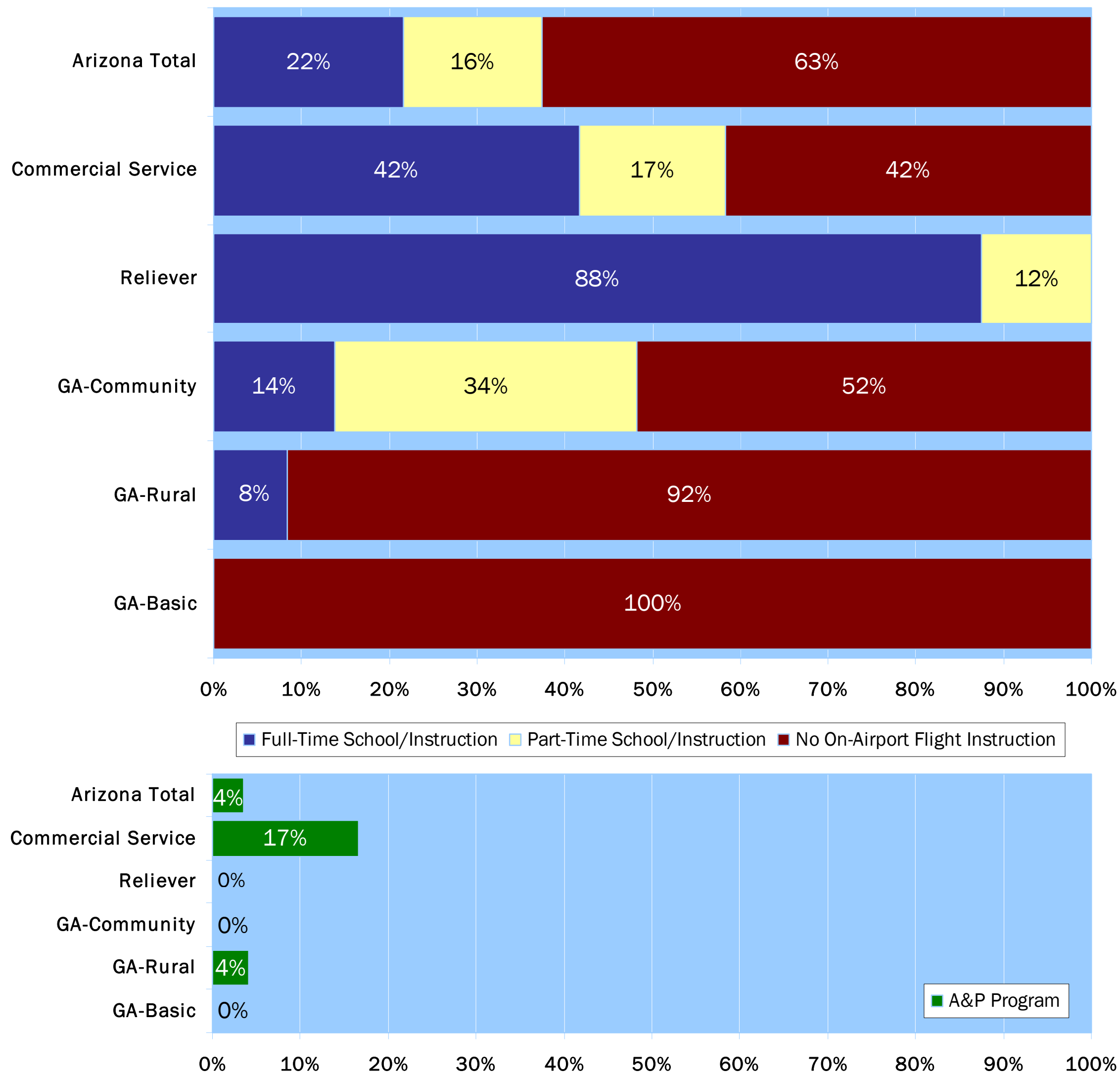
Source: *Airport Inventory & Data Survey* 2008

Percent of system airports supporting flight training

Airports that provide or accommodate flight instruction help to add pilots to the aviation system. They also provide outlets for people who are interested in aviation. Flight instructors are always willing to discuss flight principles with those who are interested. Another way that flight instruction is beneficial is through introductory flights (that are often free) to those attracted to aviation.

Figure 6-58 shows the percentage of each airport role that supports flight training with a full-time or part-time flight instructor or school, and/or an A&P program. In total, 38 percent of SASP airports have full-time or part-time flight instruction based at their airport. The following performance measures detail each of these types of aviation education. Figure 6-59 depicts the availability of flight instruction at SASP airports throughout the state as noted in early 2008. Eighty percent of Arizona's population is within a 30-minute drive time of an airport with a full-time or part-time flight school or instructor.

Figure 6-58: Percent of Airports by Role Supporting Flight Instruction and Aviation-Related Education



Source: *Airport Inventory & Data Survey* 2008

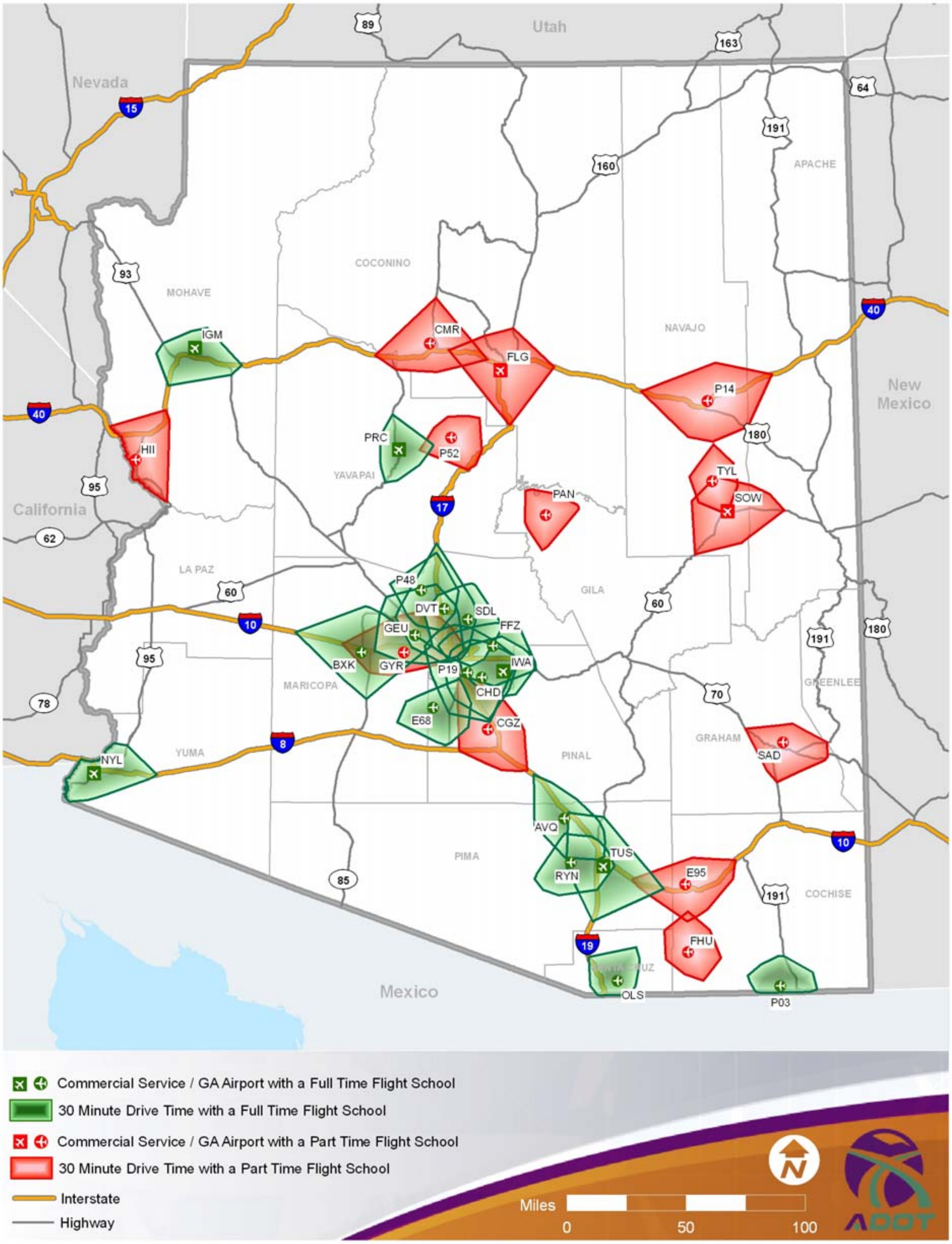
Percent of the statewide population within a 30-minute drive time of a system airport with a full-time flight school/flight instructor

Figure 6-58 reveals that 22 percent of SASP airports have a full-time flight school or instructor. The 17 airports include 42 percent of Commercial Service, 88 percent of Reliever, 14 percent of GA-Community, and 8 percent of GA-Rural.

Percent of the statewide population within a 30-minute drive time of a system airport with a part-time flight school/flight instructor

Figure 6-58 shows that an additional 16 percent of SASP airports have part-time flight instruction. By role, this includes 17 percent of Commercial Service, 13 percent of Reliever, and 36 percent of Reliever. Airports with only a part-time flight school or instructor cover approximately 30 percent of the total state population.

Figure 6-59: 30-Minute Drive Times of System Airports with a Full-Time or Part-Time Flight School/Flight Instructor



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of system airports supporting Airframe and Powerplant (A&P) programs

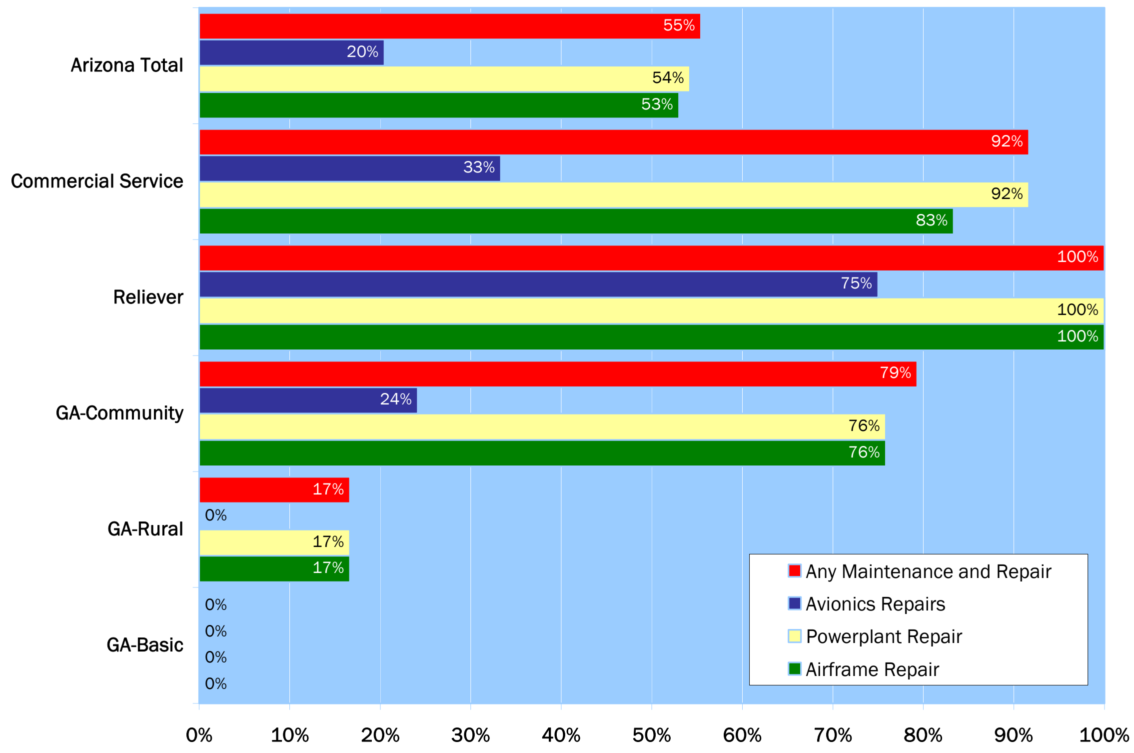
On-the-job training is one means by which airports in Arizona can support aviation-related education and employment. An Airframe and Powerplant (A&P) program is a type of on-the-job training associated with aviation maintenance. Many airports in Arizona have on-airport businesses that provide some type of maintenance and/or repair service, but only three system airports (four percent of the total) have a dedicated A&P program:

- Phoenix-Mesa Gateway/Chandler-Gilbert Community College (Commercial Service Role)
- Tucson International/Pima County Community College (Commercial Service Role)
- Cochise College (GA-Rural Role)

Percent of system airports that have aviation maintenance and repair

Airport managers were asked of the availability of three types of aviation maintenance and repair at their airports: airframe repairs, powerplant repairs, and avionics repairs. Figure 6-60 reveals that statewide, 55 percent of all SASP airports have at least one of these maintenance services. Fifty-four percent have powerplant repairs, 53 percent airframe repairs, and 20 percent of all SASP airports offer avionics repairs. By role, 92 percent of Commercial Service airports offer some sort of maintenance and repair, as do 100 percent of Relievers and 79 percent of GA-Community airports. No aviation maintenance or repair services are offered at any GA-Basic airports.

Figure 6-60: Percent of Airports by Role with Aviation Maintenance and Repair Services



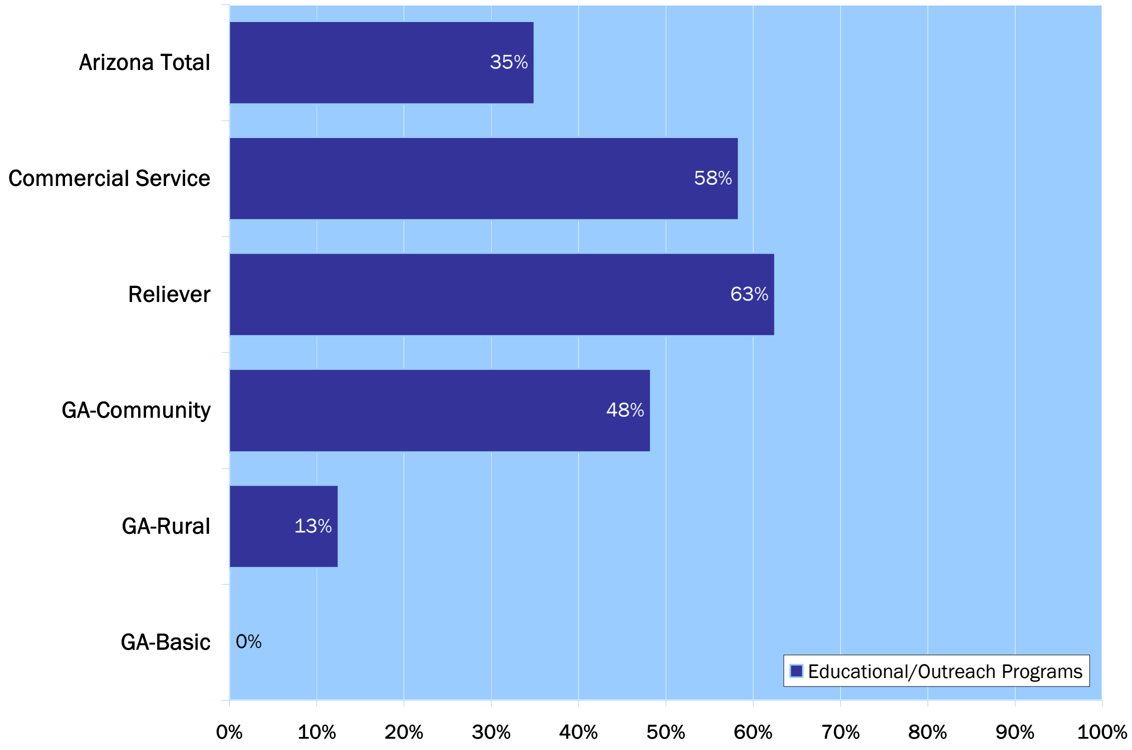
Source: *Airport Inventory & Data Survey* 2008

Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools

Airports can be important educational and training centers. There are many aviation-related careers, and around the country, there are numerous examples of colleges and technical schools that have partnered with airports to provide aviation-related curricula. Because of this, stewardship programs are important for airports to emphasize. These programs often attract young people to the aviation industry, and also create awareness of the importance of aviation and local airports to their communities and regions as a whole.

In the *Airport Inventory and Data Survey 2008*, Arizona airport managers were asked if their airports had educational outreach programs affiliated with local schools, community colleges, or technical/vocational schools. Figure 6-61 displays the percentage of airports by system role which have these programs. In total, 35 percent of SASP airports have these programs. By role, 58 percent of Commercial Service, 63 percent of Reliever, and 48 percent of GA-Community airports have programs affiliated with local education institutions. Results of the inventory effort reveal several types of programs at these airports, such as school tours, Young Eagles programs, and airport representatives that participate in high school career days.

Figure 6-61: Percent of Airports by Role with Programs Affiliated with Local Educational Institutions



Source: *Airport Inventory & Data Survey* 2008

SUMMARY

This chapter has examined the current performance of Arizona's airport system according to the airport roles and performance categories set in previous chapters. Current performance is summarized below. The next chapter will analyze where the airport system can improve and recommendations on how this can be done.

Change Since the SANS 2000

It is important to chart Arizona airport system performance at regular intervals in order to quantify how the system has changed. The SANS 2000 provided a summary that showed how measures changed since the 1995 study. Figure 6-62 does the same, comparing the results of the SASP performance measures to the same performance measures in the SANS 2000 and SANS 1995. This helps to show specific areas where performance has improved or where it has declined. Eight performance measures detailed in this chapter were also included in the SANS 2000, and seven of these were included in the SANS 1995.

Since 2000, five measures have declined in performance. Geographic and population coverage for commercial service and general aviation airports have both decreased by over 10 percentage points since the SANS 2000 study. As mentioned earlier in this chapter, the number of communities with a population over 5,000 has drastically increased. This, in combination with fewer Commercial Service airports, led to the lower coverage by Arizona's Commercial Service airports. In addition, the increased number of communities with a population of at least 1,000 is the primary reason that the percentage of these communities lying within a 30-minute drive time of a general aviation airport has decreased.

The performance of some other measures can also be attributed to the rapid growth in Arizona's population. Since 2000, the number of airports operating below target demand-capacity ratios has decreased by five percentage points. As stated previously, the difference in coverage of recreational sites is largely due to the number of recreational sites that were included in the SANS 2000 versus in the SASP. The sites in the SASP were provided directly by the Office of Tourism. The decrease in airports having adequate utilities is also likely due to a difference in the studies. In the SANS 2000, only water, telephone, and electricity were accounted for. In this study, electricity, sewer, telephone, gas, and water were included.

Several performance measures have shown improvement since the SANS 2000. The number of communities with a population of at least 15,000 which are within 30 minutes of an airport capable of accommodating B-II aircraft and IMC conditions increased by seven percentage points to 97 percent. Since 1995, 30-minute drive time coverage by airports with IMC capability, on-site weather reporting, and jet fuel has increased from 80 percent to 85 percent of hospitals in the state. The number of airports experiencing delay to operations remained unchanged at 23 airports from the SANS 2000 to now.

Figure 6-62: Summary Comparison of SASP, SANS 2000 and SANS1995

Performance Measure	*Current Compliance 2008*	*SANS 2000*	*SANS 1995*	Change 2000-2007	Change 1995-2007
Goal Category: Development					
Percent of communities in the State with a population greater than 5,000 within a 60-minute drive time of a commercial service airport	82%	94%	98%	-12%	-15%
Percent of communities in the State with a population greater than 1,000 within a 30-minute drive time of a general aviation airport	87%	100%	100%	-13%	-13%
Percent of communities in the State with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability	97%	90%	90%	+7%	+7%
Percent of airports with sufficient operational capacity	87%	92%	92%	-5%	-5%
Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion	23	23	NA	0%	NA
Goal Category: Economic Support					
Number of major recreational areas in the state within a 30-minute drive time of a system airport	84%	97%	97%	-13%	-13%
Number of airports having adequate utilities (electricity, telephone, water, sewer, and gas)	49%	64%	65%	-15%	-16%
Goal Category: Safety and Standards					
Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability	85%	82%	80%	3%	+5%

Sources: *Airport Inventory & Data Survey 2008*, *Arizona State Aviation Needs Study* 2000

Summary of Other Performance Measures

The remaining performance measures are new and were not part of the SANS 2000. These are summarized for all airports in Figure 6-63. Several new performance measures address population within 30 minutes of airports in several categories: public use, NPIAS, all SASP airports, or airports having certain capabilities such as on-site weather reporting or an instrument landing system. In general, population coverage was very good, generally between 70 and 85 percent of the total state population. In addition, 94 percent of licensed Arizona pilots live within a 30-minute drive time of a system airport.

How the airports themselves are performing is often less successful than geographic coverage. For example, only 36 percent of system airports have the ideal conditions for medical aircraft to operate based on the conditions noted specifically by the operators. Just over half of the airports have available jet fuel, and less than half have any aviation fuel available 24/7.

Compliance with planning and zoning performance measures are also inconsistent. Less than half of system airports are noted that they have implemented height zoning to address FAR Part 77, have airport disclosure areas with surrounding communities, have security plans, have a current emergency response plan, or have a stormwater pollution prevention plan. In addition, less than 20 percent have obstruction removal or wildlife management plans. Increasing all of these percentages is strongly urged for the continued success of Arizona's airport system.

Figure 6-63: Summary of Performance Measures not Included in the SANS 2000

Performance Measure	*Current Compliance*
Goal Category: Development	
Percent of population within a 30-minute drive time of each airport, by role category	86%
Percent of population within a 30-minute drive time of a public use airport	85%
Percent of population within a 30-minute drive time of a National Plan of Integrated Airport Systems (NPIAS) airport	83%
Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach	80%
Percent of airports within a 30-minute drive time of an airport with ILS or LPV	31%
Percent of licensed pilots within a 30-minute drive time of an airport	94%
Percent of airports capable of supporting emergency medical transport aircraft	40%
Percent of statewide land area within 25 nautical miles of an airport with on-site weather reporting	47% of airports 57% of land area
Percent of population within a 30 minute drive time of an all weather runway (paved, instrument approach, AWOS)	77%
Percent of airports with jet fuel	52%
Percent of airports with 24/7 fuel	45%
Percent of airports projected to have sufficient operational capacity in 2030	80%
Percent of population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2020	72% Population 40% Employment
Airports with a current (past 5 years) master plan and/or ALP	55%
Percent of airports with surrounding municipalities that have adopted "disclosure areas"	35%
Percent of airports with surrounding municipalities that have adopted controls/ zoning to make land use in the airport environs compatible with airport operations and development	60%
Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77	46%
Percent of airports that are recognized in local comprehensive plan	64%
Percent of airports included in regional transportation plans	47%
Goal Category: Economic Support	
Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport	99%
Percent of population and area within a 30-minute drive time of a system airport meeting business user needs	79%
Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	54%
Percent of airports with an average pavement condition index (PCI) of 70 or greater	59%
Goal Category: Safety and Standards	
Percent of airports with clear approaches to all runway ends	51%
Percent of airports with adopted Wildlife Management Plans	18%
Percent of airports with adopted Security Plans	31%
Percent of airports that have a written emergency response plan	47%
Airports controlling all runway end Runway Protection Zones (RPZs)	60%
Percent of airports that meet runway/taxiway separation criteria for their current ARC	79%
Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC	59%
Percent of airports that have procedures in place to conduct self-inspections on a regular basis	72%

Figure 6-63: Summary of Performance Measures not Included in the SANS 2000 (Continued)

Performance Measure	*Current Compliance*
Goal Category: Safety and Standards	
Percent of airports that support search and rescue operations	64%
Percent of airports that support aerial fire fighting operations	57%
Goal Category: Environmental Sensitivity and Stewardship	
Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)	45%
Percent of the population that are within a 30-minute drive time of a system airport with a flight school/flight instructor	74%
Percent of system airports with a flight school/instructor	38%
Percent of system airports supporting A&P programs	4%
Percent of system airports that have aviation maintenance and repair	55%
Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools	35%

CHAPTER SEVEN: FUTURE AIR TRANSPORTATION SYSTEM PERFORMANCE

INTRODUCTION

Previous chapters of the Arizona State Airports System Plan (SASP) analyzed performance measures selected specifically for Arizona to determine how well the state's system of airports is currently performing. Based on an assessment of the current system's adequacies, deficiencies, and overlaps, each performance measure was analyzed individually to determine potential or warranted future system performance. This chapter identifies actions that are desirable to raise the overall level of system performance. Targeted actions will enhance the overall performance of the airport system in Arizona and will enable system airports to better fulfill their identified SASP roles.

In addition to reviewing current performance, the potential impact of outside influences that could affect the future airport system's needs is identified. These outside influences are reviewed for their potential impact prior to analyzing the future system needs.

Certain performance measures provide information while others offer the opportunity for action to improve the performance. For example, an airport can install a fuel farm thereby increasing the number of airports who provide fuel services, increasing this performance measure. However, the performance measure that analyzed the percent of airports that support search and rescue operations does not have a specific project associated with changing the performance and is considered informational. By monitoring the ability of the Arizona airport system to satisfy or meet each of the performance measures, ADOT can compare and monitor current, target, and future system performance. As subsequent federal, state, and local investments are made at airports in Arizona, it will be possible to determine how this investment will raise the overall performance of the system.

The responsibility for implementing projects and taking actions identified in the system plan remains with local airport owners and sponsors in coordination with ADOT and the FAA. It is possible that local constraints (financial, man-made, political, or environmental) may make it impossible for individual airports to meet all targets outlined in this portion of the system plan. Final recommendations in the SASP will be a blend of airport initiatives and system plan recommendations.

ROLE OF PRIVATE AIRPORTS

There are 11 privately owned airports included in the SASP. These 11 airports were identified at the outset of the study as playing a role in the system and ADOT was interested in obtaining more information regarding the airports and their activities. Therefore, the 11 airports have been included in previous tasks of the SASP, including the airport role analysis. Based on the role analysis, the 11 private airports and their corresponding roles in the system as noted in previous tasks are as follows:

- Sky Ranch at Carefree GA-Community
- Stellar Airpark GA-Community
- Grand Canyon Valle GA-Community
- Pleasant Valley GA-Community
- Marble Canyon GA-Rural
- Estrella Sailport GA-Rural
- Grand Canyon Caverns GA-Rural
- La Cholla Airpark GA-Rural
- Eagle Roost GA-Basic
- Rimrock GA-Basic
- Grand Canyon Bar Ten Airstrip GA-Basic

While these 11 airports have been included as part of the analysis, it is important to recognize that these airports are the owners' personal property. The airports are operated for personal or other reasons. In most circumstances, these airports do not receive any funding from state or federal sources. Therefore, unlike publicly owned airports, there is no contractual obligation to abide by FAA or state airport regulations or even remain open to the public. While all of these private airports play important roles in the system, especially those in metropolitan areas where they serve a wide range of users, ADOT has limited input into the future development of the private airports.

The SASP has recognized the role that privately owned airports play in supporting the airport system. However, developing future targets and a list of recommended projects for privately owned airports based on their SASP airport role is not appropriate in this document. For the purpose of this study, it is recommended that all private airports be developed to meet the facility and service objectives for the GA-Basic role at a minimum. The recommendations for airports in this role category are minimal and pertain mainly to maintaining existing airside and landside facilities. When developing targets for future performance in this chapter, the four GA-Community and four GA-Rural airports noted above will be included in the GA-Basic role category.

OUTSIDE INFLUENCES

There are several factors that may influence aviation activity which are independent of the state airport system. For this reason, they are identified as outside influences. It is worthwhile to review outside influences to determine how they may impact future system performance. These non-aviation factors include:

- Extensive Population Growth
- Major Employment Growth
- High-Technology and Aerospace Industry Growth
- Tourism
- Retirement/Seasonal Residency
- Major Surface Transportation Improvements

The purpose of this section is to provide a "big picture overview" of what might alter demand and associated needs of Arizona's state airport system. This information should help the aviation community recognize these influences and be better prepared to respond to changes that may occur. Recognizing these factors today enables the state to fundamentally remain aware and closely monitor them. With funding constraints making it more challenging to maintain and improve the airport system for peak performance, the airport system may need to respond to external factors by shifting priorities and/or redirecting dollars to keep the airport system at the best possible performance level.

The current reality is, with the downturn in the economy, there are few major employers moving into Arizona today, no surge of small business upstarts, and no boom in real estate. However, there is immediate opportunity to invest in and guide Arizona to its ultimate potential—a quality state symbolizing diverse and progressive industry supported by an educated work force, a healthy transportation infrastructure, and an inviting tourist and retirement destination. This downturn is a prime time to take inventory of what the state has, what they envision, and how they will attain these goals. This is the time to document the lessons learned from flawed development so more thoughtful, innovative, and integrated planning may guide good development plans to become exceptional.

Extensive Population Growth

Extensive population growth can potentially place a lot of demand on an airport system. Consequently, population growth is always an important factor to review.

With respect to land mass, Arizona is the sixth largest state after Alaska, Texas, California, Montana, and New Mexico. Although Arizona is ranked 14th by population size, it has the second fastest growing population in the nation. Arizona's two largest populated counties are Maricopa and Pima counties, which include Phoenix and Tucson, respectively. Arizona is also home to 22 American Indian Reservations. The Navajo Indian Reservation in Arizona is the largest by population in America.

Arizona's ranking as the second fastest growing state is based on its 2.8 percent growth in 2007, and its 2.3 percent growth rate in 2008. Nevada and Utah ranked first in 2007 and 2008, respectively.

Prior to the recent economic downturn, strong growth was projected to continue for Arizona in the future with the majority of the population increase along the Sun Corridor. It is uncertain at this time how the downturn may impact future growth. The Sun Corridor is the name given to Arizona's megapolitan area that spans six of the 15 counties in the state. The Sun Corridor derived its name and boundaries from a study prepared by the Morrison

Institute for Public Policy, ASU, May 2008. While the Sun Corridor generally runs from the middle of Yavapai County to western Cochise County and down to the border with Mexico, the study simply included the whole of all six counties for planning purposes. The term "megapolitan area" has been used for many years, but its current criteria and terms are defined by the Metropolitan Institute at Virginia Polytechnic Institute and State University (Virginia Tech) as a "…cluster of networks of American cities whose population exceeds or will exceed 10 million by the year 2040." Virginia Tech has identified 20 megapolitan areas, including Arizona's, with the greatest growth potential in the nation. Before the designation of the Sun Corridor, Virginia Tech referred to Arizona's megapolitan area as the "Valley of the Sun," but the boundaries generally encompassed the Phoenix-Tucson corridor, spanning Maricopa, Pinal, and Pima counties. In its early development and for many years, the Phoenix-Tucson corridor was referred to as the Golden Corridor.

Today, the Sun Corridor spans six counties with approximately 20 percent of Arizona's land mass, but 80 percent of its population. With a population of over 10 million in Arizona expected by 2030, eight million will reside within the Sun Corridor. Also within the Sun Corridor are a total of 45 of the SASP's airports, which is an estimated half of all SASP airports. Figure 7-1 lists all 15 Arizona counties from largest to smallest baseline population and their projected population increase through 2030. These projections were developed prior to the recent economic downturn. The six Sun Corridor counties are in bold with their associated number of SASP airports.

Figure 7-1: Population Projections and Number of Sun Corridor Airports

County	*Baseline Population (2006) **	*Projected Population 2030*	*Population Change*	*Percent Change*	*Number of Sun Corridor Airports***
Arizona	**6,239,482**	**10,347,513**	**4,108,061**	**66%**	
Maricopa	**3,764,446**	**6,207,980**	**2,443,534**	**65%**	**15**
Pima	**980,977**	**1,442,420**	**461,443**	**47%**	**6**
Pinal	**269,892**	**852,463**	**582,571**	**216%**	**9**
Yavapai	**212,722**	**355,462**	**142,740**	**67%**	**6**
Yuma	195,499	316,158	120,659	62%	
Mohave	194,920	330,581	135,661	70%	
Cochise	**134,789**	**187,725**	**52,936**	**39%**	**8**
Coconino	132,826	173,829	41,003	31%	
Navajo	112,672	165,647	52,975	47%	
Apache	74,691	93,447	18,756	25%	
Gila	55,102	69,879	14,777	27%	
Santa Cruz	**45,303**	**71,033**	**25,730**	**57%**	**1**
Graham	35,873	44,556	8,683	24%	
La Paz	21,489	28,074	6,585	31%	
Greenlee	8,281	8,289	8	0%	

Source: AZ Depart of Economic Security Population Projections 2006-2030
Notes: *U.S. Census estimates that 1996 population for AZ was 6,166,318. **Sun Corridor Airports include SASP airports inside the six counties included in the Sun Corridor. Airports are also located in other counties but the focus of this is on the Sun Corridor.The following lists the system airports within the Sun Corridor by county.

15 Maricopa County airports:

- Phoenix-Sky Harbor
- Phoenix-Goodyear
- Phoenix-Deer Valley
- Falcon Field
- Chandler Municipal
- Phoenix-Mesa Gateway
- Glendale Municipal
- Scottsdale Municipal
- Buckeye Municipal
- Sky Ranch at Carefree
- Stellar Airpark
- Memorial Airfield
- Pleasant Valley
- Wickenburg Municipal
- Eagle Roost

Nine Pinal County airports:

- Pinal Airpark
- San Manuel
- Coolidge Municipal
- Superior
- Phoenix Regional
- Casa Grande Municipal
- Eloy Municipal
- Kearny Municipal
- Estrella Sailport

Six Pima County airports:

- Tucson International
- Ryan Field
- Marana Regional
- Cholla Airpark
- Eric Marcus Municipal
- Sells

Six Yavapai County airports:

- Prescott Municipal
- Sedona
- Seligman
- Bagdad
- Rimrock
- Cottonwood

One Santa Cruz County airport:

- Nogales International

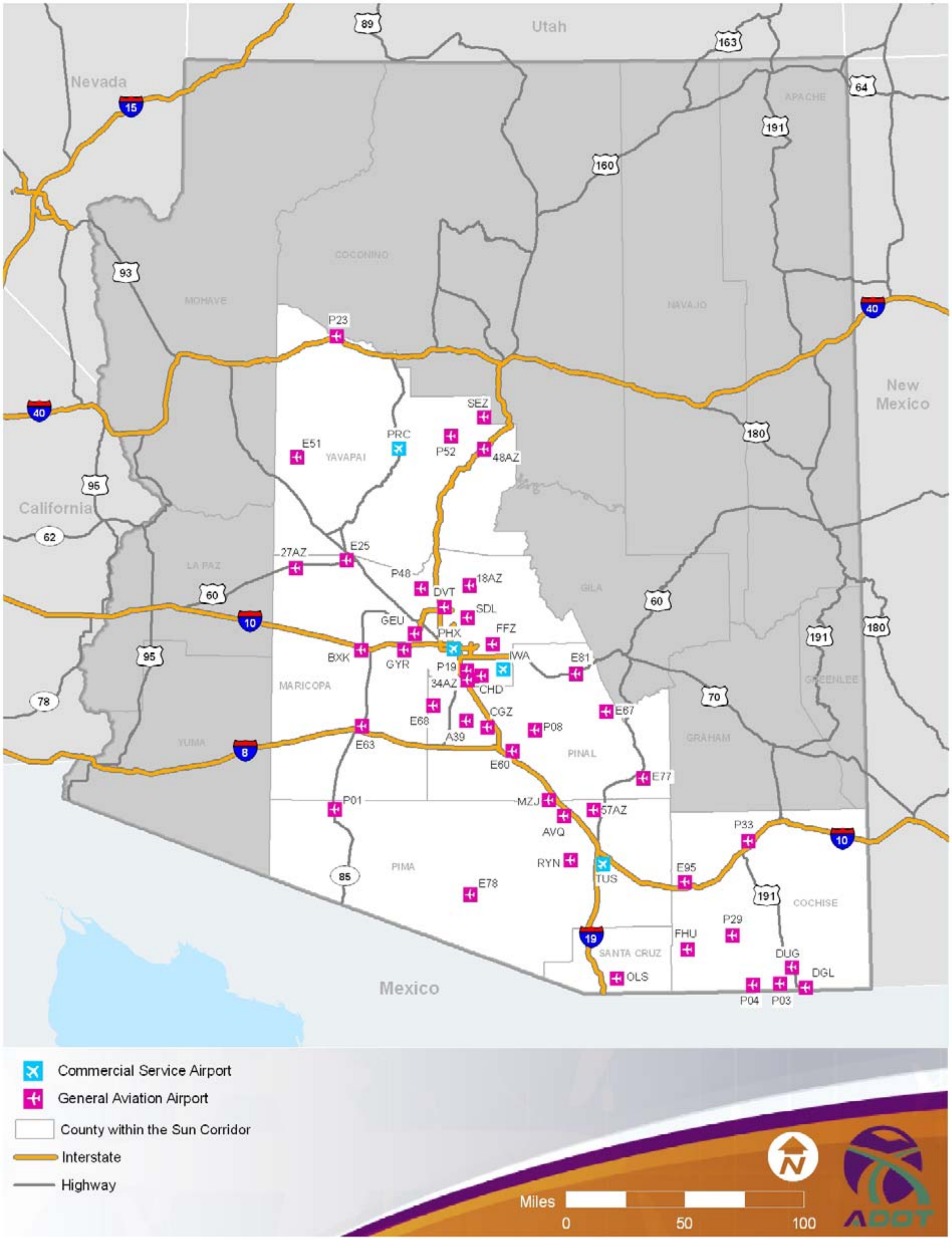
Eight Cochise County airports:

- Bisbee Municipal
- Douglas Municipal
- Bisbee-Douglas International
- Sierra Vista Municipal
- Benson Municipal
- Cochise County
- Cochise College
- Tombstone Municipal

Figure 7-2 depicts the location of these airports within the six Sun Corridor counties.

The Sun Corridor airports are noted because recent studies call attention to the area as holding the greatest potential for substantial population growth. Following recovery from the current economic downturn, there is speculation that the Sun Corridor could potentially experience extensive population growth associated with major economic development efforts under way. The Sun Corridor is one of 20 areas in the U.S. that is projected to experience the greatest growth in the next two decades according to data from the Morrison Institute for Public Policy, ASU.

Figure 7-2: SASP Airports Located Within Sun Corridor Counties



Sources: Airport Planning West, Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Major Employment Growth

New or expanding major employment centers can also impact aviation demand. Employment growth and projections generally track population growth and projections, but the recent economic downturn has resulted in a drop in employment. Nevertheless, Arizona has been working to attract new and more diversified industry for several years so the eventual economic recovery will benefit from these efforts.

In October 2008, the Arizona Department of Commerce, Research Administration provided a brief forecast update on employment, projecting that non-farm job loss will reach more than 47,000 in the state before recovery begins. The Research Administration projects that recovery for Arizona will begin in late 2009. Further, many economists suggest that the recovery will take an estimated two to three years before returning to economic activity levels prior to the downturn. For airports, this suggests an interim slowdown or decrease in aviation demand after many were formerly experiencing steady growth. However, the state's efforts to diversify and attract new employers and industry are expected to help the state return to a less vulnerable economy as the national and global economies turn around. New employers and industry will help return aviation demand to its forecast levels.

This return to strong employment growth in Arizona under a more diversified economy would translate to an additional two million jobs by 2030, primarily within the Sun Corridor, according to a study by Morrison Institute for Public Policy, ASU, May 2008. This means that jobs in the Sun Corridor will increase 84.3 percent by 2030 over baseline year 2000 figures. This is greater than the 82.5 percent Sun Corridor population increase projected.

Growing population and employment, limited land resources, and the concept of sustainability may drive the need to build up and not out. The Morrison Institute for Public Policy's study on megapolitans states that density is simply the best option for more people. The study defines a megapolitan as two or more metropolitan areas with anchor principal cities between 50 and 200 miles apart. The study supports the idea that megapolitans, like the Sun Corridor, will see large growth because concentrating economic power and opportunity is the future.

While megapolitans are expected to see more growth, there will still be spillover to more rural communities. Better understanding and consideration of airport issues, land use protection, and interdependent planning will be key to a healthy state airport system that meets the needs of its users. Near-sighted planning will hinder smart growth in the future so airports and communities in a region must recognize their long-term interdependency. This does not suggest that communities and airports no longer compete for economic development opportunities, but rather strategically complement each other for the better of all.

Many tout the Sun Corridor as offering more developable land for economic growth compared to major corridors in other states, but factors such as tribal and public lands, location of infrastructure, water rights and policies, and community opinion reveal that it is more densely utilized than most think. Figure 7-3 provides a breakdown of land ownership in the six Sun Corridor counties. As shown, significant portions of land are tribal and public lands.

Figure 7-3: Sun Corridor Counties and Land Ownership

County	*Total Square Miles*	*Ownership: Individual or Corporate*	*Forest Service/BLM*	*State Land*	*Tribal Land*	*Other Publicly Owned*
Maricopa	9,222	29%	39%	11%	5%	16%
Pima	9,184	14%	12%	15%	42%	17%
Pinal	5,374	22%	14%	35%	23%	6%
Yavapai	8,125	25%	50%	25%	< 0.5%	<0.5%
Cochise	6,219	40%	22%	35%	-	4%
Santa Cruz	1,236	38%	55%	8%	-	-

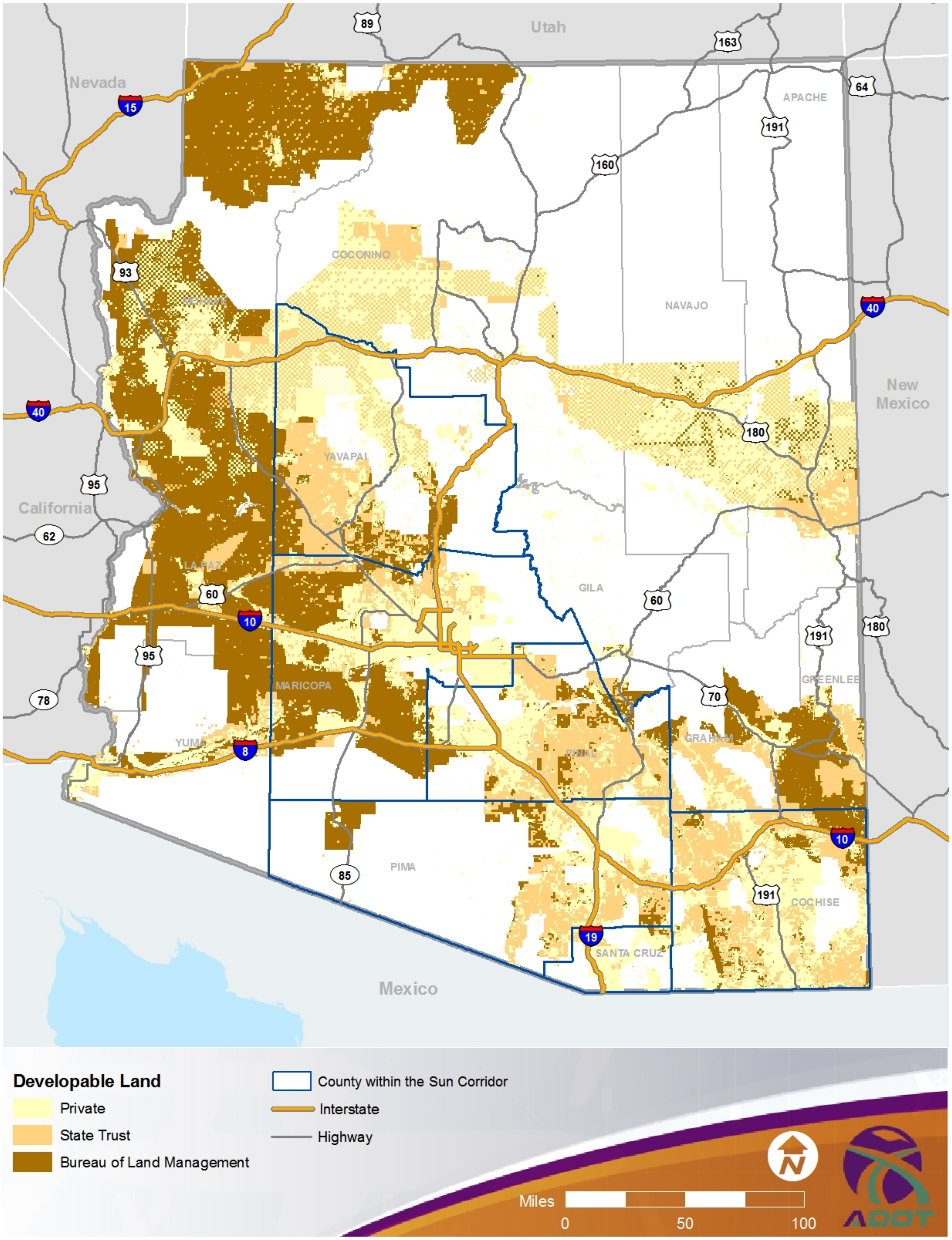
Source: AZ Depart of Commerce County Profiles
Note: Figures are rounded

Figure 7-4 (on the following page) maps the Sun Corridor in relation to where developable land exists in Arizona. Smaller economic development regions where other general aviation airports exist may still be opportune.

The diversification that is underway in Arizona's economy is expected to produce more environmentally sensitive jobs in the future. According to the Greater Phoenix Economic Council, an economic development group, "...a growth in green companies, especially solar, is among the best ways to diversify the state's economy and reduce its reliance on housing construction." In light of previous high fuel costs in 2008, the nation has turned to focus more on green (environmentally sensitive) economic development programs to address mass transit and more energy efficient vehicles. Recent news reports have discussed the possibility of Arizona creating more green jobs in the fields of building retrofitting, more efficient electrical grids, wind power, solar power, and advanced biofuels. While the traditional green job reference has often brought to mind the field of recycling and wastewater treatment, there are substantial economic growth opportunities for existing fields to turn "green" such as architects learning to design more energy-efficient buildings. Carpenters and plumbers could be trained to install solar systems and weatherize homes. This shift in the economy is expected to support the projected employment in the Sun Corridor.

Further, the state's recognition for various business-attractive traits will encourage growth. Arizona recently ranked #17 in the nation based on its state tax score, which is a consideration for entrepreneurs and small businesses interested in locating in Arizona. Four cities in Arizona made *Money's* list of the top 100 small cities to live in 2008. These cities included: Gilbert (#28), Chandler (#30), Scottsdale (#47), and Peoria (#55).

Figure 7-4: Sun Corridor Counties and Developable Land in Arizona



Sources: Airport Planning West, Arizona Land Resource Information System (ALRIS), Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Also, six companies headquartered in Arizona made the current Fortune 500 list announced in April 2008, which is up from four companies that made the list in 2007. According to the *Phoenix Business Journal*, the six Arizona companies on the Fortune 500 list include:

- Freeport-McMoRan Copper & Gold Inc. (nearly $18 billion in annual revenue last year, #140)
- Avnet Inc. electronics distributor (more than $15 billion in revenue,#163)
- Tempe-based US Airways Group Inc. ($11.7 billion in revenue, #216)
- Phoenix-based Allied Waste Industries Inc. ($6.1 billion in revenue, #400)
- Tempe's Insight Enterprises Inc., an electronics and office equipment wholesaler ($4.8 billion in revenue, # 477)
- Phoenix-based PetSmart Inc. (nearly $4.7 billion, #489).

Several other large Fortune 500 companies have locations in Arizona including, AT&T Inc., Bank of America, Boeing, Morgan Stanley, Johnson Controls, Merck, Motorola, and Wells Fargo. Honeywell's Aerospace division is headquartered in Phoenix, and the valley hosts many of its avionics and mechanical facilities. Intel has one of its largest sites in the city, employing about 10,000 employees.

As part of Arizona's efforts to diversify the economy, the state has been striving to ensure that high quality employment and educational opportunities are provided. In the past, Arizona has faced low income, high poverty rates, and low educational attainment compared to national averages. High quality employment and better paying jobs requires an educated workforce. Statistically, just over one-third of college bound students from low income families ever complete a college degree because affordability has long been an issue. To address this issue, Surprise, Arizona, will be home to Arizona's first "communiversity", or a campus that hosts both community colleges and universities with programs aligned to simplify a student's transition from the more cost-effective community college associate degree to continue into a bachelor and master's degree with minimal transfer credit loss. A similar concept in New Jersey has enhanced college education opportunities for students. The intent is to help increase the number of college graduates around the state. Making this more attractive is the fact that the campus will offer onsite and online courses, professors can teach through one or both of these methods and the partnerships between the community colleges and universities will ensure more credits are transferrable. This is not only good news for high school graduates looking for a more affordable and accessible college education, but also for many of the recently unemployed midcareer adults needing more education to pursue and compete for new jobs.

Arizona recognizes that a better educated workforce will attract better paying employment. Combined, this will enhance the quality of life for Arizonans and, consequently, have a positive impact on aviation demand around the state.

High-Technology and Aerospace Industry Growth

High-technology growth is mentioned separately from employment growth here since certain high-tech industries have a more significant impact and/or relationship with aviation.

Despite the trend of outsourcing, the past few years did bring some new high-tech companies to Arizona. Existing high-tech companies also expanded their operations in the state, some of which are in the microelectronics industry. This is important because growth in this time-sensitive, high-value industry is often tied to aviation demand. Intel's growing presence in the Phoenix Valley since the 1980s and their late 2007 opening of another semiconductor plant has contributed to Arizona ranking as the fourth largest semiconductor manufacturing employment center in the U.S. Further, Arizona State University (ASU) and the University of Arizona (UA) have been serving as incubators for emerging technologies and boosting high-tech industry growth in the state.

Skysong, located in Scottsdale and considered a high-tech development area, has 1.2 million square feet of research, office, and retail space. Skysong is located between downtown Scottsdale and Tempe's ASU campus. According to an article in *Business Facilities* in late 2007, there are several high-tech international firms that have located at Skysong such as "…FScreen Sci-Tech Co. (a solar technology firm from China), Aurigin Technology (a biomedical technology firm from Singapore), Sebit (an e-learning company from Turkey), and Ubidyne (a wireless technology developer from Germany)."

The aerospace industry has also been attracted to the state, which can be attributed to the state's accommodating weather, prominent higher education institutions, and reasonable operating costs. Honeywell, Boeing, and General Dynamics are among the nearly 300 aerospace companies in Arizona. In fact, Phoenix-Mesa Gateway Airport has been developing into an international aerospace center. Some of the more than 20 tenant organizations there include Boeing, Ratts Air Service, Fighter Combat International, L3 Communications, U.S. Positioning, Chandler-Gilbert Community College, and ASU Polytechnic.

Other examples of high-tech and aerospace development include General Dynamics' "Factory of the Future" in Gilbert, which is a modern satellite manufacturing facility, and the Chandler-based Orbital Science Corporation. Orbital Science works with Orion, which is the next-generation space-exploration vehicle that will replace the Space Shuttle.

Unmanned Aerial Vehicle (UAV) Activity

Another high-tech aerospace industry segment that deserves special attention with respect to the airport system is unmanned aerial vehicle (UAV) activity. UAV technology has been fast evolving in recent years and becoming a part of military, civil, and commercial aviation. Although the UAV's role and benefits may vary among these three aviation segments, all uses will have some level of impact on the National Airspace System (NAS). The potential cost savings as well as the advances in automation and sensor technologies have increased the demand for UAVs so consideration of airspace impacts is gaining attention. In 2005, MITRE's Center for Advanced Aviation Development (CAASD) in McLean, Virginia, identified examples of the many possible uses for UAVs by 2020, some of which are being tested and applied today including the following:

- High-Altitude Imagery
- Border Patrol
- Maritime Surveillance
- Environmental Sensing
- Media and Traffic Reporting
- Tactical Law Enforcement
- Stratospheric Telecommunications Airship

Currently, there is regular UAV activity in southeastern Arizona. Cochise County's Unmanned Aerial System Runway is located north of Highway 82, east of Whetstone, Arizona. The site is located within Sierra Vista airspace on Arizona state land that is leased by Cochise County and privately operated by Unmanned Vehicles International, Inc.

As early as 2004, Homeland Security published a fact sheet about Arizona and the Mexico border stating that there were reports of over 477 flight hours by UAVs to assist in rescues, apprehensions, and drug-related detections along the border. The continued issues with security and illegal persons entering the US will likely mean higher rates of UAV utilization in the future.

Since UAVs have a wide range of physical and performance characteristics that are unlike any current aircraft, it is evident that there will be impacts to Arizona's airport and airspace system. However, the NAS is projected to change significantly over the next decade as new technologies and procedures address capacity and inefficiencies. These advancements will likely facilitate the routine and safe entry of UAV operations into civil airspace, but a comprehensive look at what the integration of UAV activity means to aviation is just beginning and not available for review as part of the SASP.

Tourism

Tourism has long been an aviation demand factor. Arizona Office of Tourism reports that tourism is the second highest contributor to the state's economy, behind only microelectronics. The Office of Tourism estimates that tourism provides 7.2 percent of all state and local tax revenue. An increase or decrease in tourism is often mirrored in aviation demand throughout Arizona. It is estimated that annual Arizona visitors travelling by air reached 13.1 million before a recent decline of an estimated 10 to 15 percent. However, it's anticipated that this decline will begin a turnaround in 2010.

The Arizona Office of Tourism has seen significant declines in Arizona tourism for 2008, so far, but this follows a record year for tourism for Arizona in 2007. Following recovery from the economic downturn, tourism figures are expected to return to former levels, some of which are described here.

In the past, total Arizona visitation according to the Arizona Bureau of Tourism reached 34 million with many of international origin. Data on specific international origins is not available only for Arizona, but was reviewed for the U.S. as a whole. While Canadian visitors to the U.S. increased 17 percent from 2002 to 2006, international tourists from France, UK, Germany, Italy, and Japan were down in 2006, with Asian countries picking up tourism market share.

Visitors to Arizona's National Parks reportedly increased 2.8 percent from 2006 to 2007 for a total of nearly 11.9 million visitors. Arizona State Park visitors increased 2.6 percent for the same period for a total of nearly 2.6 million visitors. The top five National Park destinations in Arizona for 2007 included Grand Canyon National Park, Lake Mead National Recreation Area, Glen Canyon National Recreation Area, Canyon de Chelly National Monument, and Saguaro National Park. The top five State Park destinations in Arizona for 2007 included Lake Havasu, Slide Rock, Patagonia Lake, Kartchner Caverns, and Catalina.

There are no new recreational areas under development at this time. However, the BLM is preparing a Recreation Plan for the Table Mesa area. The Table Mesa area is located northeast of Lake Pleasant, between New River and Black Canyon City, west of I-17. Public meetings planned for November 2008 will address possible recreational uses for the area.

In the vicinity of metropolitan Phoenix and Tucson, the Cactus League's spring training brings in a large number of visitors from around the state and the nation to 11 stadiums in nine cities. Recent reports have stated that the Fort McDowell Yavapai Nation is working to bring a new baseball stadium and training facility to the area. The site is south of AZ Highway 87, near Fountain Hills. The stadium, at an estimated cost of $80 million, would serve as a spring training facility to two Cactus League teams.

The Yavapai Nation also plans to renovate its old Fort McDowell Casino, which has been highly prosperous. The role of tribal communities in the growth and development of Arizona has been increasing in recent years and is expected to play a significant role in the future. There are seven reservation communities within the Sun Corridor.

Retirement/Seasonal Residency

Traditional retirement destinations in the past have included Arizona, Nevada, and Florida for many reasons including climate. The fact that these states have offered active adult living communities and other retirement facilities to cater to this market has also played a role. In fact, an estimated 13.1 percent of Arizona population is currently over 65 years of age. The large number of baby boomers retiring will increase demand for retirement amenities nationwide. The question remains as to what this means to Arizona in the future and more specifically, how this growth impacts the airport system. Retirees in Arizona become permanent or seasonal residents and have varying impacts based on their residency.

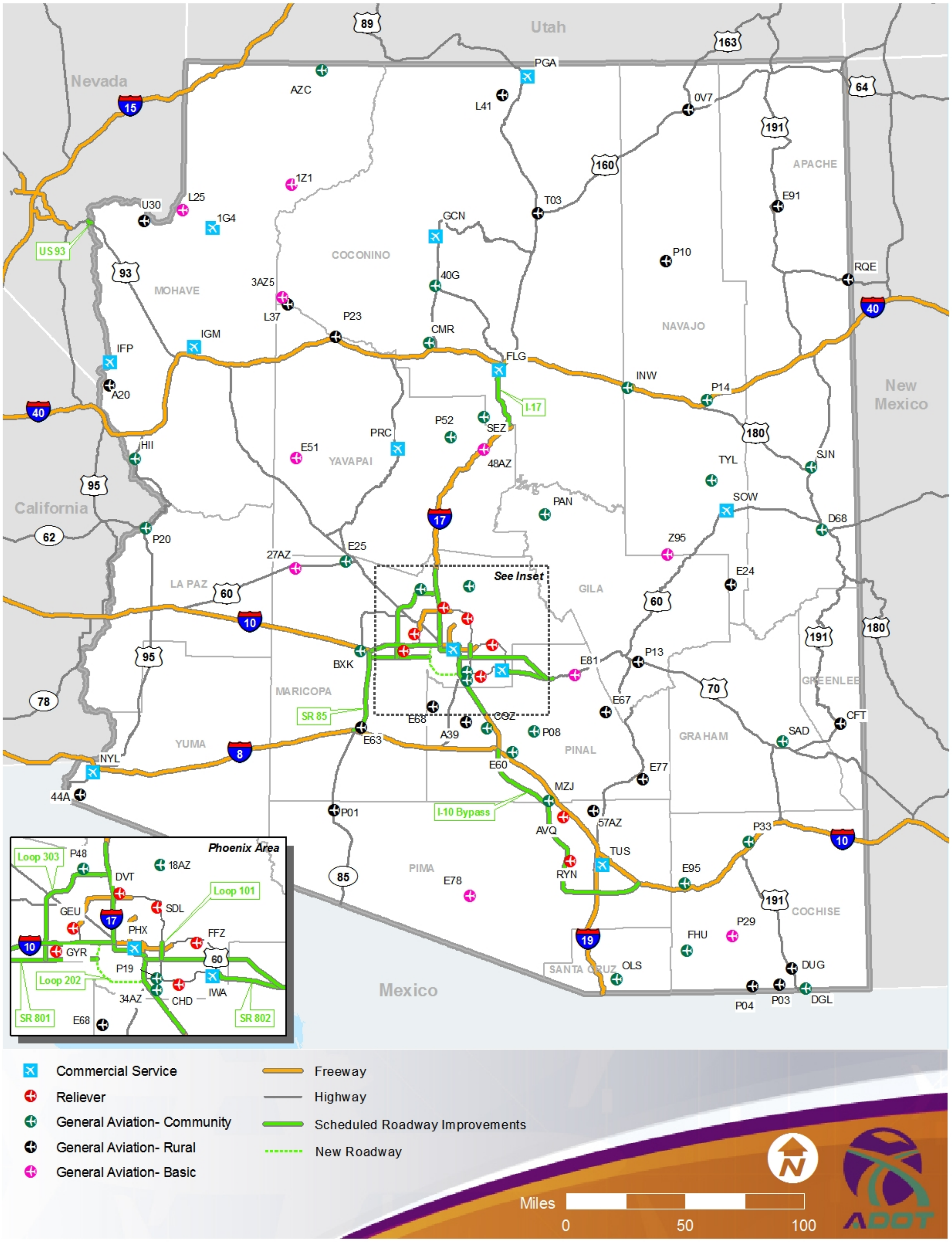
News reports over the last year have addressed how the economic downturn is guiding the choices for those nearing retirement. Many retirees, once planning to retire within two years, have postponed retirement to help weather the economic downturn. Others see the downturn as an opportunity to move to their retirement destination and buy a home at a price that is 25 percent lower than what they would have paid during the housing boom. A Del Webb survey reported that an estimated 50 percent of people surveyed about retirement expected to live in a different state upon retiring. However, the New York Times reported that, statistically, 90 percent of retirees are currently choosing to remain in their pre-retirement location to be near family, friends, and other established ties. This would mean that a growing economy that is attracting a large population would inherently keep most of that population once they retired. This translates to a broader span of airport users as state residents continue to span all age groups.

While Arizona is expected to remain a larger player in the retiree/second home market, the cost of relocating or choosing to purchase a second home may slow the influx of new retirees/vacation home residents into the state for now until the economy recovers. In a *U.S. News and World Report* article in September 2007, Prescott, Arizona was listed in the top 10 places to retire. Typically, this recognition spurs population growth. However, recognition of cities in this manner can often make the city more expensive because of its sudden popularity.

Major Surface Transportation Improvements

Major surface transportation improvements can have an impact on aviation. According to ADOT, there are numerous active roadway improvement projects around the state and several proposed improvements for the future. The majority of improvements are in the Sun Corridor. Figure 7-5 shows the location of proposed major roadway improvements and the airports in close proximity to these roadway improvements. These major improvements are discussed below.

Figure 7-5: Proposed Major Roadway Improvements



Sources: Airport Planning West, Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Interstate 17: ADOT and the Federal Highway Administration are currently conducting studies to develop a long-range plan for Interstate 17 (I-17) improvements. The study area covers the I-17 corridor between the State Route 179 traffic interchange (Sedona turnoff) and the Interstate 40 traffic interchange in Flagstaff. Improvements will increase capacity and ensure smooth operations for the projected traffic volumes over the next 20 to 30 years.

Interstate 10 by-pass for Tucson: State officials have been discussing the possibility of an I-10 by-pass west of Tucson. Although Pima County has already passed a resolution approving the bypass, an extensive study regarding the location would be required and is likely more than a decade away. If constructed, this project could improve capacity around metropolitan Tucson.

Metropolitan Phoenix Area: Major freeway/highway improvements proposed will help address increasing traffic congestion and expanding urban development around the metropolitan Phoenix area. These improvements include Loop 202, Loop 303, I-17, I-10, Loop 101, and U.S. Highway 60. The Loop 202 improvements consist of the construction of its final segment, which is proposed to continue west from its current I-10 location, go west along the Gila River Indian Community, then north aligned with 55th Avenue, and then connect with I-10 in west Phoenix. Loop 303 improvements includes construction of an interim four-lane divided roadway from Happy Valley Road to I-17 and an upgrade of the current interim roadway between I-10 and Grand Avenue to a six-lane freeway. New general purpose lanes and HOV lanes are proposed for portions of I-17, I-10, Loop 202, Loop 101, and U.S. Highway 60. All of these improvements will increase efficiency of the Phoenix metro area's roadway network. These improvements provide more efficient access to airports around the Valley, too.

State Route 85: SR 85 is primarily a four-lane divided roadway running north-south between Interstate 10 in Buckeye and Interstate 8 in Gila Bend. There are plans to turn this rural highway into a freeway through several phases to address anticipated traffic projections within the next 20 years.

U.S. Highway 93 (U.S. 93): U.S. 93 has been designated a North American Free Trade Agreement (NAFTA) route, but restrictions at the Hoover Dam along with several switchbacks has caused significant congestion. Consequently, a Hoover Dam Bypass project was needed. This project, currently underway, is a 3.5-mile corridor that begins in Clark County, Nevada, crosses the Colorado River approximately 1,500 feet downstream of the Hoover Dam, and ends in Mohave County, Arizona on U.S. 93. This by-pass will alleviate the heavy traffic congestion near the Dam today. There is also a four-lane divided highway under construction south of the dam. Other improvement projects are under way along U.S. 93 south of Interstate 40.

State Route 801: This proposed roadway is under study and would serve as an east-west I-10 reliever since I-10 is frequently congested. It is proposed to connect SR 85 to Loop 202 and interchange at Loop 303. This roadway, which is currently only funded within Maricopa County, would be designed and constructed sometime after 2015.

State Route 802: SR 802 is a proposed freeway in the Southeast Valley that would connect the Santan Freeway segment of Loop 202 near Phoenix-Mesa Gateway Airport to US 60 in western Pinal County. This roadway would be completed after 2015, with design completed and initial construction likely beginning prior to 2015.

Ongoing Studies: According to the Arizona State Transportation Improvement Program (STIP) for Fiscal Years 2009-2012, there are 25 studies under way for Arizona roadway improvements. The majority of these studies will be completed by 2011. Consequently, recommendations will be made for additional roadway improvements in the future.

Conclusions

ADOT Aeronautics and the state's airport system are facing and will continue to face numerous outside influences that have the ability to affect future aviation needs. By recognizing and monitoring these changes the state will be able to respond to the impacts associated with the airport system. More specifically, these impacts may mean that there are airport needs that are greater than those outlined in the SASP, particularly the needs of the Sun Corridor airports, or possibly the types of airports needed to serve demand in the future.

While factors such as population, employment, and tourism trends may intermittently be stagnant in the economy, this offers a pause to take a closer look at the airport system before the economy builds momentum again.

GOAL CATEGORY: DEVELOPMENT

Figure 7-6 restates the performance measures included under the Development goal category, noting each measure as either action- or information-oriented.

Figure 7-6: Performance Measures in the Development Goal Category

Performance Measure	*Informational/ Action*
Percent of population within a 30-minute drive time of each airport, by role category	Informational
Percent of communities in the state with a population greater than 5,000 within a 60-minute drive time of a commercial service airport	Informational
Percent of communities in the state with a population greater than 1,000 within a 30-minute drive time of a general aviation airport	Informational
Percent of population within a 30-minute drive time of a public use airport	Informational
Percent of population within a 30-minute drive time of a National Plan of Integrated Airport Systems (NPIAS) airport	Informational
Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach	Action
Percent of airports within a 30-minute drive time of an airport with ILS or LPV	Action
Percent of licensed pilots within a 30-minute drive time of an airport	Informational
Percent of airports capable of supporting emergency medical transport aircraft:	Action
Percent of communities in the state with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability	Informational
Percent of airports with on-site weather reporting and percent of statewide area within 25 nautical miles of an airport with on-site weather reporting	Action
Percent of population and area within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)	Action
Percent of airports with 24/7 fuel	Action
Percent of airports with jet fuel	Action
Percent of airports with sufficient operational capacity	Informational
Percent of airports projected to have sufficient operational capacity in 2030	Informational
Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion	Informational
Percent of population and employment centers that are within a 30-minute drive time of a system airport exceeding 60 percent demand/capacity, current and 2030	Informational
Airports with current (past 5 years) master plans	Action
Percent of airports with surrounding municipalities that have adopted “disclosure areas”	Action
Percent of airports with surrounding municipalities that have adopted controls/zoning to make land use in the airport environs compatible with airport operations and development	Action
Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77	Action
Percent of airports included in regional transportation plans	Action
Percent of airports that are recognized in local comprehensive plan	Action

Source: Wilbur Smith Associates

Each of these measures is discussed in the subsequent sections with regard to future system performance.

Percent of population within a 30-minute drive time of each airport, by role category

It is essential for Arizona to have a strategy that provides the state with a system of airports that supports current as well as long-term air transportation and economic needs, including providing reasonably convenient access. The foundation of such a strategy includes the identification of the system of airports that is needed to best serve Arizona's anticipated population and economic growth.

As part of the SASP, airports were initially placed into one of five roles: Commercial Service, Reliever, GA-Community, GA-Rural, and GA-Basic (see Chapter Five for the full role analysis). An in-depth quantitative process used many factors to place each airport into one of these five roles. When these airport roles were identified, it was noted that the current roles would be evaluated to determine if changes were needed in the future in order for the state system to function more effectively.

To better evaluate the coverage provided by the various airport role categories, the coverage provided by each category was reviewed independently, as well as an "additive" process wherein the additional coverage provided by the various roles were added to the coverage from the previous roles (see Figure 7-7). For example, the Commercial Service airports provide coverage to 68 percent of Arizona's population, but when the additional coverage provided by Reliever airports is combined with the Commercial Service coverage, 74 percent of the population is within reasonable access to airports in one of these two categories. Commercial Service, Reliever, and GA-Community airports provide coverage to 82 percent of Arizona's population. By adding in the GA-Rural and GA-Basic airports, an additional four percent of the population is provided with access, providing a total of 86 percent coverage to all of Arizona's residents by the existing airport system.

Figure 7-7: Current and Target Coverage of Each Airport Role Category

	Current Coverage-Combined Roles	*Current Coverage-Individual Role Category*	*Future Target*
All System Airports	86%	86%	86%
Commercial Service	68%	68%	68%
Reliever	74%	62%	62%
GA-Community	82%	58%	58%
GA-Rural	85%	9%	9%
GA-Basic	86%	1%	1%

Based on a review of the current roles for system airport, completed with the assistance of ADOT Aeronautics staff, it was determined that no changes in current airport roles appear to be warranted at this time. Therefore, the future target for population coverage by system airports will remain unchanged and this measure is considered informational only. There are several things that may impact the future coverage including the construction of new airports/closure of existing airports and demographic growth throughout the state.

Planned New/Replacement Airports

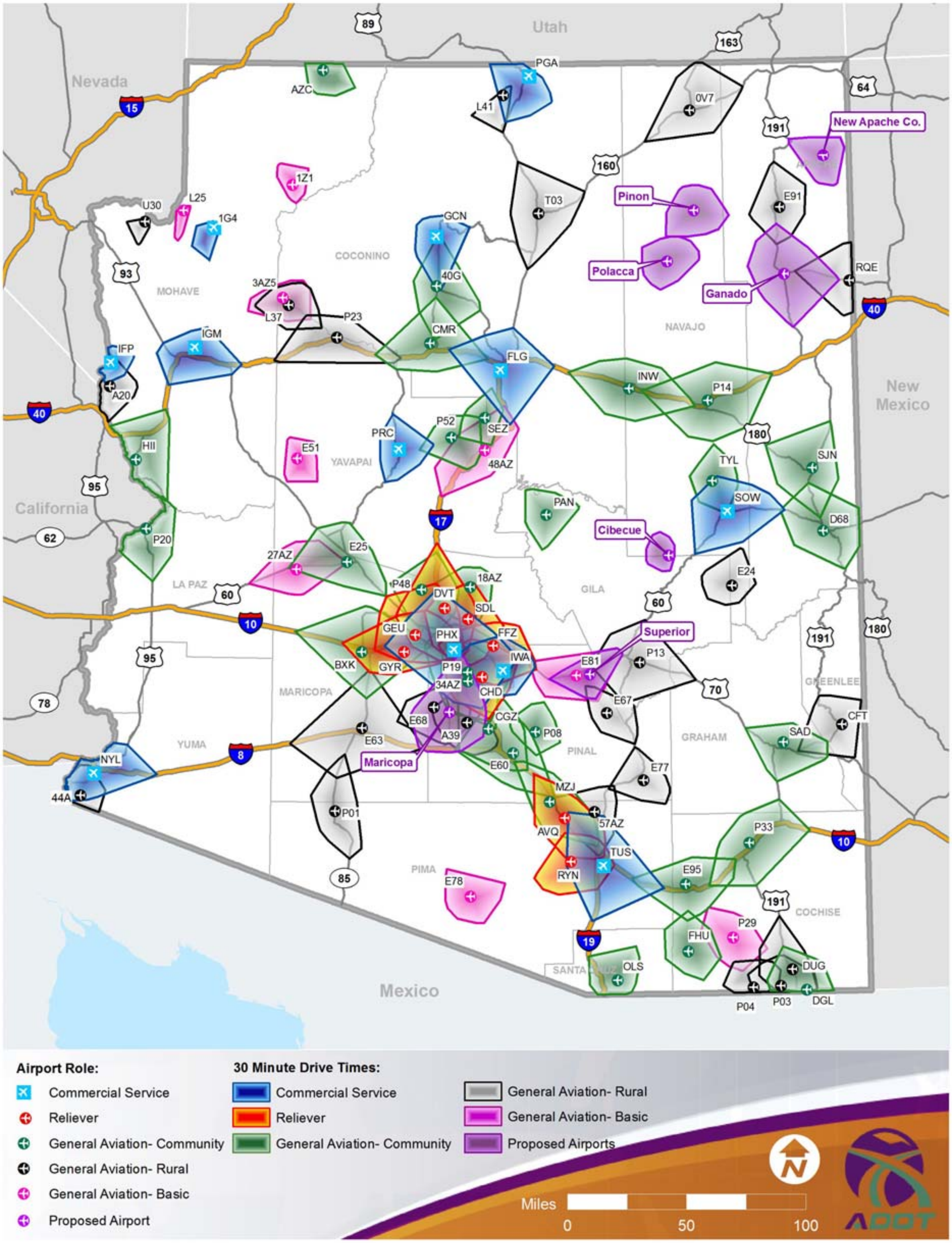
There are several proposed new or replacement general aviation airports being considered throughout Arizona. These airports and their 30-minute drive times are depicted on Figure 7-8. Approximately one percent additional population coverage would be provided by all seven new airports combined if and/or when these facilities were constructed. This is due to the fact that they are either planned to be developed on existing airport sites or there are very few people living in the remote areas such as the Native American communities where airports are being considered.

The new general aviation airports being planned by public sponsors include a replacement airport for Superior Municipal Airport and a new airport in the city of Maricopa in Pinal County. The new Superior Airport is a replacement to the existing airport and a needs analysis and site selection must still be completed. The need for a new airport in Superior is being driven largely by a large business user nearby. The site selection study for the new Maricopa airport was completed in 2008 and noted that the best site for the new airport is at the existing Estrella Sailport site. The development of Maricopa Airport is driven largely by the explosive demographic and socioeconomic growth that occurred and is projected to occur for the city of Maricopa and Pinal County.

Master plan/site selection studies are underway for two tribal airports: Polacca (Hopi Tribe) and Cibecue (White Mountain Apache Tribe). A new site for the Cibecue replacement airport has been identified two miles from the existing airport. The airport design is underway and the White Mountain Apache Tribe is currently applying for funding for the new airport. While the Polacca Airport Master Plan identified the need for a replacement airport, a site selection study has not been completed.

The Navajo Nation is also in the early planning stages to add three new airports that will provide additional access and coverage to several of the communities identified as being without adequate coverage. The Nation noted that they plan to rebuild Ganado Airport on the existing airport site. The second proposed new airport is in Pinon in Navajo County. The third new proposed airport is in the northeast corner of Arizona, and would serve Lukachukai, Tsaile, Rock Point, and Teec Nos Pos. The Navajo DOT is currently identifying potential sites for these last two new airports.

Figure 7-8: Locations of Proposed New/Replacement Airports in Relation to Existing Airport System



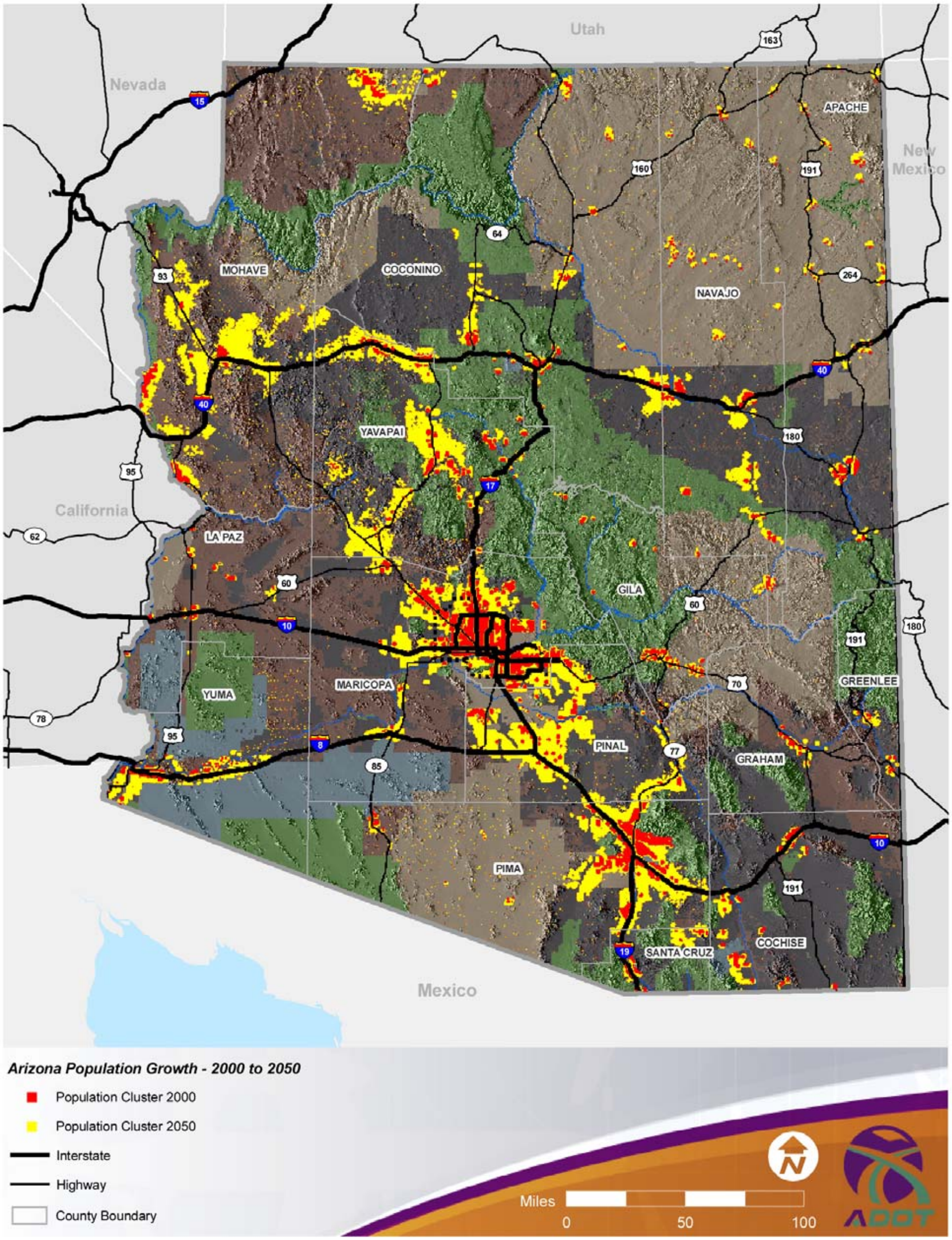
Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A.

Coverage for High Growth Corridors

As discussed in detail above, most of the accelerated socioeconomic and demographic growth in the state is projected to occur in the six counties that comprise the Sun Corridor. The Maricopa Association of Governments (MAG) has mapped the growth of population clusters in the state through 2050. The projected population growth as of 2000 is presented in Figure 7-9. As shown, much of the growth is projected to occur as outgrowths of current population centers along the major roadways. Both the Phoenix and Tucson metropolitan areas are projected to get larger and Pinal County, between the two metro areas will also grow rapidly. Other major growth corridors in the state include Wickenburg, Prescott, and along I-40, especially along the eastern half of the highway in the state and near Winslow and Holbrook.

The role analysis conducted as part of the SASP indicates that there are airports in the top three roles that are located in these high growth areas, however, analysis has indicated that not all of the airports meet the facility and service objectives associated with their roles. It is important that the airports in these high growth areas are well-equipped to handle the additional demands on the system that may result from the projected high growth. If existing airports in these regions cannot be expanded to meet demand from larger aircraft and on a more frequent basis, new airports should be considered to meet this demand and provide ample population coverage in the future. New airports beyond those that are already under consideration are not proposed as part of the SASP to meet demand, but ADOT is supportive of assisting communities that experience high growth in determining the true need for aviation facilities in the future.

Figure 7-9: Forecasted Population Growth in Arizona, 2000-2050



Sources: Maricopa Association of Governments, Wilbur Smith Associates

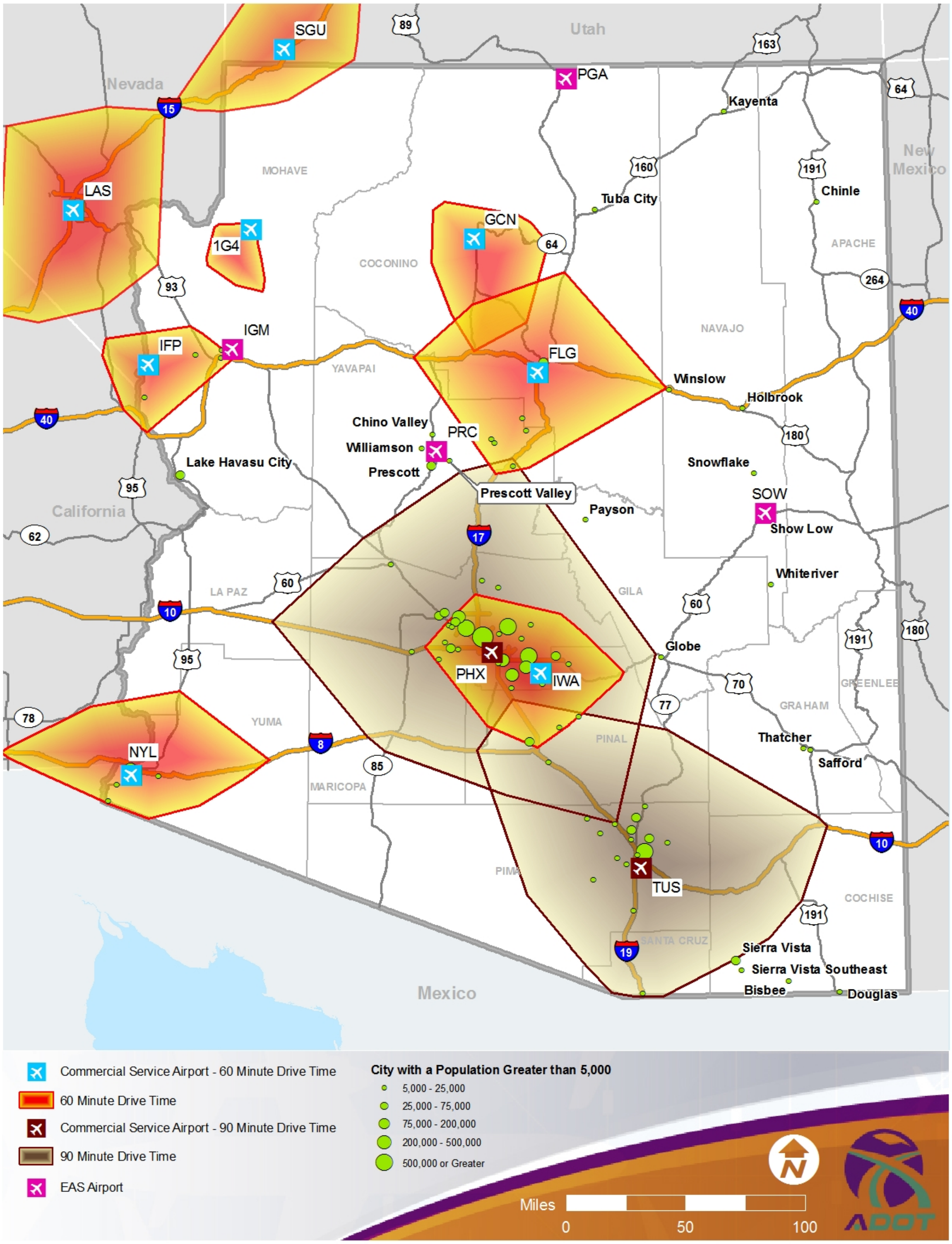
Percent of communities in the state with a population greater than 5,000 within a 60-minute drive time of a commercial service airport or 90 minutes of Phoenix-Sky Harbor International and Tucson International

It is generally desirable for most, if not all, of a state's population to be within a reasonable drive of a commercial service airport. The previous chapter of the SASP identified that 83 percent of Arizona communities having a population of at least 5,000 lie within a 90-minute drive time of Phoenix Sky Harbor International or Tucson International, or within a 60-minute drive time of one of the state's other 10 commercial service airports. The majority of the population that is not included within these areas is located in communities that have had commercial air service in the past including Lake Havasu City, which had commercial air service as recently as 2006, and Bisbee-Douglas and Holbrook, although this service was not provided in the recent past.

Changing airline service patterns, aircraft types serving the communities, and airline financial needs have impacted the ability of airports in small communities to successfully support airline service without some form of subsidy. Four of Arizona's commercial service airports are part of the Essential Air Service (EAS) program. These four airports are Page, Kingman, Show Low, and Prescott. Without their participation in this program and the federal subsidy that is associated with the program, even these airports are at risk of losing airline service, further impacting the level of population and number of communities with more than 5,000 persons that is within a reasonable drive time of a commercial service airport. If these four airports were to no longer have commercial airline service, coverage of the communities with a population of 5,000 or greater would drop from 82 percent to 74 percent. Figure 7-10 depicts this information on a map, showing the drive time areas of Arizona's commercial service network without its current EAS airports.

The commercial airline industry is ever-changing. It is the airlines, not the state or local communities that typically make decisions regarding the level of airline service. Due to the state's limited ability to impact commercial service levels, this performance measure is considered to be informational, not action-oriented. No recommendation is made to increase commercial service coverage of Arizona population centers.

Figure 7-10: Percent of Communities in the State with a Population Greater than 5,000 Within a 60-Minute Drive Time of a Commercial Service Airport or 90 minutes of Phoenix-Sky Harbor International and Tucson International, excluding Kingman, Page, Prescott, and Show Low



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of communities in the state with a population greater than 1,000 within a 30-minute drive time of a general aviation airport

Currently, 87 percent of Arizona communities having a population of at least 1,000 are within a 30-minute drive of any system airport. To more accurately depict the availability of airport access for Arizona's residents, it is necessary to also look at out-of-state airports which may serve Arizona communities. **Figure 7-11** shows all Arizona communities with a population of 1,000, existing system airports and 30-minute drive time areas, and out-of-state public use airports within a 30-minute drive time of Arizona. The following communities are served by out-of-state airports only:

- Ehrenberg
- Quartzsite
- Fredonia
- Houck

As part of this evaluation, a more detailed review of communities identified as having a population of 1,000 that are located just outside of general aviation airport 30-minute drive time areas was also conducted. While the GIS analysis provided 30-minute drive times based on average road speeds and conditions, in some cases, additional analysis showed that several of the identified communities are within 30 to 40 minutes and, for the purposes of the SASP, are close enough to existing airports to be considered to have adequate coverage. The following communities and statistical areas identified as having at least 1,000 in population are considered to have adequate airport coverage:

- Tanque Verde
- Strawberry
- Spring Valley
- Cordes Lake
- Wellton
- Paulden
- Mayer

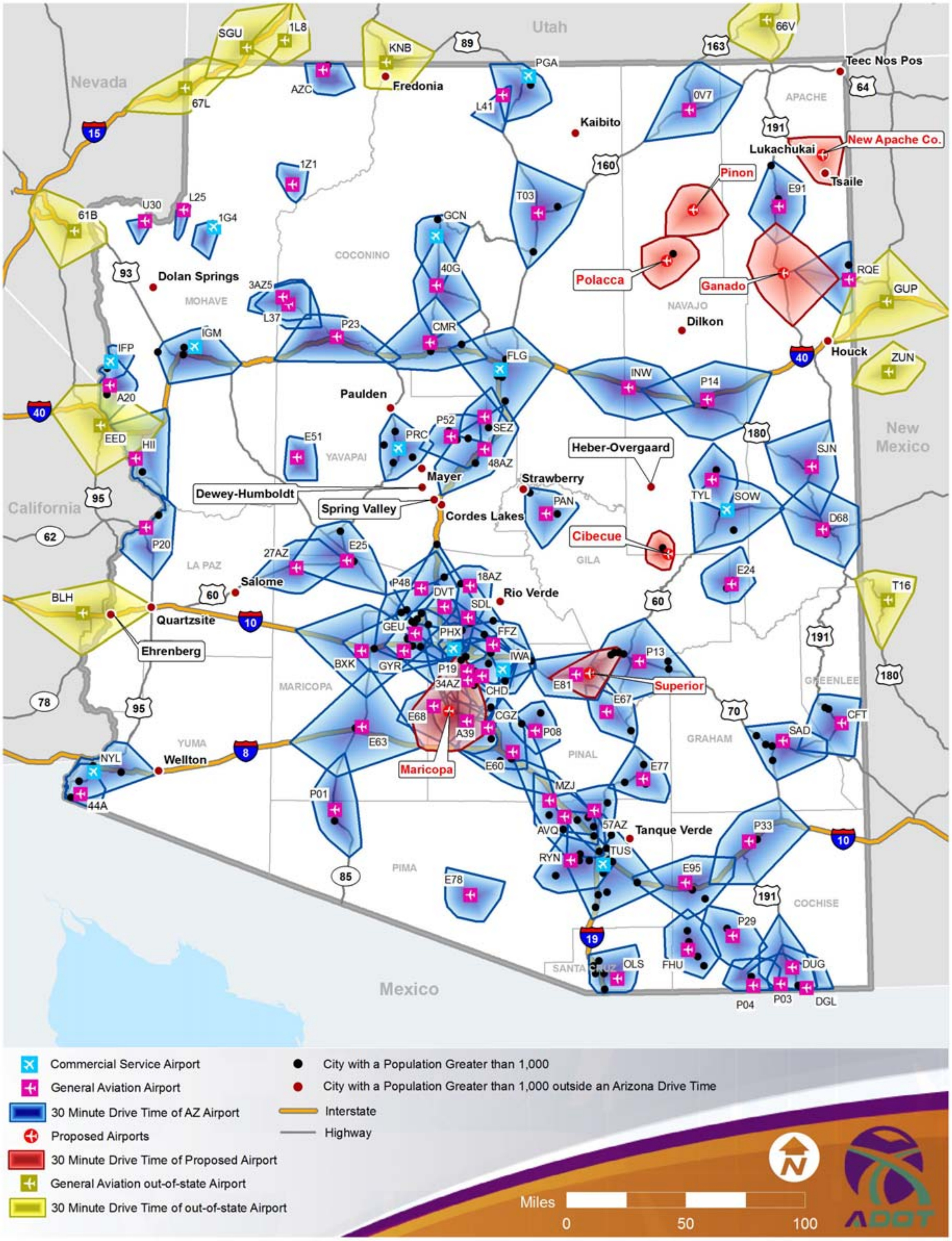
This is an informational performance measure. While there are 12 communities with a population of at least 1,000 which lie beyond a reasonable drive time that are considered to have inadequate access to aviation services within the existing Arizona system, there is no action associated with improving performance. Several of these communities are located within Navajo and Apache Counties.

- Dewey-Humboldt
- Dilkon
- Dolan Springs
- Ganado
- Heber-Overgaard
- Kaibito
- Lukachukai
- Pinon
- Rio Verde
- Salome
- Teec Nos Pos
- Tsaile

New Airports

As discussed above, there are several new airports in various stages of planning that are proposed in Arizona. These airports, located in or near the towns of Maricopa, Superior, Cibecue, Polacca, Pinon, Ganado, and Lukachukai, are also mapped in Figure 7-11. As shown, the airports would provide coverage for four additional communities with a population of at least 1,000 residents located on the Navajo Indian Reservation: Lukachukai, Tsaile, Pinon, and Ganado.

Figure 7-11: Communities in the State with a Population Greater than 1,000 within a 30-Minute Drive Time of a General Aviation Airport, Additional Coverage Provided by Out-of-State Airports, and Potential Coverage by New System Airports.



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of population within a 30-minute drive time of a public use airport

This information-oriented performance measure revealed that 85 percent of Arizona's population falls within a 30-minute drive time of a public use airport. While this coverage is considered adequate, the development of the proposed new airports would increase this coverage just one percentage point to 86 percent. ADOT is supportive of increasing the coverage provided by public use airports and has participated in new airport studies throughout the state for many years. However, the coverage currently provided is considered adequate and, at this time, no new airports are proposed as part of the SASP for the purpose of increasing public-use airport accessibility and coverage. As the population of the state continues to grow and expands from current populated areas, future SASP updates will continue to examine coverage provided by public use airports and the need for additional public use facilities.

Percent of population within a 30-minute drive time of a NPIAS Airport

The results from Chapter Six for this informational performance measure showed that 83 percent of Arizona's population is located within a 30-minute drive time of an airport included in the National Plan of Integrated Airport Systems (NPIAS). An analysis was completed to evaluate other airports' eligibility for inclusion in the NPIAS. This analysis is presented in its entirety as Appendix C. Several airports were analyzed for inclusion in the NPIAS based on these standard eligibility criteria:

- Facilities: runway length and width, surface, and approach
- Activity: operations and based aircraft
- Former inclusion in the NPIAS
- Proximity to nearest NPIAS airport; airports which serve isolated communities
- Reliever status
- Airports which serve the U.S. Postal Service
- Airports with a national defense role
- Airports included in the SASP
- Positive results of a benefit-cost analysis

At the current time, Rolle Airfield does not meet the eligibility to be considered for NPIAS inclusion due to a low number of current and projected based aircraft. However, the military plans continued growth at Yuma International Airport in the next 10 years. As Yuma International looks for options to relieve congestion in the future, Rolle Airfield may play a larger role in the region, especially for recreational users. Rolle Airport is currently owned by the U.S. Bureau of Reclamation and is leased to the Yuma Airport Authority. The Authority has stated that it hopes to re-sign a 25-year lease with the bureau, with the current lease expiring in 2011. After the 25-year period, the authority hopes to double its current size to approximately 1,280 acres and purchase the airport. Rolle Airfield should be monitored for possible future inclusion in the NPIAS as the airport grows.

A new airport at Maricopa, and replacement airports at Superior, Cibecue, Polacca, and others on the Navajo Indian Reservation are expected to be included in the NPIAS when operational. The addition of these airports would increase population coverage by NPIAS airports to 84 percent of the state total.

Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach

Currently, 80 percent of Arizona's population is located within a 30-minute drive time of an airport with an instrument approach. Instrument approaches not only help during periods of poor weather, they also help expedite traffic into and out of the congested Phoenix and Tucson metro areas. This performance measure is action-oriented. Facility and service objectives indicate that all airports in the Commercial Service, GA-Reliever, GA-Community, and GA-Rural roles are recommended to have some sort of instrument approach. It appears that all recommended airports can currently accommodate an instrument approach but more detailed analysis will be needed to determine the exact approach. These airports are listed in Figure 7-12. If these airports are successful in installing an instrument approach, system performance would increase to 85 percent coverage of the total statewide population.

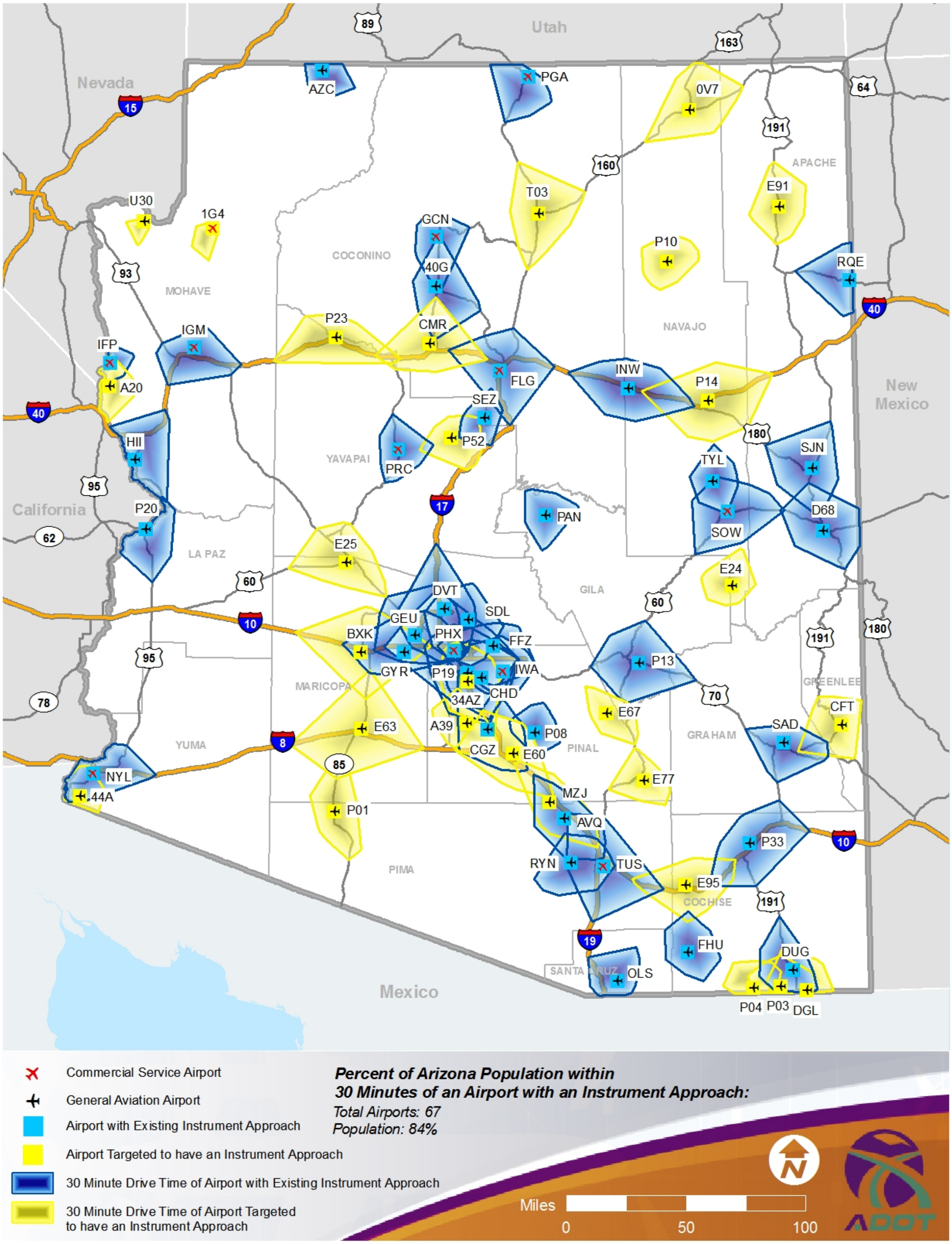
Figure 7-12: Airports Needing an Instrument Approach to Meet Target

Associated City	*Airport Name*	*Associated City*	*Airport Name*
Commercial Service: Objective – Near-Precision LPV		GA-Rural: Objective – Non-Precision	
Peach Springs	Grand Canyon West	Ajo	Eric Marcus Municipal
GA-Community: Objective – Non-Precision		Bisbee	Bisbee Municipal
Benson	Benson Municipal	Bullhead City	Sun Valley
Buckeye	Buckeye Municipal	Chinle	Chinle Municipal
Chandler	Memorial Airfield	Clifton/Morenci	Greenlee County
Cottonwood	Cottonwood	Douglas	Cochise College
Douglas	Douglas Municipal	Gila Bend	Gila Bend Municipal
Eloy	Eloy Municipal	Kayenta	Kayenta
Holbrook	Holbrook Municipal	Kearny	Kearny
Marana	Pinal Airpark	Phoenix	Phoenix Regional
Wickenburg	Wickenburg Municipal	Polacca	Polacca
Williams	H.A. Clark Memorial Field	San Luis	Rolle Airfield
		San Manuel	San Manuel/Ray/Blair
		Seligman	Seligman
		Temple Bar	Temple Bar
		Tuba City	Tuba City
		Whiteriver	Whiteriver

Source: Wilbur Smith Associates

Figure 7-13 depicts the enhanced coverage that would be available if instrument approach capabilities are available at all Commercial Service, GA-Reliever, GA-Community, and GA-Rural airports. If all airports meet this performance measure target, the number of system airports that have an instrument approach would increase from 39 to 67.

Figure 7-13: Potential Coverage of Airports Able to Support an Instrument Approach



Source: Wilbur Smith Associates

Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of airports within a 30-minute drive time of an alternate airport with an Instrument Landing System (ILS) or LPV (300', 1 mile)

Use of Localizer Performance with Vertical guidance (LPV) approach systems is growing rapidly. An LPV approach provides near-precision approach capabilities and is operationally similar to an ILS. LPVs are less expensive than ILS approaches because no navigation infrastructure needs to be installed at airport runways.[1] There are currently over 675 LPV approaches in use, and the FAA has plans to install another 300 each year. This has been made feasible largely due to expansion of the Wide Area Augmentation System (WAAS) network, which was upgraded and completed in late 2008.

This performance measure is action-oriented and several system airports are recommended to install an LPV approach to improve performance. Currently, 31 percent of SASP airports are located within a 30-minute drive time of an alternate airport having an ILS or LPV. Facility and service objectives, as well as a preliminary feasibility analysis, revealed that nearly all airports in the Commercial Service and Reliever categories appear capable of upgrading their approach to an LPV. Based on SASP analysis, the following six Commercial Service and Reliever airports should be evaluated for an upgrade to an LPV approach in order to meet the targets:

- Kingman
- Grand Canyon West
- Show Low Regional
- Phoenix Goodyear
- Falcon Field
- Marana Regional

Based on a preliminary analysis, it appears that two GA-Relievers, Chandler Municipal and Scottsdale, are incapable of supporting an LPV approaches with the near-precision minima (300 feet, 1 mile) desired for this performance measure. Scottsdale has immovable objects in its primary surface and Chandler Municipal can not meet the appropriate design standards for its runway/taxiway separation. These airports support GPS non-precision approaches. It should be noted that these two airports are both within a 30-minute drive time of an alternate airport with an ILS or LPV approach.

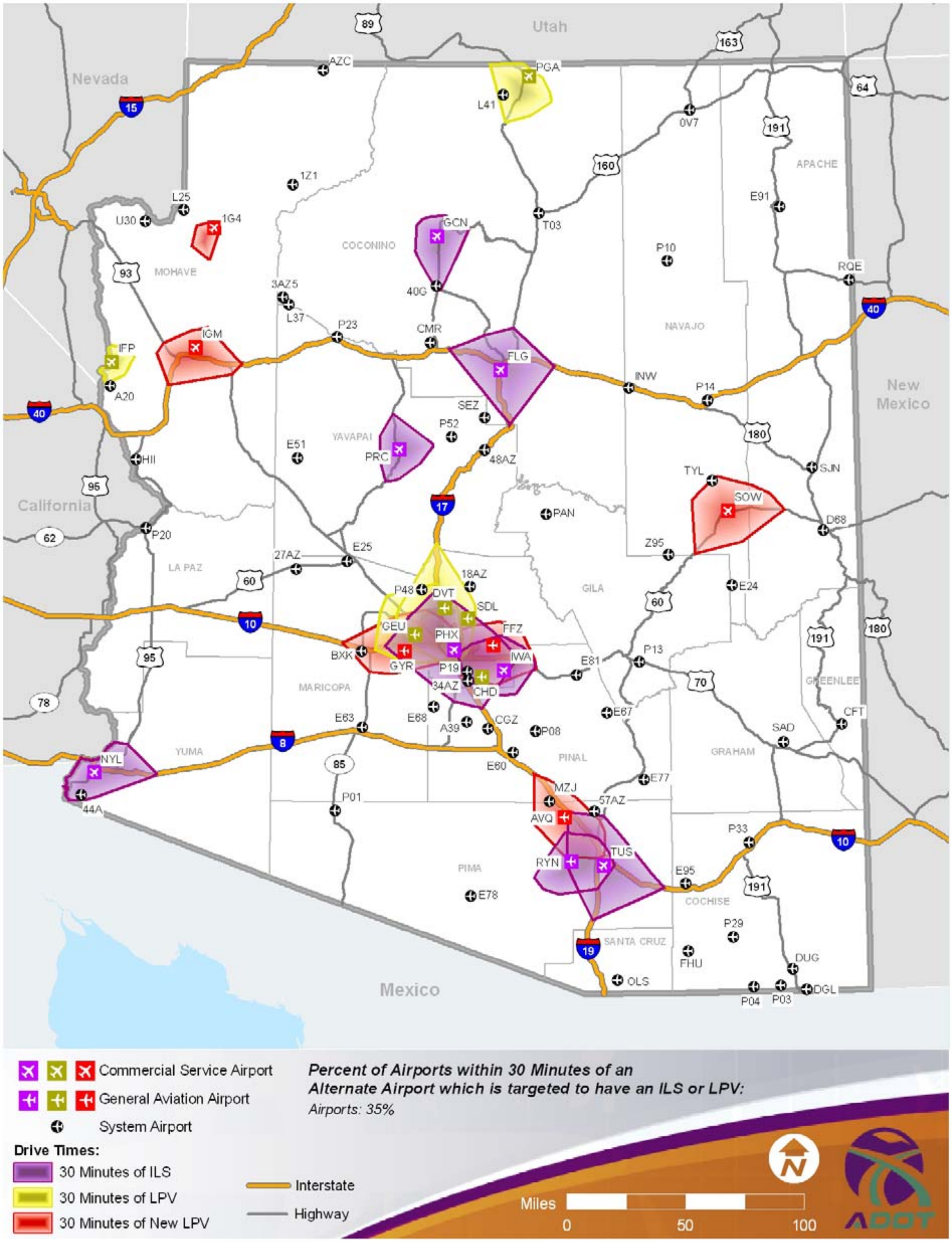
Figure 7-14 depicts the additional coverage provided by the six airports if LPV approaches are installed. This would improve coverage to 35 percent of system airports.

Percent of licensed pilots within a 30-minute drive time of a system airport

Analysis in the previous chapter revealed that 94 percent of Arizona's registered pilots are located within a 30-minute drive time of an existing system airport. This excellent level of coverage is likely to improve over time as new pilots are most likely to reside in areas of existing airport coverage or in areas where new airports are proposed. As previously noted, new airports are proposed at five locations throughout Arizona. These airports would provide additional coverage to existing and future licensed pilots. This is an informational performance measure, and therefore no additional action is required.

[1] *WAAS Status and LPV Q&As,* Federal Aviation Administration

Figure 7-14: Potential Additional Coverage of Airports within 30 Minutes of an Alternate Airport with an ILS or LPV



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of airports with on-site weather reporting and percent of statewide area within 25 nautical miles of an airport with on-site weather reporting

Although a large portion of Arizona experiences mild weather conditions for much of the year, there are times and locations where weather reporting is extremely valuable for safe aircraft operations. Currently, 46 percent of Arizona's airport system has on-site weather reporting provided by an AWOS or ASOS. Fifty percent of Arizona's land area is within 25 nautical miles of a system airport with on-site weather reporting. Completed in 2007, the *Arizona AWOS Network Study* reviewed individual airport AWOS requirements. The study identified an AWOS network consisting of 30 existing AWOS/ASOS units and recommended 26 new AWOS units for inclusion in the network. Planned AWOS units were dispersed around the state to offer the most weather-reporting coverage with the fewest units. AWOS units were not recommended at airports covered within 25 nautical miles of an airport with on-site weather reporting, as weather reporting at these airports can be handled by nearby AWOS or ASOS unit.

The recommendations in the AWOS Network Study have been adopted for the purpose of the SASP for this action-oriented performance measure. Since completion of the study in 2007, AWOS units have been installed at Laughlin-Bullhead International, Benson, San Carlos Apache, Springerville Municipal, Wickenburg, Buckeye, Greenlee County, and Avi Suquilla. **Figure 7-15** presents the additional airports recommended for installation of new AWOS units as noted in the *AWOS Network Study*.

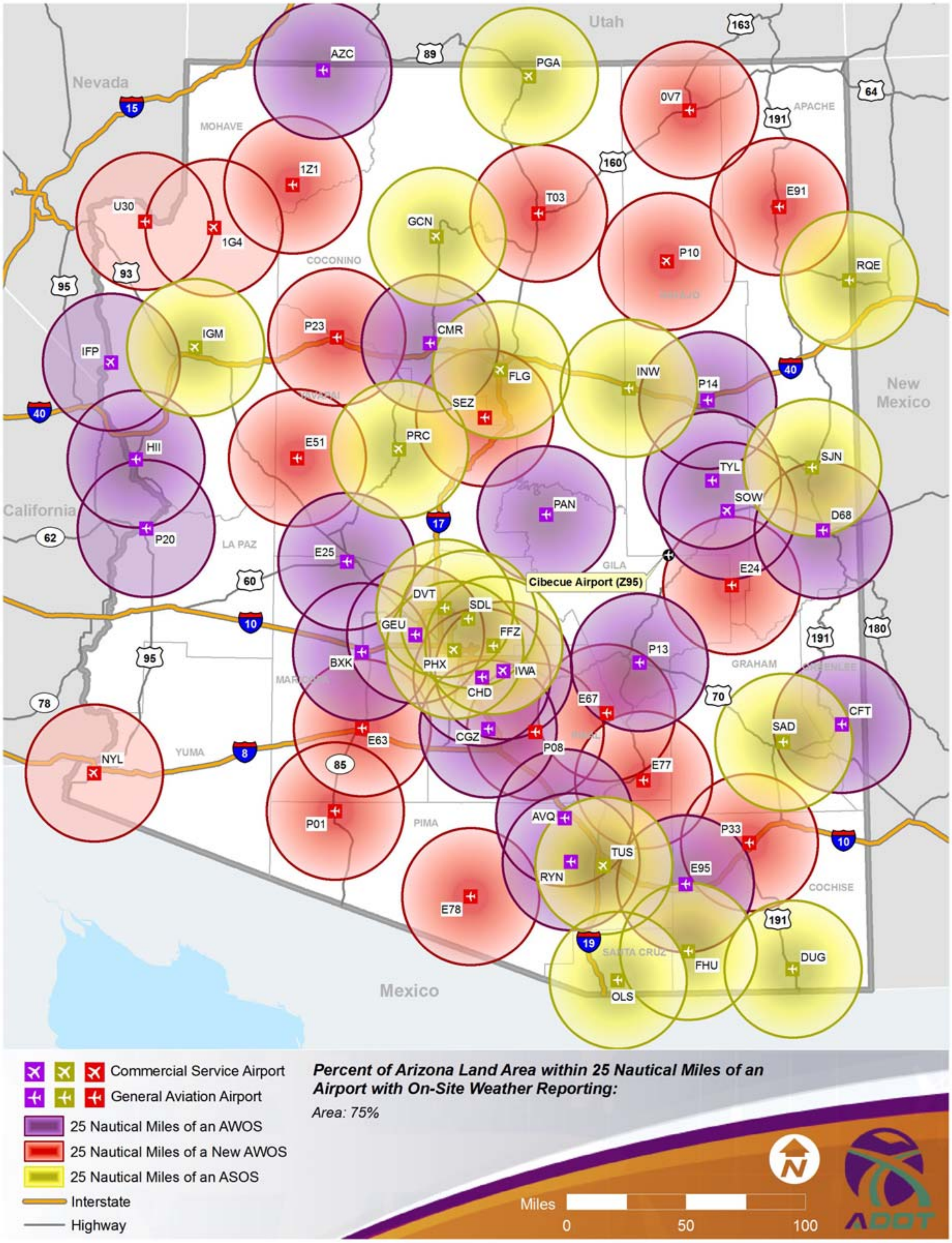
Figure 7-15: Airports Recommended by the ADOT *AWOS Network Study* to Install an AWOS

Associated City	*Airport Name*	*Associated City*	*Airport Name*
Commercial Service		**GA-Rural**	
Peach Springs	Grand Canyon West	Kearny	Kearny
Yuma	Yuma International	Polacca	Polacca
GA-Community		San Manuel	San Manuel/Ray/Blair
Coolidge	Coolidge Municipal	Seligman	Seligman
Sedona	Sedona	Temple Bar	Temple Bar
Willcox	Cochise County	Tuba City	Tuba City
GA-Rural		Whiteriver	Whiteriver
Ajo	Eric Marcus Municipal	**GA-Basic**	
Chinle	Chinle Municipal	Bagdad	Bagdad
Gila Bend	Gila Bend Municipal	Sells	Sells
Kayenta	Kayenta	Whitmore	Grand Canyon Bar Ten Airstrip

Source: ADOT *AWOS Network Study 2007*

Figure 7-16 depicts potential increased weather reporting facility coverage should they be installed at all airports recommended in the *AWOS Network Study*. With the recommendations implemented, the percent of SASP airports with on-site weather reporting will be 67 percent and land area coverage of on-site weather reporting increases to 75 percent of the state total. As depicted, the coverage provided would be extensive for Arizona.

Figure 7-16: Potential Additional Land Area Coverage Provided by On-Site Weather Reporting



Sources: ADOT AWOS Network Study 2007, Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

There are 22 airports in the system that are considered to have adequate coverage because they are within the 25 nautical mile coverage area of another system airport with on-site weather reporting. There is one airport which is not covered by the optimal AWOS network: Cibecue. Cibecue is very close to the 25 nautical mile areas of several airports.

Percent of airports capable of supporting emergency/physician/medical transport aircraft

As detailed in Chapter Six, emergency medical operators have specific facilities that they desire when operating at an airport. The following facilities represent the ideal airport conditions for these operators:

- Runway length of 4,000 feet or greater
- Well-maintained pavement on runways
- On-site weather reporting
- Instrument approach procedure
- Rotating beacon
- Medium or high intensity runway lighting
- Full perimeter fencing (desired)
- Approach landing system (ALS) (desired)

Currently, 40 percent of airports included in the SASP meet the minimum conditions for this performance measure. Target performance of this measure is based on whether or not the airport met the facility and service objectives, as well as the recommendations from the *AWOS Network Study* completed in 2007. Although full perimeter airport fencing and an approach lighting system are desired facilities for this performance measure, they are not required or mandated by the operators and therefore are not included as a condition to meet the target performance. Inclusion in the AWOS network qualifies an airport for this performance measure.

For this action-oriented performance measure, future target system-wide performance is 72 percent of all airports based on the analysis of facility and service objectives and the AWOS network recommendations. Figure 7-17 details which airports should add projects to meet this performance measure. The table also details whether an airport is recommended by the *AWOS Network Study* to install an AWOS or will be covered by the existing AWOS network and therefore considered compliant with the weather reporting element of this performance measure.

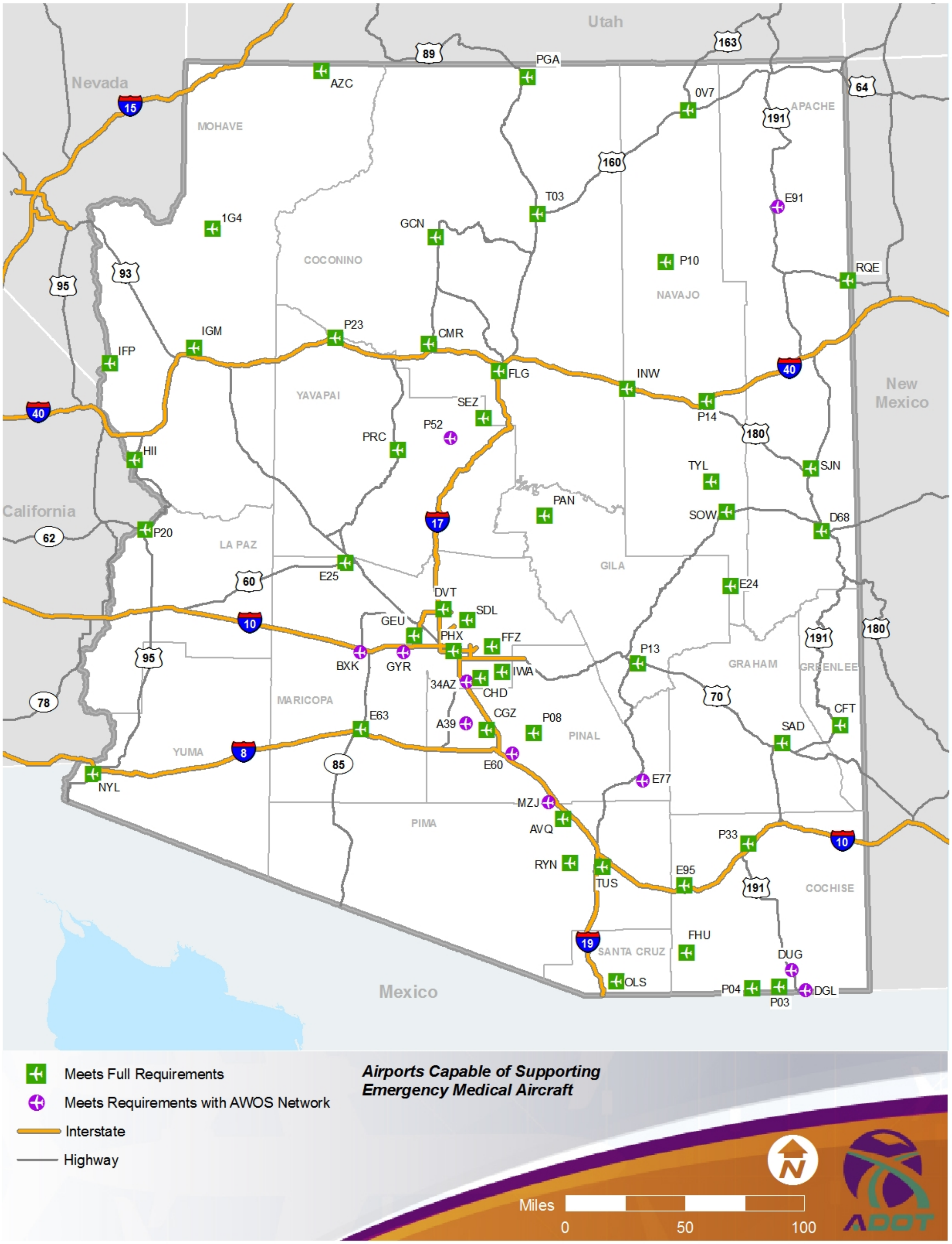
Figure 7-18 depicts the geographic distribution of the airports throughout Arizona that currently meet the measure and those that have the potential to meet the target. It is important for these airports that meet the conditions to have widespread coverage to provide access to more remote areas. Distribution throughout the state is generally even, but there are areas with fewer airports meeting these requirements, such as in the southwest and northeast. The map also depicts which airports meet the full conditions and which ones are located within the AWOS network but do not have on-site weather reporting.

Figure 7-17: Airports Needing Projects to Ideally Support Medical Aircraft Operations

Associated City	*Airport Name*	*Runway Length*	*On-Site Weather Reporting*	*Instrument Approach*	*Rotating Beacon*	*HIRL/ MIRL*
Commercial Service						
Peach Springs	Grand Canyon West	-	Install New AWOS	Install	Install	Install
Yuma	Yuma International	-	Install New AWOS	-	-	-
Reliever						
Goodyear	Phoenix Goodyear	-	Served by Glendale	-	-	-
GA-Community						
Benson	Benson Municipal	-	-	Install	-	-
Buckeye	Buckeye Municipal	-	-	Install	-	-
Chandler	Memorial Airfield	-	Served by PHX/ Chandler	Install	Install	Install
Coolidge	Coolidge Municipal	-	Install New AWOS	-	-	-
Cottonwood	Cottonwood	-	Served by Sedona/ Prescott	Install	-	-
Douglas	Douglas Municipal	-	Served by Bisbee-Douglas	Install	-	-
Eloy	Eloy Municipal	+100’	Served by Casa Grande	Install	-	-
Holbrook	Holbrook Municipal	-	-	Install	-	-
Marana	Pinal Airpark	-	Served by Marana	Install	-	-
Wickenburg	Wickenburg Municipal	-	-	Install	-	-
Willcox	Cochise County	-	Install New AWOS	-	-	-
Williams	H.A. Clark Memorial Field	-	-	Install	-	-
GA-Rural						
Bisbee	Bisbee Municipal	-	Served by Bisbee-Douglas	Install	-	-
Chinle	Chinle Municipal	-	Install New AWOS	Install	-	-
Clifton/Morenci	Greenlee County	-	-	Install	-	-
Douglas	Cochise College	-	Served by Bisbee-Douglas	Install	-	Install
Gila Bend	Gila Bend Municipal	-	Install New AWOS	Install	-	-
Kayenta	Kayenta	-	Install New AWOS	Install	-	-
Phoenix	Phoenix Regional	-	Served by Casa Grande/Chandler	Install	Install	Install
Polacca	Polacca	-	Install New AWOS	Install	Install	Install
San Manuel	San Manuel/Ray/Blair	-	Install New AWOS	Install	Install	Install
Seligman	Seligman	-	Install New AWOS	Install	-	-
Tuba City	Tuba City	-	Install New AWOS	Install	-	-
Whiteriver	Whiteriver	-	Install New AWOS	Install	-	-

Source: Wilbur Smith Associates

Figure 7-18: Potential Additional Airports Capable of Supporting Emergency/Physician/Medical Transport Aircraft



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of communities in the state with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability

Of Arizona's communities with at least 15,000 residents, only the Census-designated place of Tanque Verde falls outside a 30-minute drive time market area of airports meeting these requirements. As previously stated in this chapter, Tanque Verde's proximity to Tucson International provides the area with adequate coverage, as it rests on the very edge of the market area. This is an informational performance measure and therefore no further action is required.

Percent of population within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)

Poor weather conditions do not frequently impact much of Arizona. However, it is important that the system can accommodate those instances of poor weather, especially in the northern and eastern portions of the state. Target performance for this measure was developed based on which airports can meet the facility and service objectives for paved runways and approaches, and which airports are recommended for AWOS installation in the *AWOS Network Study*. Thirty-one system airports currently have an all weather runway, covering 77 percent of the state's total population.

Figure 7-19 details projects needed at 33 system airports to meet this action-oriented performance measure target. All of the airports already meet the paved runway element of this measure. The *AWOS Network Study* did not recommend an AWOS at 10 of the airports since they are located within 25 nautical miles of an airport that has (or plans to have) an on-site AWOS or ASOS. For the purpose of this measure, these airports meet the AWOS element since their weather reporting coverage is deemed adequate.

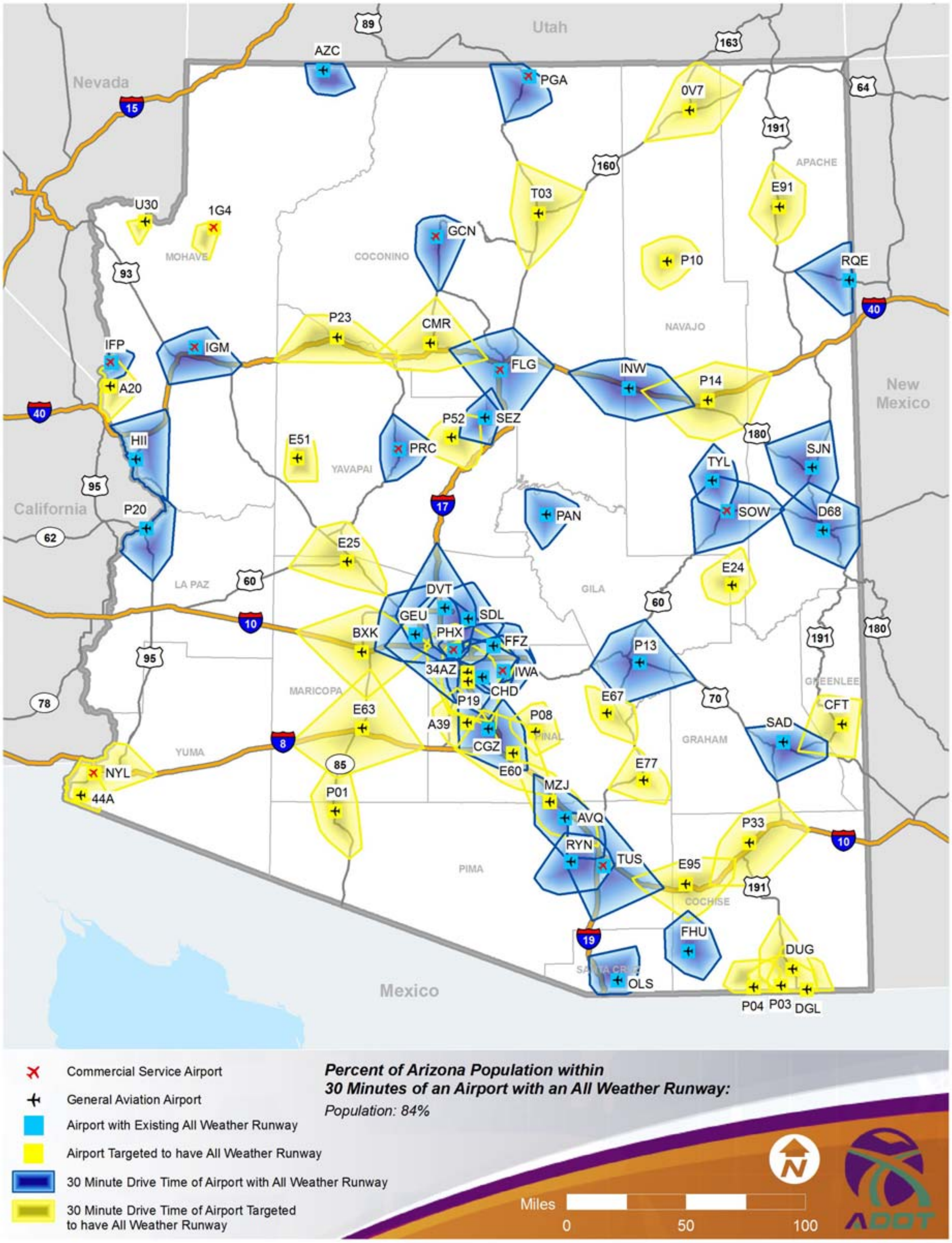
Figure 7-20 maps the enhanced coverage that would be provided if all airports recommended in this performance measure have a paved runway, an instrument approach, and weather reporting. The resulting target population coverage if all airports make the recommended improvements is 84 percent of the state total.

Figure 7-19: Airport Projects Needed to Meet the All-Weather Runway Performance Measure Target

Associated City	*Airport Name*	*ID*	*Weather Reporting*	*Runway Surface*	*Instrument Approach*
Commercial Service					
Peach Springs	Grand Canyon West	1G4	Install AWOS	-	Install
Yuma	Yuma International	NYL	Install AWOS	-	-
Reliever					
Goodyear	Phoenix Goodyear	GYR	Served by Glendale	-	-
GA-Community					
Benson	Benson Municipal	E95	-	-	Install
Buckeye	Buckeye Municipal	BXK	-	-	Install
Chandler	Memorial Airfield	34AZ	Served by PHX/ Chandler	-	Install
Coolidge	Coolidge Municipal	P08	Install AWOS	-	-
Cottonwood	Cottonwood	P52	Served by Sedona/ Prescott	-	Install
Douglas	Douglas Municipal	DGL	Served by Bisbee-Douglas	-	Install
Eloy	Eloy Municipal	E60	Served by Casa Grande	-	Install
Holbrook	Holbrook Municipal	P14	-	-	Install
Marana	Pinal Airpark	MZJ	Served by Marana	-	Install
Wickenburg	Wickenburg Municipal	E25	-	-	Install
Willcox	Cochise County	P33	Install AWOS	-	-
Williams	H.A. Clark Memorial Field	CMR	-	-	Install
GA-Rural					
Ajo	Eric Marcus Municipal	P01	Install AWOS	-	Install
Bisbee	Bisbee Municipal	P04	Served by Douglas Bisbee-	-	Install
Bullhead City	Sun Valley	A20	Served by Laughlin/ Bullhead	-	Install
Chinle	Chinle Municipal	E91	Install AWOS	-	Install
Clifton/Morenci	Greenlee County	CFT	-	-	Install
Douglas	Cochise College	P03	Served by Douglas Bisbee-	-	Install
Gila Bend	Gila Bend Municipal	E63	Install AWOS	-	Install
Kayenta	Kayenta	0V7	Install AWOS	-	Install
Kearny	Kearny	E67	Install AWOS	-	Install
Phoenix	Phoenix Regional	A39	Served by Casa Grande/Chandler	-	Install
Polacca	Polacca	P10	Install AWOS	-	Install
San Luis	Rolle Airfield	44A	Served by Yuma	-	Install
San Manuel	San Manuel/Ray/Blair	E77	Install AWOS	-	Install
Seligman	Seligman	P23	Install AWOS	-	Install
Temple Bar	Temple Bar	U30	Install AWOS	-	Install
Tuba City	Tuba City	T03	Install AWOS	-	Install
Whiteriver	Whiteriver	E24	Install AWOS	-	Install

Sources: ADOT *AWOS Network Study* 2007, Wilbur Smith Associates

Figure 7-20: Potential Coverage of Airports with an All Weather Runway



Sources: ADOT *AWOS Network Study 2007*, Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Percent of airports meeting aviation fuel goals

Percent of airports with 24/7 fuel

Currently, 46 percent of SASP airports provide either Jet A or AvGas 24 hours a day, seven days a week. This can be accomplished with a credit card reader pump or full-service FBO. Facility and service objectives established in a previous chapter recommend that Commercial Service and Reliever airports should provide both Jet A and AvGas on a 24/7 basis. As shown in **Figure 7-21**, six of the 20 airports comprising the Commercial Service and Reliever categories currently do not have AvGas and Jet A available 24 hours a day, seven days a week. One airport, Chandler Municipal, has only AvGas available 24/7. Therefore the recommended action is that service be upgraded to 24-hour availability for these airports. This will increase full system performance to 52 percent of all airports.

Figure 7-21: Commercial Service and Reliever Airports Needing 24/7 Fuel to Meet Target

Associated City	*Airport Name*	*AvGas 24/7*	*Jet A 24/7*	*Recommendation*
Commercial Service				
Bullhead City	Laughlin/Bullhead International	N	N	Add 24/7 AvGas and Jet A
Grand Canyon	Grand Canyon National Park	N	N	Add 24/7 AvGas and Jet A
Peach Springs	Grand Canyon West	N	N	Add 24/7 AvGas and Jet A
Prescott	Ernest A. Love Field	N	N	Add 24/7 AvGas and Jet A
Reliever				
Chandler	Chandler Municipal	Y	N	Add 24/7 Jet A
Goodyear	Phoenix Goodyear	N	N	Add 24/7 AvGas and Jet A

Source: *Airport Inventory & Data Survey* 2008

Percent of airports with jet fuel

Fifty-two percent of all SASP airports currently have jet fuel available to the public. Facility and service objectives previously established noted that Commercial Service, Reliever, and GA-Community airports should provide jet fuel. Of the 49 airports which make up these three role categories, 42 currently offer Jet A fuel to the public. One of the seven remaining airports, Pleasant Valley, is private, and therefore has no recommended upgrade. The recommended action is adding jet fuel service at the six remaining airports in these roles will improve full system performance to 59 percent of the total. The following six airports should add jet fuel service:

- Grand Canyon West
- Chandler – Memorial Airfield
- Cottonwood
- Holbrook
- Taylor
- Williams – H.A. Clark Memorial Field

Percent of airports meeting capacity goals

Sufficient operational capacity at airports in Arizona, especially in the Phoenix and Tucson metropolitan areas, has been an ongoing concern in the aviation community over the last decade. Although airports can operate safely above the FAA's 60 and 80 percent demand/capacity triggers, aircraft may experience operational delays at peak intervals of demand.

In the SANS 2000, six airports were above the 60 percent demand/capacity ratio. Phoenix Sky Harbor, Ernest A. Love Field, and Grand Canyon National Park were above 100 percent capacity. Scottsdale, Phoenix Deer Valley, and Tucson International were between 60 and 100 percent in their ratio of demand to capacity. Since the SANS 2000 was completed, several of the airport ASVs have been recalculated and updated. A few airports have completed projects to improve capacity. These airports include:

- Phoenix Sky Harbor International: A third runway at Phoenix Sky Harbor was completed in October 2000. This improved operating capacity at the airport.
- Tucson International: Construction is currently underway that will allow for parallel takeoffs and landings and will improve operational capacity.
- Grand Canyon National Park: A FAA-operated air traffic control tower was constructed at the airport and completed in May 2003.
- Phoenix Deer Valley: Several small taxiway projects were completed in 2004.

It is worth noting that although improvements have been made, each of these airports may again exceed operational capacity in the SASP forecast period.

As part of the SASP, there are four performance measures that are capacity-related. Through the study's analysis, an evaluation of each airport's annual operating capacity was conducted. This level of analysis only identifies potential capacity issues on a surface level; more detailed analysis is needed to determine if capacity is truly an issue at many airports.

The following summarizes the results of these performance measures from Chapter Six:

- Percent of airports with sufficient operational capacity: 87 percent
- Percent of airports projected to have sufficient operational capacity in 2030: 80 percent
- Number of airports experiencing possible delay to aircraft operation
  - 2007: 23 airports
  - 2030: 28 airports
- Percent of population and employment centers within a 30-minute drive time of a system airport projected to not have sufficient capacity in 2030:
  - Population: 72 percent
  - Employment centers: 40 percent

According to the analysis presented in Chapter Six, the SASP airports presented in **Figure 7-22** have current and/or future capacity levels that are at or above FAA demand/capacity triggers of 60 percent. As shown, four airports in the Phoenix Metro Area are currently above the FAA triggers, while nearly all (nine) Phoenix Metro airports are projected to exceed 60 percent demand/capacity ratios by 2030. Three airports in the Tucson Metro Area have demand capacity ratios that are above the FAA trigger of 60 percent. Several other airports in the state are also currently and/or are projected to operate above 60 percent demand/capacity, including Grand Canyon National Park, Grand Canyon West, Ernest A. Love Field, Yuma International, and Sierra Vista Municipal.

Figure 7-22: SASP Airports with Capacity Concerns above the 60% Demand/Capacity Ratio, 2007 and 2030

Associated City	*Airport Name*	*SASP Role*	*2007*	*2030*
Phoenix Metro Airports				
Mesa	Phoenix-Mesa Gateway	Commercial Service		101%
Phoenix	Phoenix Sky Harbor Intl	Commercial Service	79%	132%
Chandler	Chandler Municipal	Reliever		105%
Glendale	Glendale Municipal	Reliever		66%
Goodyear	Phoenix Goodyear	Reliever	91%	140%
Mesa	Falcon Field	Reliever	67%	104%
Phoenix	Phoenix Deer Valley	Reliever		92%
Scottsdale	Scottsdale	Reliever	88%	137%
Peoria	Pleasant Valley	GA-Community		74%
Tucson Metro Airports				
Tucson	Tucson International	Commercial Service	81%	97%
Marana	Marana Regional	Reliever	60%	93%
Tucson	Ryan Field	Reliever	66%	118%
Other				
Grand Canyon	Grand Canyon National	Commercial Service		77%
Peach Springs	Grand Canyon West	Commercial Service	105%	142%
Prescott	Ernest A. Love Field	Commercial Service	64%	76%
Yuma	Yuma MCAS/Yuma Intl	Commercial Service	66%	91%
Sierra Vista	Sierra Vista Municipal- LAA	GA-Community	73%	87%

Sources: Airport Records, Wilbur Smith Associates, September 2008

Several of the airports noted in the table above have capacity-enhancing projects underway or planned. The projects include:

- Phoenix-Mesa Gateway: The master plan noted several improvements to the taxiway system to increase capacity including additional parallel taxiways, numerous high-speed taxiway exits, and additional terminal area taxilanes.
- Phoenix Sky Harbor: Construction of two new taxiways on the west side of the airport has been approved. These projects will have a minimal impact on operational capacity.
- Chandler Municipal: The airport's master plan included several taxiway projects that will improve safety and efficient operations.
- Glendale Municipal: Glendale Municipal's master plan included limited capacity enhancing projects including a runway extension (now complete) and taxiway system expansion.
- Falcon Field: Limited capacity enhancing projects were noted in the 2008/2009 master plan including high speed taxiway exits to existing runways and a new parallel taxiway with high speed exit taxiways.
- Phoenix Deer Valley: Several small capacity enhancing projects are included in the airport's 2007 master plan. These projects include a taxiway extension and bypass taxiway to Runway 7R and additional high speed taxiway exits to Runway 7L-25R.
- Phoenix Goodyear: The construction of an additional 4,300-foot long runway is identified in the airport's 2007 master plan. An additional parallel taxiway and high speed taxiway exits are also planned for the existing runway.
- Tucson International: Tucson is studying alternatives for improving capacity through the relocation and/or upgrade of 11R/29L; a preferred alternative should be identified by December of 2009.
- Ryan Field: Although the master plan update is still under development, the plan envisions construction of a third runway and the extension and upgrade of the existing runway/taxiway system in the long term.

- Marana Regional: Included in the 2006 Master Plan Update is the construction of a new parallel runway 12R-30L and adjacent taxiways and taxiway exits. Additional taxiway improvements to existing runways and the construction of an air traffic control tower are also planned to help improve operational capacity. Construction of the control tower is subject to approval and must meet the requirements of the FAA.
- Grand Canyon National Park: In recognition of potential operational capacity concerns, the master plan's long range development plan (20+ years) includes the development of a parallel runway.
- Grand Canyon West: The airport is currently relocating the runway, widening the runway, constructing a new parallel taxiway and associated taxiway connectors, and installing runway lights, PAPIs, and a rotating beacon to allow for additional capacity.

The FAA has analyzed future operational capacity limitations at Tucson International Airport and in the Phoenix Metro Area as well as throughout the entire country. The FAA completed *Capacity Needs in the National Airspace System, an Analysis of Airport and Metropolitan Area Demand and Operational Capacity in the Future* (FACT 1) in 2004 and updated the analysis in 2007 (FACT 2). According to their findings, FACT 1 noted that Tucson International will experience operational constraints by 2015 if capacity enhancing projects are not undertaken. As noted above, Tucson International has a runway relocation project already underway to address this. FACT 2 identified that Phoenix Sky Harbor International Airport will be in need of additional capacity to grow as forecasted. Although the city of Phoenix noted it is working with Phoenix-Mesa Gateway to increase the commercial service usage there, this effort alone will not offset the increased operational demand that is projected at Phoenix Sky Harbor International Airport and in the entire Phoenix Metro Area. Currently, no major capacity enhancing projects are under consideration at Phoenix Sky Harbor International.

As part of the Phoenix Regional Aviation System Plan (RASP), Maricopa Association of Governments (MAG) also noted major operational capacity concerns for the region. Four alternatives were developed to improve the system. The final plan recommended development of at least one new general aviation airport in addition to expanding the existing airports as much as possible to accommodate additional operational demand.

Significant boosts in capacity can usually be provided by either building new runways or by introducing additional airports into the system. A review of system airports approaching the FAA demand/capacity triggers indicates that most of these airports do not appear to be capable of easily and readily supporting the development of additional runways. Three airports noted in Figure 7-22 are planning to construct new runways: Phoenix Goodyear, Ryan Airfield, and Marana Regional.

The congestion in the Phoenix Metro Area has and will continue to impact outlying airports as well. Airports such as Casa Grande, Eloy, and Buckeye have seen a great deal of growth in recent years as Phoenix-area recreational pilots look for less congested airports to fly into and out of. In addition, a lot of the training activity by Phoenix area flight schools is moving to these airports since they are less congested, but still nearby. There is also one new general aviation airport planned for the city of Maricopa in western Pinal County at the current site of Estrella Sailport. This airport will help support the rapid socioeconomic and aviation growth of Pinal County but will provide a limited amount of relief to the congestion in the Phoenix Metro Area.

Due to the level of analysis and the need for individual airports to determine if they are willing to increase capacity, the SASP does not contain any additional capacity-enhancement projects such as parallel taxiways, new runway entrances/exits, an air traffic control tower, and/or a parallel runway. It is recommended that capacity-enhancing projects included in airport master plans be implemented. Air traffic delays in the metropolitan areas of Phoenix and Tucson should be monitored. Further investigation of developing new system airports is warranted as operational delays continue to increase.

Airports with a current (past 5 years) master plan

Chapter Six revealed that 55 percent of the airport system, or 58 percent of the applicable airport system (46 of 72 airports) have a current master plan completed in the past five years or one currently underway. It is important to note that, although 64 percent of applicable system airports have a recently completed master plan, only 32 percent of applicable system airports have their master plan forecasts and airport layout plans (ALPs) approved by the FAA in the last five years. FAA approval of forecast and ALPs is typically necessary to begin projects detailed in airport master plans.

Target performance for this action-oriented measure is that all publicly owned and Native-owned airports have a current master plan. Figure 7-23 details which airports should seek to develop a current master plan in the near term. Periodic updates of current master plans will be included as part of capital project development for the study. In addition, all applicable airports should work closely with the FAA to obtain approval shortly following master plan completion.

Figure 7-23: Airports Recommended to Develop a Current Master Plan

Associated City	*Airport Name*	*Associated City*	*Airport Name*
Commercial Service		GA-Rural	
Phoenix	Phoenix Sky Harbor Intl	Phoenix	Phoenix Regional
GA-Community		Polacca	Polacca
Douglas	Douglas Municipal	San Luis	Rolle Airfield
Eloy	Eloy Municipal	Temple Bar	Temple Bar
Grand Canyon	Grand Canyon National Park	Whiteriver	Whiteriver
Sedona	Sedona	Window Rock	Window Rock
St Johns	St Johns Industrial Air Park	GA-Basic	
Willcox	Cochise County	Bagdad	Bagdad
GA-Rural		Cibecue	Cibecue
Ajo	Eric Marcus Municipal	Meadview	Pearce Ferry
Bisbee	Bisbee Municipal	Peach Springs	Hualapai
Bullhead City	Sun Valley	Sells	Sells
Chinle	Chinle Municipal	Superior	Superior Municipal
Douglas	Cochise College	Tombstone	Tombstone Municipal
Douglas Bisbee	Bisbee Douglas International		

Source: *Airport Inventory & Data Survey* 2008
Note: The SASP airports not included in the table either have finalized a master plan in the last five years, have a master plan underway, or have the funding in place to begin a master plan

Percent of airports meeting zoning and land use control goals

Figure 7-24 details airports that should implement the types of zoning and land use controls specified by the three related performance measures. Disclosure areas, airport-compatible zoning and controls, and height zoning to address FAR Part 77 issues are all required of publicly owned airports within the Arizona system. These three performance measures each have a specific action associated with them to meet SASP targets.

Percent of airports with surrounding municipalities that have adopted "disclosure areas"

Thirty-five percent of airports in Arizona's system have adopted disclosure areas as defined in Arizona statutes. The target for this performance measure includes all public- and Native-owned airports, as well as any privately owned airports that already have an adopted disclosure area. If these airports develop and adopt disclosure areas, performance will increase to 89 percent of all SASP airports. Figure 7-24 shows which airports are recommended to implement them. Airports marked as private ownership are not required to implement disclosure areas, however, Sky Ranch at Carefree and Rimrock have both published disclosure areas.

Percent of airports with surrounding municipalities that have adopted controls/zoning to make land use in the airport environs compatible with airport operations and development

As with the last performance measure, applicable airports for this measure are considered all public and Native-owned airports. Some municipalities near privately-owned airports have also adopted some type of controls to protect airport environs. The target for this performance measure is that these airports (all public owned and Native-owned as well as private owned that already have controls in place) should have airport-compatible controls and zoning in their surrounding municipalities. Currently, 60 percent of all SASP airports meet this performance measure. By including privately owned airports already meeting this measure, performance will increase to 94 percent if the target is met. Figure 7-24 shows which airports are recommended to implement compatible zoning and controls. Airports designated as having private ownership are not required to meet this performance measure; however, six privately owned airports have surrounding municipalities that have adopted airport-compatible controls and zoning including Sky Ranch at Carefree, Grand Canyon Valle, Marble Canyon, Estrella Sailport, La Cholla Airpark, and Rimrock.

Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77 (height zoning)

Currently, 46 percent of airports included in the SASP have height zoning that addresses FAR Part 77 regulations. FAR Part 77 states that any airport of public ownership must comply with these regulations. When including private airports which are also compliant with Part 77, this brings target performance to 87 percent of the airport system. Figure 7-24 shows airports which are recommended to adopt Part 77 zoning. Airports that are not required to comply with FAR Part 77 height zoning are marked as being privately owned. The following privately owned system airports have already adopted height zoning to address Part 77 issues: Sky Ranch at Carefree, Grand Canyon Valle, and Marble Canyon.

Figure 7-24: Airports Recommended to Meet Zoning and Land Use Control Performance Measures

Associated City	*Airport Name*	*Disclosure Areas*	*Controls/Zoning*	*Part 77*
Commercial Service				
Bullhead City	Laughlin/Bullhead Intll	Yes	Implement	Yes
Grand Canyon	Grand Canyon National Park	Implement	Implement	Implement
Kingman	Kingman	Yes	Yes	Implement
Page	Page	Implement	Yes	Yes
Peach Springs	Grand Canyon West	Implement	Implement	Implement
Prescott	Ernest A. Love Field	Yes	Yes	Implement
Show Low	Show Low Regional	Yes	Implement	Yes
Yuma	Yuma International	Implement	Yes	Implement
Reliever				
Glendale	Glendale Municipal	Yes	Yes	Implement
Marana	Marana Regional	Yes	Yes	Implement
GA-Community				
Benson	Benson Municipal	Implement	Yes	Yes
Buckeye	Buckeye Municipal	Yes	Yes	Implement
Casa Grande	Casa Grande Municipal	Implement	Yes	Implement
Chandler	Memorial Airfield	Implement	Yes	Implement
Colorado City	Colorado City Municipal	Implement	Yes	Yes
Coolidge	Coolidge Municipal	Implement	Yes	Yes
Eloy	Eloy Municipal	Implement	Yes	Yes
Holbrook	Holbrook Municipal	Implement	Yes	Yes
Lake Havasu City	Lake Havasu City	Implement	Implement	Implement
Marana	Pinal Airpark	Implement	Yes	Implement
Nogales	Nogales International	Implement	Yes	Yes
Parker	Avi Suquilla	Implement	Implement	Implement
Payson	Payson	Yes	Implement	Yes
Safford	Safford Regional	Implement	Yes	Yes
Sedona	Sedona	Yes	Implement	Implement
Springerville	Springerville Municipal	Implement	Implement	Yes
St Johns	St Johns Industrial Air Park	Implement	Yes	Yes
Willcox	Cochise County	Implement	Implement	Yes
Williams	H.A. Clark Memorial Field	Implement	Yes	Yes
Winslow	Winslow-Lindbergh Regional	Implement	Yes	Yes
GA-Rural				
Ajo	Eric Marcus Municipal	Implement	Yes	Implement
Bisbee	Bisbee Municipal	Yes	Implement	Implement
Bullhead City	Sun Valley	Implement	Yes	Yes
Chinle	Chinle Municipal	Implement	Yes	Implement
Clifton/Morenci	Greenlee County	Implement	Implement	Implement
Douglas	Cochise College	Implement	Implement	Implement
Douglas Bisbee	Bisbee Douglas International	Implement	Implement	Yes
Gila Bend	Gila Bend Municipal	Implement	Yes	Yes
Globe	San Carlos Apache	Implement	Yes	Yes
Kayenta	Kayenta	Implement	Implement	Implement
Kearny	Kearny	Implement	Yes	Implement

Figure 7-24: Airports Recommended to Meet Zoning and Land Use Control Performance Measures (Continued)

Associated City	*Airport Name*	*Disclosure Areas*	*Controls Zoning*	*Part 77*
Phoenix	Phoenix Regional	Implement	Implement	Implement
Polacca	Polacca	Implement	Yes	Implement
San Luis	Rolle Airfield	Implement	Implement	Implement
San Manuel	San Manuel/Ray/Blair	Implement	Yes	Implement
Seligman	Seligman	Yes	Implement	Implement
Temple Bar	Temple Bar	Implement	Implement	Implement
Tuba City	Tuba City	Implement	Implement	Implement
Whiteriver	Whiteriver	Implement	Implement	Implement
Window Rock	Window Rock	Implement	Implement	Implement
GA-Basic				
Bagdad	Bagdad	Yes	Implement	Implement
Cibecue	Cibecue	Implement	Implement	Implement
Meadview	Pearce Ferry	Implement	Implement	Implement
Peach Springs	Hualapai	Implement	Implement	Implement
Sells	Sells	Implement	Implement	Implement
Superior	Superior Municipal	Implement	Yes	Implement
Tombstone	Tombstone Municipal	Implement	Implement	Implement

Source: *Airport Inventory & Data Survey* 2008

Percent of airports meeting local and regional planning goals

Percent of airports included in regional transportation plans

Currently, 47 percent of SASP airports are included in regional transportation plans. It is recommended that 100 percent of publicly owned airports in Arizona's system should seek inclusion in the appropriate regional transportation plan for this action-related performance measure. **Figure 7-25** presents which SASP airports should seek inclusion in regional transportation plans.

Percent of airports that are recognized in local comprehensive plan

Sixty-four percent of all SASP airports are currently included in a local comprehensive plan. The target has been set that 100 percent of all airports included in the SASP should achieve this goal. The action associated with meeting this target is that all airports with public, private, and Native ownership alike should achieve inclusion in the appropriate local comprehensive plan. Figure 7-25 shows which SASP airports need to be included in local comprehensive plans to meet this target.

Figure 7-25: Airports Recommended for Inclusion in Regional Transportation or Local Comprehensive Plans

Associated City	*Airport Name*	*Local Comprehensive Plan*	*Regional Transportation Plan*
Commercial Service			
Grand Canyon	Grand Canyon National Park		Implement
Kingman	Kingman		Implement
Peach Springs	Grand Canyon West	Implement	Implement
Yuma	Yuma International	Implement	Implement
Reliever			
All Reliever Airports meet objective			
GA-Community			
Chandler	Memorial Airfield		Implement
Colorado City	Colorado City Municipal		Implement
Cottonwood	Cottonwood		Implement
Eloy	Eloy Municipal	Implement	Implement
Marana	Pinal Airpark	Implement	Implement
Nogales	Nogales International	Implement	Implement
Parker	Avi Suquilla	Implement	Implement
Peoria	Pleasant Valley	Implement	Implement
Springerville	Springerville Municipal	Implement	Implement
Willcox	Cochise County	Implement	Implement
Williams	H.A. Clark Memorial Field		Implement
Winslow	Winslow-Lindbergh Regional		Implement
GA-Rural			
Ajo	Eric Marcus Municipal	Implement	Implement
Bisbee	Bisbee Municipal		Implement
Bullhead City	Sun Valley	Implement	Implement
Douglas	Cochise College	Implement	Implement
Douglas Bisbee	Bisbee Douglas International	Implement	Implement
Gila Bend	Gila Bend Municipal		Implement
Kayenta	Kayenta	Implement	Implement
Phoenix	Phoenix Regional	Implement	Implement
Polacca	Polacca		Implement
San Luis	Rolle Airfield	Implement	Implement
Seligman	Seligman	Implement	Implement
Temple Bar	Temple Bar	Implement	Implement
Tuba City	Tuba City	Implement	Implement
Window Rock	Window Rock		Implement
GA-Basic			
Bagdad	Bagdad	Implement	Implement
Cibecue	Cibecue	Implement	Implement
Meadview	Pearce Ferry	Implement	Implement
Peach Springs	Hualapai	Implement	Implement
Sells	Sells	Implement	Implement
Superior	Superior Municipal		Implement
Tombstone	Tombstone Municipal	Implement	Implement

Source: *Airport Inventory and Data Survey* 2008

GOAL CATEGORY: ECONOMIC SUPPORT

Figure 7-26 restates each performance measure under the Economic Support Goal Category, showing each as either action- or information-oriented.

Figure 7-26: Performance Measures in the Economic Support Goal Category

Performance Measure	*Informational/ Action*
Dollars of economic impact on the state from aviation	Informational
Number of major recreational areas in the state within a 30-minute drive time of a system airport	Informational
Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport	Informational
Percent of population within a 30-minute drive time of a system airport meeting business user needs	Action
Number of airports having adequate utilities (electricity, telephone, water, sewer, and gas)	Informational
Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	Action
Percent of airports with an average pavement condition index (PCI) of 70 or greater	Action

Dollars of economic impact on the state from aviation

As stated in Chapter Six, it is estimated that aviation currently produces $38.5 billion in economic impact for Arizona. No action is recommended as part of this information-oriented performance measure; however it should be noted that ADOT tries to update the statewide economic impact analysis every five years and provides the information to airports included in the analysis.

Number of major recreational areas in the state within a 30-minute drive time of a system airport

Currently, 84 percent of the state's major recreational areas fall within a 30-minute drive time of a SASP airport. This coverage is considered adequate and is likely to improve in the future with the installation of new system airports in areas of deficiency. However, this is an information-oriented performance measure, and therefore has no specific recommendations.

Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport

Currently, 99 percent of businesses with a propensity to use aviation (as described in a previous chapter) are located within a 30-minute drive of a system airport. This is an informational performance measure, with no recommendation for future changes. The 99 percent coverage is considered very successful, and will likely stay constant in the future, as new businesses that have a likelihood of using aviation will likely locate within these areas where there are existing airports.

Percent of population and area within a 30-minute drive time of a system airport meeting business user needs

As stated in Chapter Six, business user needs have been defined as the following five airport facilities:

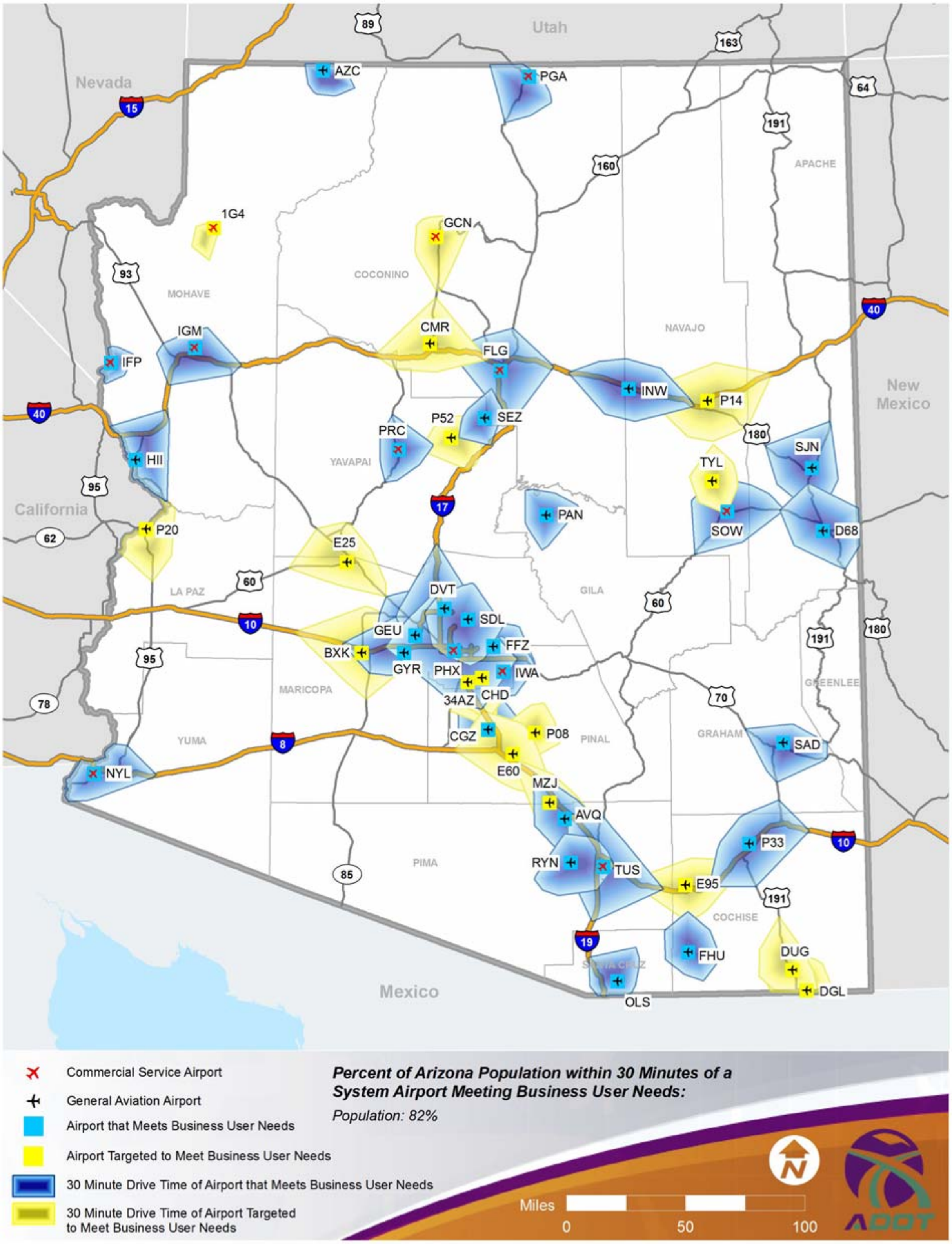
- 5,000' runway
- Instrument approach
- Jet fuel
- Terminal
- Ground transportation

Currently, 29 system airports meet all of these needs as identified by typical airport business users. Based on target facility and service objectives, target compliance for this action-oriented performance measure is 46 airports, or 55 percent of the total system. The following 16 airports are targeted to meet business user needs in addition to the 25 which currently meet the needs:

- Grand Canyon National Park
- Grand Canyon West
- Chandler Municipal
- Benson Municipal
- Buckeye Municipal
- Coolidge Municipal
- Cottonwood
- Douglas Municipal
- Eloy Municipal
- Holbrook Municipal
- Marana – Pinal Airpark
- Parker – Avi Suquilla
- Taylor
- Wickenburg Municipal
- Williams – H.A. Clark Memorial Field
- Bisbee Douglas International

Figure 7-27 depicts this target coverage with 30-minute drive time areas. The target is set that 82 percent of Arizona's total population will be located within a 30-minute drive time of a system airport meeting business user needs.

Figure 7-27: Potential Coverage Provided by Airports Meeting Business User Needs



Source: Wilbur Smith Associates
Note: A reference table containing airport codes, airport names, and associated city can be found in Appendix A

Number of airports having adequate utilities (electricity, telephone, water, sewer, and gas)

Currently, 49 percent of airports included in the SASP have all five of the utilities listed above. Although certain utility upgrades may be eligible for funding, no specific utility projects are recommended as part of the SASP. Therefore, this performance measure is considered informational and has no specific target. Airports are still strongly urged to provide these utilities to improve the airport's future viability to attract development in the airport environs.

Percent of airports with a PCI of 70 or greater

As discussed in Chapter Six, a primary runway or average pavement condition index (PCI) was not readily available at all SASP airports. It is known that 59 percent of SASP airports have an average PCI of at least 70 on all pavements, and 54 percent have a primary runway PCI of at least 70. The action recommended for this measure is for all known PCIs under a rating of 70 to be improved to at least 70. Figure 7-28 displays the PCIs which are known to be under 70 and for which projects will be identified to improve performance in subsequent analyses.

Figure 7-28: Airports Recommended to Improve either a Primary Runway or Average PCI Rating to at Least 70

Associated City	*Airport Name*	*Average 2006 PCI*	*Primary Runway PCI*
Commercial Service			
Bullhead City	Laughlin/Bullhead International	Compliant	57
GA-Community			
Casa Grande	Casa Grande Municipal	Compliant	64
Colorado City	Colorado City Municipal	Compliant	62
Marana	Pinal Airpark	58	59
Springerville	Town of Springerville Municipal	Compliant	65
Willcox	Cochise County	62	Compliant
Winslow	Winslow-Lindbergh Regional	69	67
GA-Rural			
Douglas	Cochise College	59	Compliant
Douglas Bisbee	Bisbee Douglas International	55	Compliant
San Luis	Rolle Airfield	Compliant	67

Source: Arizona Department of Transportation

Percent of airports meeting minimum facility and service objectives

In Appendix A, facility and service objectives were evaluated for each airport in the system. Objectives were determined depending on the role category of each airport. A preliminary feasibility analysis was conducted for each of these objectives at all 83 SASP airports. The SASP did not include a detailed facility analysis for each airport based on demand, but instead examined each airport's general ability to meet the objectives associated with its role in a high-level manner.

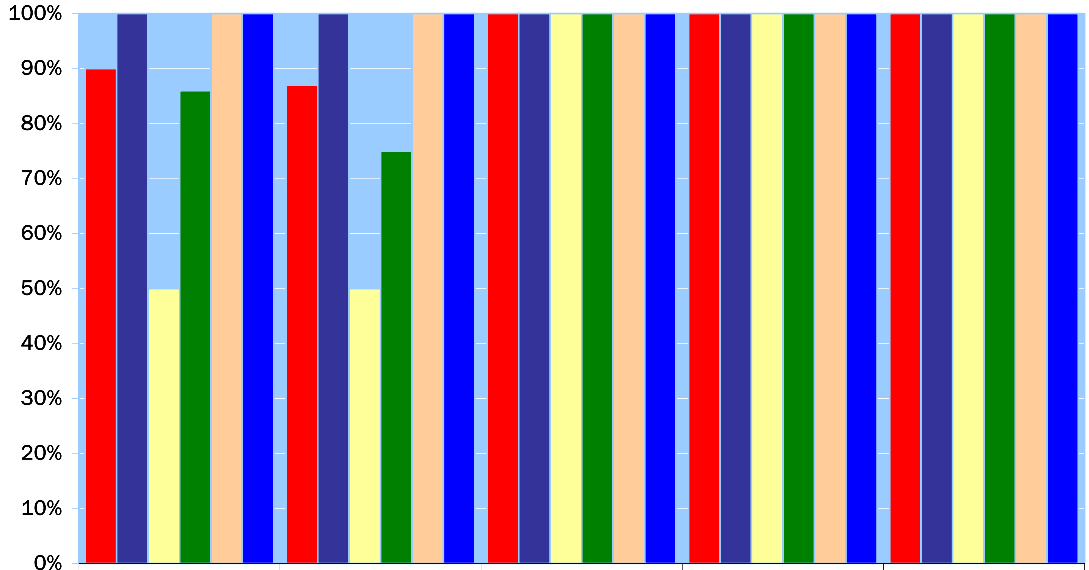
Airport master plans, ALPs, and satellite imagery were all analyzed to determine the general feasibility of the improvements. Master plans and ALPs provided information on planned expansion of facilities such as runways, taxiways, parking, and apron space. In addition, physical constraints to other development can also be derived from ALPs and master plans. Constraints to development that reduce feasibility include major roadways, terrain, and commercial and residential development. Vegetation was not considered a constraint to development. Where a master plan or ALP was not available, satellite imagery was analyzed to identify developable land and possible constraints. It must be noted that this analysis did not consider an airport sponsor's ability to acquire land required to expand airport facilities or the ability to pay for the expansion.

The following facility and service objectives were automatically assumed to be feasible for the purpose of the SASP:

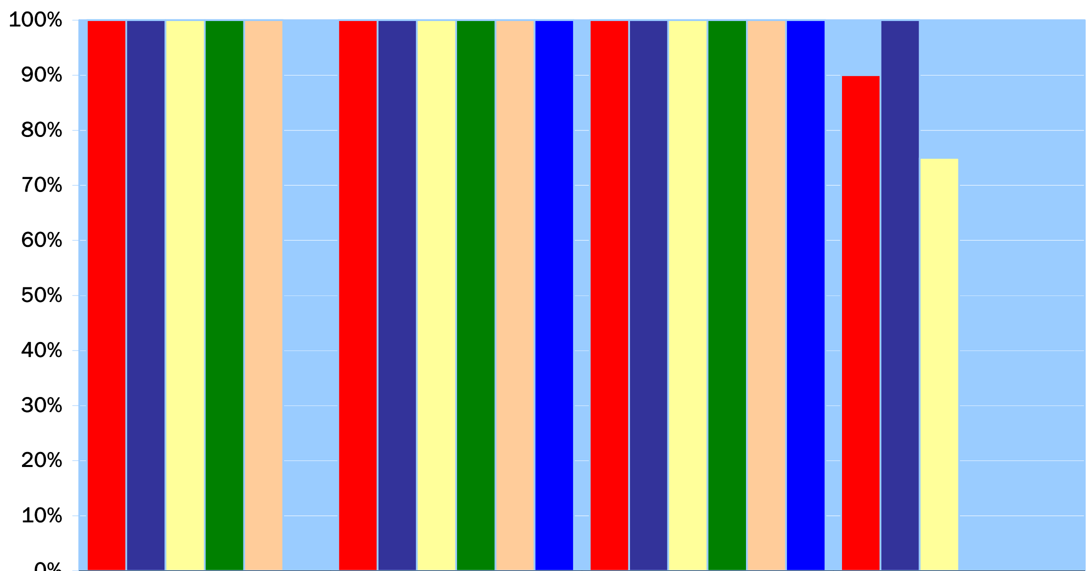
- FBO requirements
- Maintenance
- Ground transportation
- Phone
- Restroom
- Fuel

This performance measure is action-oriented. Figure 7-29 presents future target facility and service objectives by role. Blank areas are objectives for which no goal was set for a particular role category.

Figure 7-29: Target Facility and Service Objective Compliance

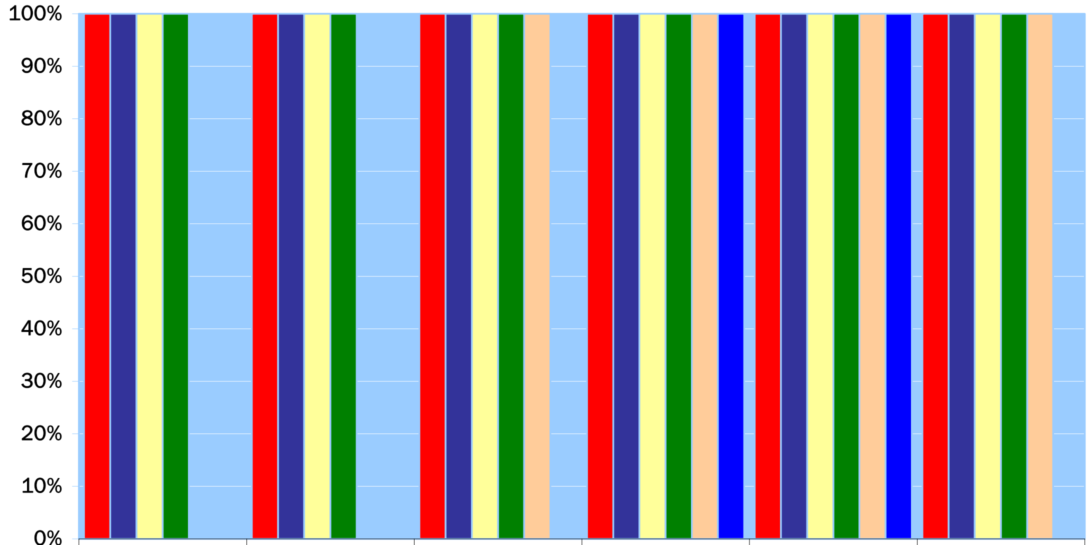


	ARC	Primary Runway Length	Primary Runway Width	Runway Surface	Taxiway
Arizona Total	90%	87%	100%	100%	100%
Commercial Service	100%	100%	100%	100%	100%
Reliever	50%	50%	100%	100%	100%
GA-Community	86%	75%	100%	100%	100%
GA-Rural	100%	100%	100%	100%	100%
GA-Basic	100%	100%	100%	100%	100%

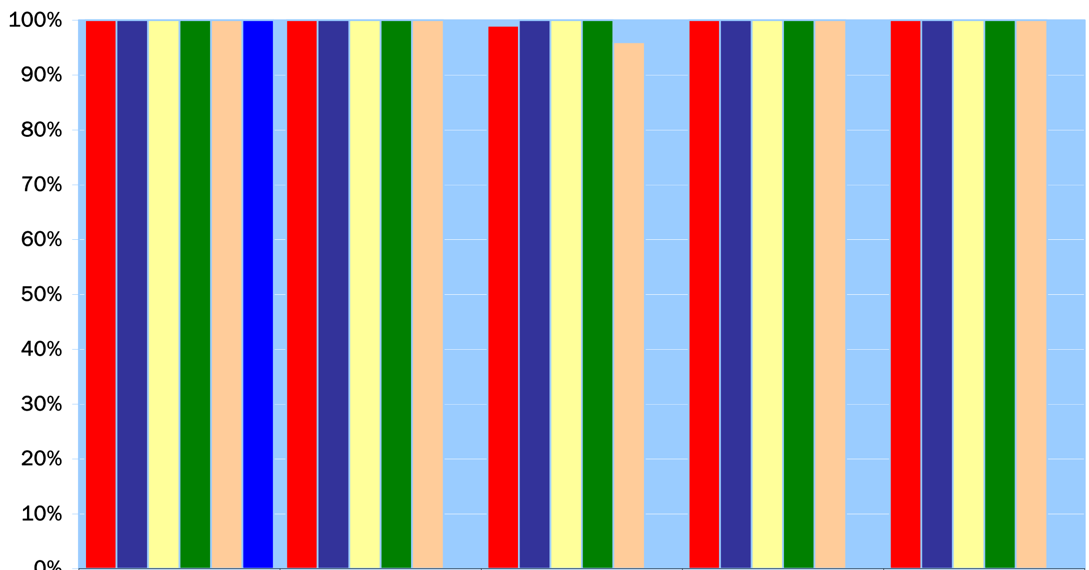


	Approach	Visual Aids	Lighting	ALS
Arizona Total	100%	100%	100%	90%
Commercial Service	100%	100%	100%	100%
Reliever	100%	100%	100%	75%
GA-Community	100%	100%	100%	
GA-Rural	100%	100%	100%	
GA-Basic		100%	100%	

Figure 7-29: Target Facility and Service Objective Compliance (continued)



	FBO	Maintenance	Ground Transportation	Phone	Restroom	Fuel
Arizona Total	100%	100%	100%	100%	100%	100%
Commercial Service	100%	100%	100%	100%	100%	100%
Reliever	100%	100%	100%	100%	100%	100%
GA-Community	100%	100%	100%	100%	100%	100%
GA-Rural			100%	100%	100%	100%
GA-Basic				100%	100%	



	Airport Fencing	Terminal	Hangar Spaces	Apron Spaces	Auto Parking Spaces
Arizona Total	100%	100%	99%	100%	100%
Commercial Service	100%	100%	100%	100%	100%
Reliever	100%	100%	100%	100%	100%
GA-Community	100%	100%	100%	100%	100%
GA-Rural	100%	100%	96%	100%	100%
GA-Basic	100%				

GOAL CATEGORY: SAFETY AND STANDARDS

Figure 7-30 restates each performance measure under the Safety and Standards Goal Category, showing each as either action- or information-oriented.

Figure 7-30: Performance Measures in the Safety and Standards Goal Category

Performance Measure	*Informational/ Action*
Percent of airports with clear approaches to primary runway ends	Action
Percent of airports with adopted security plans	Action
Percent of airports with adopted Wildlife Management Plans	Informational
Percent of airports that have a written emergency response plan	Action
Airports controlling all runway end Runway Protection Zones (RPZs)	Action
Percent of airports that meet runway/taxiway separation criteria for their current ARC	Action
Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC	Action
Percent of airports that have procedures in place to conduct self-inspections on a regular basis	Action
Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability	Informational
Percent of airports that support search and rescue operations	Informational
Percent of airports that support aerial fire fighting operations	Informational

Percent of airports with clear approaches to primary runway ends

Currently, 51 percent of system airports meet FAA-designated optimal approach slopes on their primary runways according to data provided on FAA Form 5010s. FAA Form 5010 lists the types of obstructions that impede clear approaches to these runway ends. It is desired for all airports owned publicly or by a Native American community to meet this action-oriented performance measure. However, not all obstructions can be removed or relocated.

Figure 7-31 shows which applicable airports do not currently meet their optimal approach slope and notes the obstructions identified through the 5010s. Obstructions such as roads, buildings, or terrain are not likely to be removed or relocated to attain this optimal approach slope. Others, such as brush or trees, can usually be addressed, particularly with the assistance of a vegetation management or obstruction removal program. The target for this performance measure is set at 100 percent of applicable airports. However, no specific projects are to be proposed as part of this plan. Each airport with obstructions in their approaches should carry out an obstruction removal study. The following privately owned airports meet this performance measure, despite not being a requirement:

- Grand Canyon Valle
- Maricopa – Estrella Sailport
- Rimrock

Figure 7-31: Airports with Obstructions Listed in FAA Form 5010, Airport Master Record

Associated City	*Airport Name*	*Obstruction*
Commercial Service		
Peach Springs	Grand Canyon West	Road
Phoenix	Phoenix Sky Harbor International	Building/Road
Prescott	Ernest A. Love Field	Road
Show Low	Show Low Regional	Pole
Tucson	Tucson International	Ground
Yuma	Yuma International	Unknown
Reliever		
Mesa	Falcon Field	Road/Tree
Phoenix	Phoenix Deer Valley	Road/Hill
GA-Community		
Casa Grande	Casa Grande Municipal	Road/Road
Coolidge	Coolidge Municipal	Tree
Cottonwood	Cottonwood	Brush
Douglas	Douglas Municipal	Road
Holbrook	Holbrook Municipal	Road
Lake Havasu City	Lake Havasu City	Hill
Payson	Payson	Tree
Springerville	Springerville Municipal	Fencing
St Johns	St Johns Industrial Air Park	Poles
Winslow	Winslow-Lindbergh Regional	Tree/Tower
GA-Rural		
Bisbee	Bisbee Municipal	Brush
Bullhead City	Sun Valley	Road
Douglas	Cochise College	Roads
Gila Bend	Gila Bend Municipal	Trees
Kearny	Kearny	Trees
Phoenix	Phoenix Regional	Trees
Polacca	Polacca	Brush
Seligman	Seligman	Fencing
Tuba City	Tuba City	Hill/Brush
Window Rock	Window Rock	Hill/Trees
GA-Basic		
Bagdad	Bagdad	Brush/Ground
Peach Springs	Hualapai	Unknown
Sells	Sells	Trees
Superior	Superior Municipal	Brush/Tree
Tombstone	Tombstone Municipal	Brush

Source: FAA Form 5010, Airport Master Record

Percent of Airports with Adopted Safety and Security Planning

Percent of airports that have a written emergency response plan

Only 47 percent of all system airports currently have a written emergency response plan. The target performance is that 100 percent of Commercial Service and Reliever airports have an emergency response plan. When including general aviation airports which already have an active emergency response plan, this sets the system-wide target at 49 percent. All Commercial Service airports currently have an emergency response plan. The following two airports should initiate an emergency response planning process, and adopt a plan, to fulfill this target:

- Mesa – Falcon Field
- Tucson – Ryan Field

Guidelines for emergency response plans have been outlined by the FAA. FAA Advisory Circular 150/5200-31A details the process for developing and implementing an airport emergency plan (AEP). These plans help to ensure safety not only for an airport's users, but also for the surrounding community. An AEP is also intended to lower the impact of emergencies by addressing issues in the time period after the emergency. An AEP is intended to create quick response to emergencies by outlining responsibilities that individuals or organizations have. The plan is also airport-specific, detailing the emergencies most likely to happen at a particular airport, and what airport characteristics may affect a timely and efficient response.

Percent of airports with adopted security plans

According to data gathered as part of the Airport Inventory and Data Survey conducted during the SASP, 31 percent of Arizona system airports have adopted a security plan. The target set for this action-oriented performance measure is that all airports except those which are privately owned should develop and adopt a security plan. When including private facilities which already have a security plan (only Grand Canyon Caverns), this brings the target performance to 88 percent of the system airports. Figure 7-32 details airports which are recommended to create and implement a security plan.

Figure 7-32: Airports Recommended to Develop a Security Plan

Associated City	*Airport Name*	*Associated City*	*Airport Name*
Reliever		**GA-Rural**	
Chandler	Chandler Municipal	Ajo	Eric Marcus Municipal
Marana	Marana Regional	Bisbee	Bisbee Municipal
Mesa	Falcon Field	Bullhead City	Sun Valley
Tucson	Ryan Field	Chinle	Chinle Municipal
GA-Community		Clifton/Morenci	Greenlee County
Benson	Benson Municipal	Douglas Bisbee	Bisbee Douglas International
Buckeye	Buckeye Municipal	Gila Bend	Gila Bend Municipal
Casa Grande	Casa Grande Municipal	Globe	San Carlos Apache
Chandler	Memorial Airfield	Kayenta	Kayenta
Colorado City	Colorado City Municipal	Phoenix	Phoenix Regional
Coolidge	Coolidge Municipal	Polacca	Polacca
Cottonwood	Cottonwood	San Luis	Rolle Airfield
Douglas	Douglas Municipal	Seligman	Seligman
Eloy	Eloy Municipal	Temple Bar	Temple Bar
Holbrook	Holbrook Municipal	Tuba City	Tuba City
Parker	Avi Suquilla	Whiteriver	Whiteriver
Payson	Payson	Window Rock	Window Rock
Safford	Safford Regional	**GA-Basic**	
Springerville	Springerville Municipal	Bagdad	Bagdad
St Johns	St Johns Industrial Air Park	Cibecue	Cibecue
Taylor	Taylor	Meadview	Pearce Ferry
Wickenburg	Wickenburg Municipal	Peach Springs	Hualapai
Willcox	Cochise County	Sells	Sells
Williams	H.A. Clark Memorial Field	Superior	Superior Municipal
		Tombstone	Tombstone Municipal

Source: *Airport Inventory & Data Survey 2008*

Neither the FAA nor TSA currently require general aviation airports to develop security plans. However, TSA has a published document, *Security Guidelines for General Aviation Airports*, which is meant to be a comprehensive guide for general aviation airports to outline basic security practices. This includes the recommendation of security plans for every general aviation airport. Other recommendations in the document are concerned with several facets of security:

- Personnel: passengers, students, aircraft renters, transient pilots
- Aircraft
- Facilities: hangars, locks, perimeter control, lighting, signage, identification systems, airport planning
- Surveillance: community watch, reporting procedures, security committee, law enforcement support, closed circuit television, intrusion detection
- Security procedures and communications: procedures, threat level increases, threat communication system
- Specialty operations: agricultural, tenant facilities, fuel facilities, military facilities

It must also be noted that different levels of security plans are necessary for different airports. Several factors tie in to the depth of a security plan an airport should develop including the level and type activity, existing airport facilities, and the surrounding community. To develop an appropriate security plan, airports should consult the *Security Guidelines for General Aviation Airports*.[2]

Percent of airports with adopted Wildlife Management Plans

Currently 18 percent of airports included in the SASP have an active wildlife management plan. Because this is an informational performance measure, no specific projects are being recommended and therefore no further action is required. However, airports may still desire to implement a wildlife management plan to ensure the safety of wildlife, passengers, and pilots. Like other airport plans, a wildlife management plan outlines responsibilities and procedures which are airport-specific. These procedures attempt to first repel wildlife by means such as fencing, chemicals, and auditory and visual deterrents. If repelling or capturing wildlife does not ensure human safety at the airport, the plans also outline the circumstances under which other measures should be implemented. An airport wishing to create a wildlife management plan can find basic guidance in the FAA's *Summary of Wildlife Management Plan Requirements*.[3]

Airports controlling Runway Protection Zones (RPZs) on their primary runway

Sixty percent of airports included in the SASP currently control both ends of their primary runway RPZ through either fee simple or an avigation easement. The recommended action or target set for this performance measure is that all publicly owned airports have complete control of all runway RPZs, however, only the control of the RPZ for the primary runway is measured in this analysis. Partial control or control of only one runway end does not qualify for this performance measure. Figure 7-33 details primary runways at airports which do not currently have complete control of their primary runway RPZs.

[2] Available online at: http://www.tsa.gov/assets/pdf/security_guidelines_for_general_aviation_airports.pdf
[3] Available online at: http://www.faa.gov/airports_airtraffic/airports/regional_guidance/central/airport_safety/part139/best_practice/wildlife/media/Summary_Wildlife_Management.pdf

Figure 7-33: Airports Recommended to Gain Full Control of Primary Runway RPZs

Associated City	*Airport Name*	*RWY End*	*Current Level of Control*	*RWY End*	*Current Level of Control*
Commercial Service					
Kingman	Kingman	3	None	21	Fee Simple
Show Low	Show Low Regional	6	Fee Simple	24	None
Reliever					
Chandler	Chandler Municipal	4L	Partial Fee Simple	4R	Fee Simple
Glendale	Glendale Municipal	1	Fee Simple	19	None
Goodyear	Phoenix Goodyear	3	Fee Simple	21	Partial Fee Simple
Marana	Marana Regional	12	Partial Fee Simple	30	Partial Fee Simple
Scottsdale	Scottsdale	3	Partial Fee Simple	21	Fee Simple
GA-Community					
Casa Grande	Casa Grande Municipal	23	None	5	Fee Simple
Coolidge	Coolidge Municipal	5	Partial Fee Simple	23	Partial Fee Simple
Douglas	Douglas Municipal	21	Fee Simple	3	Partial Fee Simple
Holbrook	Holbrook Municipal	3	Fee Simple	21	None
Sedona	Sedona	3	None	21	None
Springerville	Springerville Municipal	21	Partial Fee Simple	3	Fee Simple
Taylor	Taylor	3	None	21	Fee Simple
Wickenburg	Wickenburg Municipal	5	None	23	None
Willcox	Cochise County	3	Fee Simple	21	Partial Fee Simple
Winslow	Winslow-Lindbergh Regional	4	Partial Fee Simple	22	Easement
GA-Rural					
Bisbee	Bisbee Municipal	35	Partial Fee Simple	17	Easement
Douglas	Cochise College	5	Partial Fee Simple	23	None
Kearny	Kearny	26	Partial Fee Simple	8	Partial Fee Simple
Phoenix	Phoenix Regional	3	None	21	None
Tucson	La Cholla Airpark	1	None	19	None
GA-Basic					
Sells	Sells	4	None	22	None
Superior	Superior Municipal	22	Partial Fee Simple	4	Partial Fee Simple
Tombstone	Tombstone Municipal	24	Partial Fee Simple	6	Partial Fee Simple

Source: *Airport Inventory & Data Survey 2008*

Percent of airports that meet runway/taxiway separation criteria for their objective ARC

Chapter Six detailed the airports that have a parallel taxiway that meets separation criteria for their current ARC. Nine publicly owned airports currently do not meet separation standards. One of these, Glendale, has an FAA waiver for not meeting separation standards.

The target for this action-oriented performance measure is that all publicly owned airports with a parallel taxiway meet separation standards based on their target ARC. A feasibility analysis, similar to the one conducted for facility and service objectives, was also conducted for this performance measure. Airport master plans and layout plans were analyzed to determine the ability of each airport to meet the runway/taxiway separation criteria for their target ARC. ALPs were not available for Native airports and other non-NPIAS airports. Therefore, this analysis was not entirely comprehensive.

Figure 7-34 details runway-taxiway separation standards for future objective ARCs at airports for which an ARC upgrade is recommended, where available. It is important to note that the extent and magnitude of the projects needed to meet runway/taxiway separation standards for their future ARCs are unknown. However, based on preliminary analyses, nine of these airports appear unable to meet runway-taxiway separations standards for their objective ARC.

Percent of airports that have Runway Safety Areas (RSAs) on their primary runway that meet the standards for their objective ARC

Currently, two publicly owned SASP airports do not meet RSA standards for their primary runway ARC. Avi Suquilla Airport in Parker and San Manuel/Ray/Blair Airport both have shortcomings in their RSA width.

As with runway/taxiway separation, target performance for this action-oriented measure is that all publicly owned airports have a primary runway RSA that meets standards for their target ARC as well. The same feasibility analysis was conducted for this performance measure. Figure 7-34 details RSA standards for objective ARCs just at airports for which an ARC upgrade is recommended. Results of this analysis reveal that it is likely that nine SASP airports may not be able to meet the RSA standards of their future ARC due to development constraints.

Figure 7-34: RSA and Runway-Taxiway Separation Standards

Associated City	*Airport Name*	*Current ARC*	*Target ARC*	*Required RSA Length*	*Able to Comply*	*Required RSA Width*	*Able to Comply*	*Required RWY/ TWY Separation*	*Able to Comply*
Commercial Service									
Bullhead City	Laughlin/Bullhead International	C-III	D-IV	1,000	Yes	500	Yes	400	Yes
Page	Page	B-II	D-II	1,000	Yes	300	Yes	400	Yes
Peach Springs	Grand Canyon West	B-II	C-II	1,000	Yes	500	No	400	Yes
Prescott	Ernest A. Love Field	C-III	D-IV	1,000	Yes	500	Yes	400	No
Show Low	Show Low Regional	C-III	D-III	1,000	Yes	500	Yes	400	Yes
Tucson	Tucson International	D-IV	D-V	1,000	Yes	500	Yes	400	Yes
Yuma	Yuma International	E-VI	D-IV	1,000	Yes	500	Yes	400	Yes
Reliever									
Chandler	Chandler Municipal	B-II	C-III	1,000	Yes	500	Yes	400	Yes
Glendale	Glendale Municipal	B-II	C-III	1,000	No	500	Yes	400	No
Goodyear	Phoenix Goodyear	D-IV	C-III	1,000	No	500	Yes	400	Yes
Mesa	Falcon Field	B-II	C-III	1,000	No	500	Yes	400	No
Phoenix	Phoenix Deer Valley	C-III	C-III	1,000	No	500	Yes	400	No
Scottsdale	Scottsdale	D-II	C-III	1,000	No	500	No	400	No
Tucson	Ryan Field	C-III	C-III	1,000	Yes	500	Yes	400	Yes
GA-Community									
Benson	Benson Municipal	B-I	B-II	300	Yes	150	Yes	240	Yes
Coolidge	Coolidge Municipal	B-II	B-II	600	Yes	300	Yes	240	Yes
Cottonwood	Cottonwood	B-I	B-II	300	Yes	150	Yes	240	No
Holbrook	Holbrook Municipal	B-I	B-II	300	Yes	150	Yes	240	No
Lake Havasu City	Lake Havasu City	B-II	B-II	300	Yes	150	Yes	240	Yes
Marana	Pinal Airpark	D-V	B-II	300	Yes	150	Yes	240	Yes
Nogales	Nogales International	C-II	B-II	300	Yes	150	Yes	240	Yes
Sedona	Sedona	B-I	B-II	300	No	150	Yes	240	No
Sierra Vista	Sierra Vista Municipal/LAA	D-IV	B-II	300	Yes	150	Yes	240	Yes
Springerville	Springerville Municipal	B-II	B-II	300	No	150	Yes	N/A	N/A
Winslow	Winslow-Lindbergh Regional	C-II	B-II	300	Yes	150	Yes	240	Yes

Figure 7-34: RSA and Runway-Taxiway Separation Standards for Target ARCs (Continued)

Associated City	*Airport Name*	*Current ARC*	*Target ARC*	*Required RSA Length*	*Able to Comply*	*Required RSA Width*	*Able to Comply*	*Required RWY/ TWY Separation*	*Able to Comply*
GA-Rural									
Clifton/Morenci	Greenlee County	B-II	B-I	240	Yes	120	Yes	225	Yes
Gila Bend	Gila Bend Municipal	B-II	B-I	240	Yes	120	Yes	225	Yes
Globe	San Carlos Apache	C-II	B-I	240	Yes	120	Yes	225	Yes
Kayenta	Kayenta	B-II	B-I	240	Yes	120	Yes	225	Yes
Kearny	Kearny	A-I	B-I	240	No	120	Yes	N/A	N/A
Whiteriver	Whiteriver	B-II	B-I	240	Yes	120	Yes	225	Yes
GA-Basic									
Bagdad	Bagdad	B-I	A-I	240	Yes	120	Yes	N/A	N/A
Superior	Superior Municipal	A-I	A-I	240	Yes	120	Yes	N/A	N/A

Sources: Airport master plans and ALPs, Wilbur Smith Associates
Note: data only available for airports included in the NPIAS

Percent of airports that have procedures in place to conduct self-inspections on a regular basis

Airport self-inspection programs are listed under the FAA's best practices for airport safety. A self-inspection program includes regular self-inspection, continuous surveillance, condition inspection, and maintaining records of the program. FAA Advisory Circular 150/5200-18C lists the following airport facilities as basic parts of a self-inspection:

- Pavement areas
- Markings
- Signs
- Lighting
- Navigational aids
- Obstructions
- Fueling operations
- Snow and ice
- Construction
- Aircraft rescue and firefighting
- Public protection

Currently, 72 percent of airports included in the SASP report having self-inspection procedures. The action developed for this performance measure is for all system airports to have these procedures in place. Figure 7-35 lists the system airports which should implement these procedures to meet this target.

Figure 7-35: Airports Recommended to Development Self-Inspection Procedures

Associated City	*Airport Name*	*Associated City*	*Airport Name*
GA-Community		**GA-Rural**	
Chandler	Memorial Airfield	Bisbee	Bisbee Municipal
Colorado City	Colorado City Municipal	Clifton/Morenci	Greenlee County
Coolidge	Coolidge Municipal	Phoenix	Phoenix Regional
Douglas	Douglas Municipal	Polacca	Polacca
Eloy	Eloy Municipal	Temple Bar	Temple Bar
Nogales	Nogales International	Tuba City	Tuba City
Parker	Avi Suquilla	Tucson	La Cholla Airpark
Safford	Safford Regional	Whiteriver	Whiteriver
Williams	H.A. Clark Memorial Field	**GA-Basic**	
		Cibecue	Cibecue
		Meadview	Pearce Ferry
		Peach Springs	Hualapai
		Sells	Sells
		Superior	Superior Municipal

Source: *Airport Inventory & Data Survey* 2008

Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability

Currently 85 percent of hospitals in the state are within a 30-minute drive time of a system airport meeting these requirements analyzed as part of this performance measure. This is considered an informational performance measure and no target has been established. This performance measure was part of the SANS 2000 study. Performance has improved, increasing three percent since 2000 and five percent since 1995. While this performance measure is informational, it should be noted that improved instrument approach capabilities, on-site weather reporting (or nearby and effective weather reporting coverage), and new jet fuel at SASP airports will enhance the coverage of hospitals in the state as well.

Percent of airports that support emergency operations

Percent of airports that support search and rescue operations

Sixty-four percent of system airports reported having search and rescue activities. This performance measure is informational. It is likely that additional airports may support these types of operations in the future, but there are no targets set for this activity at the current time.

Percent of airports that support aerial fire fighting operations

Fifty-seven percent of airports included in the SASP currently support aerial firefighting operations. Aerial firefighting is conducted purely on an as-needed basis, and thus operators make specific decisions as to where they base their operations. Largely because of these reasons, this is also an informational performance measure, and has no specific target set or system changes recommended.

GOAL CATEGORY: ENVIRONMENTAL SENSITIVITY AND STEWARDSHIP

Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)

It is recommended that all airports in the SASP maintain a current Storm Water Pollution Prevention Plan (SWPPP). The FAA and Arizona Department of Environmental Quality (ADEQ) require airports to meet storm water regulations set by the Environmental Protection Agency (EPA). Any facility that could potentially pollute storm water runoff is recommended to maintain a SWPPP. Thus, the target for this action-related performance measure is 100 percent of the system. Currently, only 45 percent of SASP airports meet this performance measure. Airports recommended to implement a SWPPP are listed in Figure 7-36.

Figure 7-36: Airports Recommended to Develop a Storm Water Pollution Prevention Plan

Associated City	*Airport Name*	*Associated City*	*Airport Name*
Commercial Service		**GA-Rural**	
Peach Springs	Grand Canyon West	Gila Bend	Gila Bend Municipal
Prescott	Ernest A. Love Field	Globe	San Carlos Apache
GA-Community		Kayenta	Kayenta
Coolidge	Coolidge Municipal	Phoenix	Phoenix Regional
Eloy	Eloy Municipal	Polacca	Polacca
Payson	Payson	San Luis	Rolle Airfield
Safford	Safford Regional	San Manuel	San Manuel/Ray/Blair
Sierra Vista	Sierra Vista Municipal	Seligman	Seligman
Springerville	Springerville Municipal	Temple Bar	Temple Bar
St Johns	St Johns Industrial Air Park	Tuba City	Tuba City
Taylor	Taylor	Window Rock	Window Rock
Wickenburg	Wickenburg Municipal	**GA-Basic**	
Willcox	Cochise County	Bagdad	Bagdad
GA-Rural		Cibecue	Cibecue
Ajo	Eric Marcus Municipal	Meadview	Pearce Ferry
Bisbee	Bisbee Municipal	Peach Springs	Hualapai
Bullhead City	Sun Valley	Sells	Sells
Chinle	Chinle Municipal	Superior	Superior Municipal
Douglas	Cochise College	Tombstone	Tombstone Municipal
Douglas Bisbee	Bisbee Douglas International		

Source: *Airport Inventory & Data Survey* 2008

Percent of the population that are within a 30-minute drive time of a system airport with a flight school/flight instructor

Currently, 38 percent of airports included in the SASP have a flight school or instructor. Thirty-minute drive times from these airports cover approximately 74 percent of the state's population, indicating that a high percentage of the state's persons have the ability to undertake flight training if they are interested and capable. This informational performance measure has no specific associated projects and therefore no further action is required.

Percent of system airports supporting Airframe and Powerplant (A&P) programs

Four percent of system airports currently support educational A&P programs. This is an informational performance measure with no associated actions.

Percent of system airports that have aviation maintenance and repair

Currently, 55 percent of the airport system has aviation maintenance and repair available. Most of these services are provided at Commercial Service, Reliever, and GA-Community airports. This is an informational performance measure with no associated actions.

Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools

Thirty-five percent of the aviation system currently has programs affiliated with local schools and colleges. This is also an informational performance measure with associated actions.

SUMMARY

The system's ability to meet current and target performance is summarized in Figure 7-37. The projects outlined in this chapter to improve performance of the system will provide ADOT with useful information from which to make practical and informed decisions for the future development of the Arizona airport system. Recommendations for continued increase in performance ratings within the Arizona airport system and the cost to implement these improvements are discussed in Chapter Eight of this study.

Figure 7-37: Current and Target Performance of the Arizona Airport System

Performance Measure	*Current Compliance*	*Target Performance*
Development		
Percent of population within a 30-minute drive time of each airport, by role category (additive percentages included in target column)	86%	86%
Percent of communities in the state with a population greater than 5,000 within a 60-minute drive time of a commercial service airport	82%	No target established
Percent of communities in the state with a population greater than 1,000 within a 30-minute drive time of a general aviation airport	87%	No target established
Percent of population within a 30-minute drive time of a public use airport	85%	86%
Percent of population within a 30-minute drive time of a National Plan of Integrated Airport Systems (NPIAS) airport	83%	84%
Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach	80%	85%
Percent of airports within a 30-minute drive time of an airport with ILS or LPV	31%	35%
Percent of licensed pilots within a 30-minute drive time of a system airport	94%	No target established
Percent of airports capable of supporting emergency medical transport aircraft	40%	59% Full Capability 72% with AWOS Network
Percent of communities in the state with a population greater than 15,000 within a 30-minute drive time of a general aviation airport that can accommodate large general aviation aircraft (Airport Reference Code (ARC) B-II) and has Instrument Meteorological Conditions (IMC) capability	97%	No target established
Percent of airports with on-site weather reporting and percent of statewide area within 25 nautical miles of an airport with on-site weather reporting	46% of airports 57% of land area	67% of airports 75% of land area
Percent of population and area within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)	77%	84%
Percent of airports with jet fuel	52%	59%
Percent of airports with 24/7 fuel	45%	52%
Percent of airports with sufficient operational capacity	87%	No target established
Percent of airports projected to have sufficient operational capacity in 2030	80%	No target established
Number of airports experiencing delay to aircraft operations: the maximum and average delay in minutes an aircraft experiences due to airside congestion	23 in 2007 28 in 2030	No target established
Percent of population and employment centers that are within a 30-minute drive time of a system airport projected to not have sufficient capacity in 2030	72% population 40% employment centers	No target established
Airports with a current (past 5 years) master plan	55%	100% of Applicable Airports
Percent of airports with surrounding municipalities that have adopted "disclosure areas"	35%	100% of Applicable Airports

Figure 7-37: Current and Target Performance of the Arizona Airport System (Continued)

Performance Measure	*Current Compliance*	*Target Performance*
Percent of airports with surrounding municipalities that have adopted controls/zoning to make land use in the airport environs compatible with airport operations and development	60%	100% of Applicable Airports
Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77	46%	100% of Applicable Airports
Percent of airports that are recognized in local comprehensive plan	64%	100%
Percent of airports included in regional transportation plans	47%	100%
Economic Support		
Dollars of economic impact on the state from aviation	$38.5B	No target established
Number of major recreational areas in the state within a 30-minute drive time of a system airport	84%	No target established
Percent of businesses with the propensity to use aviation within a 30-minute drive of a system airport	99%	No target established
Percent of population within a 30-minute drive time of a system airport meeting business user needs	79%	82%
Number of airports having adequate utilities (electricity, telephone, water, sewer, and gas)	49%	No target established
Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	54%	100% of Applicable Airports
Percent of airports with an average pavement condition index (PCI) of 70 or greater	59%	100% of Applicable Airports
Safety and Standards		
Percent of airports with clear approaches to primary runway ends	51%	100% of Applicable Airports
Percent of airports with adopted Wildlife Management Plans	18%	No target established
Percent of airports with adopted Security Plans	31%	100% of Applicable Airports
Percent of airports that have a written emergency response plan	47%	100% of Applicable Airports
Airports controlling all runway end Runway Protection Zones (RPZs)	60%	100% of Applicable Airports
Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC	59%	100% of Applicable Airports
Percent of airports that meet runway/taxiway separation criteria for their current ARC	60%	100% of Applicable Airports
Percent of airports that have procedures in place to conduct self-inspections on a regular basis	72%	100% of Applicable Airports
Percent of hospitals in the state within a 30-minute drive time of an airport with Instrument Meteorological Conditions (IMC) capability, on-site weather reporting, and jet fuel availability	85%	No target established
Percent of airports that support search and rescue operations	64%	No target established
Percent of airports that support aerial fire fighting operations	57%	No target established
Environmental Sensitivity and Stewardship		
Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)	45%	100% of Applicable Airports
Percent of the population that are within a 30-minute drive time of a system airport with a flight school/flight instructor	74%	No target established
Percent of system airports with a flight school/instructor	38%	No target established
Percent of system airports supporting A&P programs	4%	No target established
Percent of system airports that have aviation maintenance and repair	55%	No target established
Percent of system airports that have educational programs that are affiliated with local elementary/secondary schools, community colleges, or technical/vocational schools	35%	No target established

Source: Wilbur Smith Associates

CHAPTER EIGHT: SYSTEM DEVELOPMENT COSTS

INTRODUCTION

Prior chapters of the Arizona State Airports System Plan (SASP) resulted in a score card for current system performance. This score card showed how the system is currently performing related to the ability of individual airports to meet their respective facility and service objectives. It also showed how the system is now performing relative to each of the system goal categories and their individual performance measures. The score card showed where the Arizona aviation system is adequate or deficient and identified targets for how the system should perform in the future.

Costs for improving the system to meet the goals developed in Chapter One are presented in this chapter. These costs have been prepared for ADOT for internal planning purposes only in order to determine the overall long-term aviation needs of Arizona. The costs developed for the SASP are not intended to replace those developed in the airport master planning or capital improvement planning processes. These costs do not provide commitment of funding for projects. Actual funding of projects will be subject to the Arizona Revised Statutes, Arizona Transportation Board, and administrative policies as well as availability of funds.

METHODOLOGY/PROCESS

Development costs were estimated for each system airport by comparing existing conditions and applicable facility/service objectives established by the system plan. Development costs include all projects associated with bringing system airports into compliance with the objectives for their recommended system role. Costs to increase overall system performance, related to the SASP's performance measures, are also identified. Not all recommended actions have associated costs. In other instances, costs could not be developed because the full magnitude of the needed project could not be estimated, given the scope of this plan. Further investigation and justification would be required before many projects stemming from the system plan can be implemented. In particular, projects seeking FAA funding would require additional study.

In this process, facility needs and costs were first identified on an airport-by-airport basis. This chapter of the system plan presents this information only in summary format, with no individual airport data presented.

Three methods were used in developing the cost estimates for the Arizona State Airports System Plan through 2030. The first two methods involved utilizing existing projects and costs for the airport by reviewing each airport's master plan, airport Capital Improvement Program (CIP) and ADOT's CIP. The cities of Phoenix and Tucson provided airport CIP information for their system of airports. It is important to note that only project costs for the near-term were available for Phoenix Sky Harbor International. In addition, for the purpose of the SASP, terminal improvement costs at Phoenix Sky Harbor and Tucson International were not included in the overall need. However, the costs for the SkyTrain at Phoenix Sky Harbor are included master plan/airport CIP costs.

For projects contained in both the master plan and/or airport CIP, and the ADOT CIP, the higher cost estimate of the two was used. In some cases where data was more than five years old, the master plan costs were increased by 15 percent to account for cost increases. In general, the CIP costs were included as listed.

The third method of developing the cost estimates used construction cost history for unit prices of typical construction projects to develop costs for projects identified by the SASP as part of facility and service objectives. The applicable area (or linear foot) was used and multiplied by the unit price to obtain the construction cost for the project. All costs are presented in 2009 dollars.

In addition, for the long term period, two pavement preservation projects were assigned for each area, such as runway, taxiway, and apron pavements. This is due to the fact that pavement preservation is typically performed every three to seven years. To establish a basis for pavement preservation, ADOT's Airport Pavement Management System was reviewed. This system has a Pavement Condition Index (PCI) for the majority of the state's airports. The rule of thumb in determining pavement preservation projects was for pavements with PCIs 70 and greater, a pavement preservation project was assigned; pavements with PCIs between 55 and 70 were assigned pavement overlays; while pavements with PCIs less than 55 were assigned pavement reconstructions. In general, the following process was used:

- If there is a reconstruction in the short term (due to the PCI levels), the follow up will be a pavement preservation every five years
- If there is a pavement preservation in the short term, the follow up will be two pavement preservations (every five years) and then an overlay project
- If there is a pavement overlay in the short term, the follow up will be two pavement preservations (every five years) and then a reconstruction project

Regardless of which costing method was used, all projects were vetted against an ADOT master grant file list to verify that projects were not previously completed.

The analyses completed in previous chapters evaluated system development needs at airports over the next 20 years, based on each airport's role in the system as well as forecast activity and operational efficiency. One of the most critical elements in the planning process is the application of basic financial, economic, and management rationale to determine the feasibility of each project contained in the system plan. It is not critical to develop all recommended projects in this study immediately. On the contrary, it would be more prudent to systematically implement improvements in order to spread development costs through the 20-year period and focus efforts on critical projects in the early stages. Short, medium, and long-term implementation periods were established in order to prioritize individual projects over the next 20 years.

SYSTEM PLAN COST SUMMARY BY GOAL OBJECTIVE

Total estimated costs are presented in the following sections. Airports may incur additional costs to have sufficient operating capacity; clear approaches; comply with Part 77 standards; acquire land in an airport's RPZ; meet runway-taxiway separation standards; or meet RSA standards. These costs have not been estimated unless they were identified as part of an airport-specific CIP or master plan, as this would require a master planning level of detail.

Specific project costs have been estimated in the following categories:

- Development
  - Instrument approaches
  - Emergency medical transport aircraft accommodation projects
  - Weather reporting
  - Fuel
  - Master plans
  - Capacity (if noted in ADOT CIP or airport master plans)
  - Part 77 compliance projects (if noted in ADOT CIP or airport master plans)
- Economic Support
  - Business user needs accommodation projects
  - Pavement improvements/preservation
  - Facility and service objectives
    - Runway length projects
    - Runway width projects
    - Taxiway projects
    - Approach projects
    - Visual Aids (PAPIs, REILs, rotating beacon, segmented circle, wind cone)
    - Runway lighting projects
    - Taxiway lighting projects
    - Approach lighting projects
    - Perimeter fencing projects
    - Fuel
    - Terminal projects
    - Hangar storage
    - Apron parking spaces
    - Auto parking spaces
- Safety and Standards
  - Clear approach projects (if noted in ADOT CIP or airport master plans)
  - Security plans
  - Emergency response plan
  - RPZ land acquisition (if noted in ADOT CIP or airport master plans)
  - Runway/taxiway separation improvements (if noted in ADOT CIP or airport master plans)
  - RSA improvements/expansions (if noted in ADOT CIP or airport master plans)
- Environmental Sensitivity and Stewardship
  - Stormwater pollution prevention plans

System Costs by Goal Category: Development

Figure 8-1 details estimated project costs associated with the Development goal category. System-wide cost to meet these performance measures is estimated at $445 million. It should be noted that the costs by performance measure presented in the table cannot be added together due to the overlap of measures and specific needs related to the measures. For example, if an airport is recommended for an instrument approach, this cost is included in the three performance measures: 1) Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach, 2) Percent of airports capable of supporting emergency medical transport aircraft, and 3) Percent of population and area within a 30-minute drive time of an all weather runway.

The Development goal category cost includes regular updates to airport master plans. Costs of on-site weather reporting projects are based on project recommendations in the ADOT *AWOS Network Study.*

Estimated costs to improve operational capacity were derived from airport master plans and CIPs only. Capacity improving projects in the Development goal costs include additional runways, additional taxiways, air traffic control towers, high-speed taxiway exits, and other taxiway system improvements. It should be noted that $72 million of the funding identified for capacity improvements is for construction of the new runway at Tucson International. Additional projects are needed at several airports in order to fully meet the sufficient operating capacity performance measure. Due to the level of planning needed to develop appropriate costs, costs for these additional projects have not been developed as part of the SASP. In the following chapter, it is recommended that an airspace and operational capacity study be undertaken by the state to fully understand the needs and costs of improving the operational capacity of the system.

System Costs by Goal Category: Economic Support

Figure 8-2 shows the cost estimates for projects in the Economic Support goal category, including all projects recommended for meeting minimum facility and service objective compliance. The system-wide cost to meet these performance measures is approximately $1.85 billion. Similar to the Development goal category costs, the numbers presented in the table cannot be added together to arrive at a total due to double counting.

Included in this cost is periodic maintenance and upkeep of all airport pavements throughout the state in order to maintain pavement condition indexes (PCIs) of 70 or greater. Facility and service objective costs are estimated at $448 million for landside facilities by 2030, $228 million for airside facilities, and $4.7 million for landside services.

Figure 8-1: Development Goal Category Project Costs 2010-2030*

	System Plan Cost (2010-2030)					
Performance Measure	*Commercial Service*	*Reliever*	*GA-Community*	*GA-Rural*	*GA-Basic*	*Total*
Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach			$2,320,000	$4,775,000		$7,095,000
Percent of airports within a 30-minute drive time of an airport with ILS or LPV	$270,000	$90,000	$0	$0	$0	$360,000
Percent of airports capable of supporting emergency medical transport aircraft: Full Airport System	$900,000	$0	$3,560,000	$6,920,000	$0	$11,380,000
Percent of airports with on-site weather reporting and percent of statewide area within 25 nautical miles of an airport with on-site weather reporting	$395,000		$440,000	$1,630,000		$2,465,000
Percent of population and area within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)	$485,000	$0	$2,590,000	$6,110,000	$0	$9,185,000
Percent of airports with jet fuel	$0	$0	$890,000	$0	$0	$890,000
Percent of airports with 24/7 fuel	$1,060,000	$0	$0	$130,000	$0	$1,180,000
Percent of airports with sufficient operating capacity	$308,920,000	$57,770,000	$0	$0	$0	$366,690,000
Airports with current (past 5 years) master plans and/or ALP	$6,215,000	$9,032,000	$12,500,000	$8,725,000	$1,890,000	$58,362,000
Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77*	$0	$2,320,000	$5,280,000	$0	$0	$7,600,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans
Note: * The costs for this goal category cannot be added together for a total due to double counting of projects within the various performance measures. FAR Part 77 project costs are only those included in airport master plans or state CIP.

Figure 8-2: Economic Support Goal Category Project Costs 2010-2030*

	System Plan Cost (2010-2030)					
Performance Measure	*Commercial Service*	*Reliever*	*GA-Community*	*GA-Rural*	*GA-Basic*	*Total*
Percent of population within a 30-minute drive time of a system airport meeting business user needs	$270,000	$4,100,000	$11,060,000	$0	$0	$15,430,000
Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	$65,830,000	$34,440,000	$105,600,000	$57,350,000	$5,990,000	$269,210,000
Percent of airports with an average pavement condition index (PCI) of 70 or greater	$554,420,000	$189,920,000	$144,70,000	$45,590.000	$420,000	$934,610,000
Percent of airports meeting minimum facility and service objectives	$337,820,000	$206,750,000	$96,950,000	$36,840,000	$1,680,000	$679,580,000
Airside Facilities	$94,300,000	$50,730,000	$54,120,000	$27,280,000	$1,400,000	$227,830,000
Runway Length	$54,190,000	$14,270,000	$19,440,000	$0	$0	$87,900,000
Runway Width	$2,330,000	$8,260,000	$10,050,000	$3,320,000	$200,000	$24,160,000
Runway Surface	$0	$0	$0	$0	$0	$0
Taxiway	$4,660,000	$8,080,000	$9,320,000	$7,420,000	$0	$29,490,000
Approach Capability	$270,000	$90,000	$2,320,000	$4,780,000		$7,460,000
Visual Aids	$510,000	$270,000	$950,000	$1,100,000	$550,000	$3,380,000
Runway & Taxiway Lighting	$5,200,000	$0	$5,250,000	$10,260,000	$0	$20,720,000
Approach Lighting System	$5,150,000	$4,490,000	$350,000	$0	$0	$9,990,000
Fencing	$21,990,000	$15,270,000	$6,430,000	$400,000	$660,000	$44,740,000
Landside Services	$1,060,000	$0	$1,220,000	$2,010,000	$420,000	$4,710,000
Maintenance	$0	$0	$150,000	$0	$0	$150,000
Restroom	$0	$0	$0	$230,000	$420,000	$650,000
Fuel	$1,060,000	$0	$1,070,000	$1,790,000	$0	$3,920,000
Landside Facilities	$242,600,000	$156,030,000	$41,420,000	$8,020,000	$50,000	$448,130,000
Terminal	$24,040,000	$0	$1,250,000	$0	$50,000	$25,340,000
Hangar Space	$15,490,000	$112,750,000	$33,940,000	$6,350,000	$0	$168,520,000
Apron Space	$132,390,000	$40,370,000	$3,120,000	$1,050,000	$0	$176,940,000
Auto Parking	$70,690,000	$2,910,000	$3,110,000	$620,000	$0	$77,330,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans
Note: * The costs for this goal category can not be added together for a total due to double counting of projects within the various performance measures.

System Costs by Goal Category: Safety & Standards

Estimated project costs for the Safety and Security goal category are detailed in Figure 8-3. The system-wide cost to meet these performance measures is estimated at $152 million by 2030. All costs associated with a runway protection zone, runway safety area, or runway-taxiway separation standards came from airport documents such as master plans and airport layout plans.

System Costs by Goal Category: Environmental Sensitivity and Stewardship

Under the Environmental Sensitivity and Stewardship goal category, only the Stormwater Pollution Prevention Plan performance measure was assigned an estimated cost. Figure 8-4 details this cost by airport role, estimated at $2.6 million system-wide by 2030.

Figure 8-3: Safety and Standards Goal Category Project Costs 2010-2030

	System Plan Cost (2010-2030)					
Performance Measure	*Commercial Service*	*Reliever*	*GA-Community*	*GA-Rural*	*GA-Basic*	*Total*
Percent of airports with clear approaches to primary runway ends	$0	$0	$540,000	$500,000	$0	$1,040,000
Percent of airports with adopted Security Plans	$210,000	$300,000	$1,350,000	$1,200,000	$230,000	$3,290,000
Percent of airports that have a written emergency response plan	$0	$70,000	$0	$0	$0	$70,000
Airports controlling all runway end Runway Protection Zones (RPZs)	$1,020,000	$69,270,000	$12,370,000	$3,140,000	$0	$85,800,000
Percent of airports that meet runway/taxiway separation criteria for their current ARC	$0	$1,930,000	$13,270,000	$0	$0	$15,210,000
Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC	$21,450,000	$20,020,000	$5,280,000	$150,000	$0	$46,900,000
Total	$22,680,000	$91,590,000	$32,810,000	$4,990,000	$230,000	$152,310,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans
Note: Project cost for RPZ, RSA, and runway-taxiway separation standards are only those included in airport master plans or state capital improvement plans.

Figure 8-4: Environmental Sensitivity and Stewardship Goal Category Project Costs 2010-2030

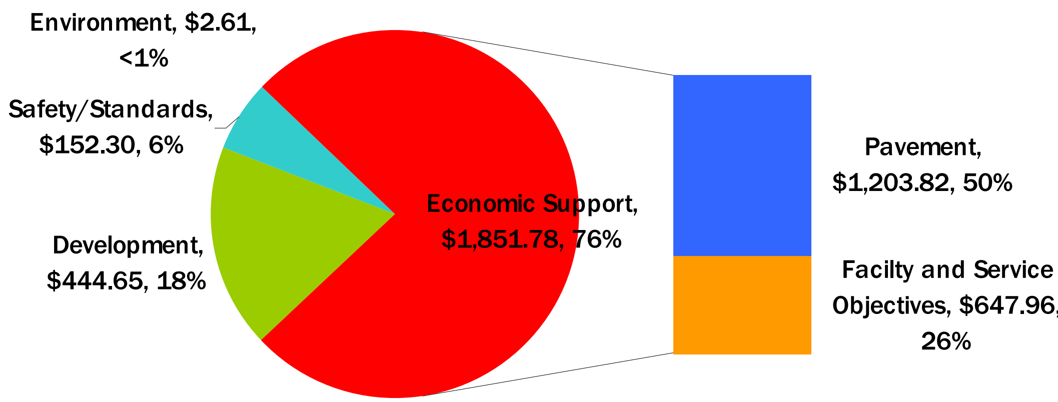
	System Plan Cost (2010-2030)					
Performance Measure	*Commercial Service*	*Reliever*	*GA-Community*	*GA-Rural*	*GA-Basic*	*Total*
Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)	$830,000	$130,000	$810,000	$750,000	$90,000	$2,610,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans

System Plan Cost Summary by Goal Category

Figure 8-5 reflects the total 20-year development costs by goal category. The 20-year estimate of costs is $2.45 billion. As previously noted, while there was some double counting of projects within specific performance measures as shown above, each project was counted in only one goal category in the totals reflected in Figure 8-5. Of the $2.45 billion in total costs, Economic Support accounts for the largest portion (76 percent). Maintaining existing pavements, under the Economic Support goal category, accounts for half of the system costs over the time period. The costs of projects needed to meet facility and service objectives comprised 26 percent of the system costs. Development goal category projects account for 18 percent of the total estimated costs. The remaining six percent of the total $2.45 billion development costs include projects to meet the Safety and Standards goal category. The cost to meet the Environmental Sensitivity and Stewardship goal category was less than one percent of the total costs.

Figure 8-5: Summary of SASP Costs, by Goal Category 2010-2030 (in millions)

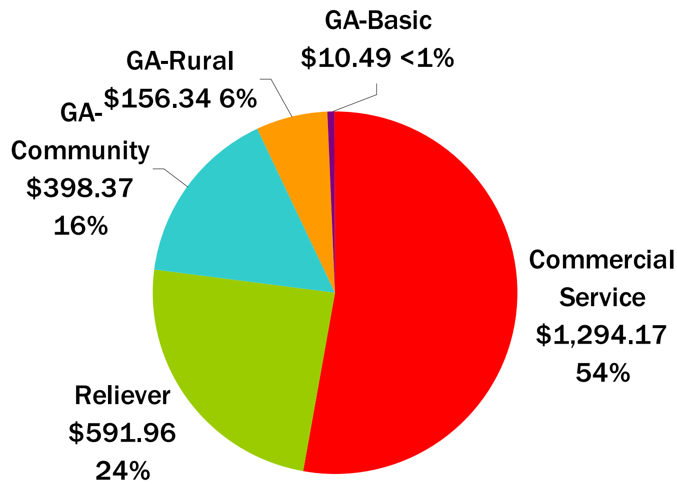


Source: Wilbur Smith Associates

SYSTEM PLAN COST SUMMARY BY AIRPORT ROLE

Figure 8-6 summarizes the estimated 20-year costs by airport role. As shown, 78 percent of these costs relate to raising the level of performance for Commercial Service and Reliever airports in Arizona (54 and 24 percent, respectively). The remaining 22 percent is needed to raise the level of performance of GA-Community, GA-Rural, and GA-Basic airports.

Figure 8-6: Summary of System Costs, by SASP Role 2010-2030 (in millions)



Source: Wilbur Smith Associates

ADDITIONAL SYSTEM COSTS

New Airports

As noted in the SASP, local communities have proposed the development of three new airports. They include Maricopa Municipal Airport in Pinal County, a new airport near Pinon in Navajo County, and a new airport near Lukachukai in Apache County. In addition, plans are underway for the replacement of following airports: Polacca, Cibecue, Superior, and Ganado. The cost for developing, constructing, and maintaining (only the existing sites) these seven airports through the forecast period would be $164.5 million. This cost is in addition to the system costs noted above.

AWOS Data Center

In addition to recommending AWOS units at various Arizona system airports, the *AWOS Network Study* also recommends the installation of the ADOT AWOS Data Center to coordinate the system, connecting existing and planned AWOS sites in Arizona to the National Airspace Data Interchange Network (NADIN). The study estimates the initial cost of establishment of the center at approximately $200,000, with an annual operating cost of $100,000. The total cost of the center through the forecast period would be $2.3 million.

State Continuous Planning

The system plan provides ADOT with a blueprint for the future development of the airport system. As the aviation industry changes and the state's socioeconomic and demographic characteristics evolve, the system plan should again be updated. It is recommended that ADOT consider updating the system plan at five-year intervals with updates in 2014, 2019, 2024, and 2029. The estimated cost for updating the system plan and its database through the forecast period would be $3.0 million.

CIP AND MASTER PLAN COST SUMMARY NOT INCLUDED IN SASP DEVELOPMENT COSTS

In addition to the projects identified in the system plan, most of the airports in Arizona have identified additional projects through local planning and goal setting. Airport-specific capital projects and costs are identified in each airport's master plan. Many of the airports in Arizona have updated their master plans in the last five years. Many planned projects in airport master plans that will use federal and state funds are identified in the current state CIP. The current state CIP has estimated project and cost information annually to 2015. Figure 8-7 presents the additional project costs identified in the state CIP and published airport master plans. In addition to the $2.45 billion identified to meet system plan recommendations, an additional $7.1 billion could be needed to meet airport needs ($504 million for other state CIP costs and $6,595 million for other master plan/airport CIP costs).

Figure 8-7: Other Future Airport Costs (in millions)

Cost Category	*Near Term 2010-2014*	*Mid-Term 2015-2019*	*Long-Term 2020-2030*	*Total*
Other State CIP Costs	$504.35	$0	$0	$504.35
Other Master Plan/Airport CIP Costs	$1,241.22	$1,847.36	$3,506.47	$6,595.04

Sources: WSA; Airport Master Plans; Tucson International and Phoenix Sky Harbor International Airport CIPs, Navajo Nation CIP, Arizona DOT

This cost summary is not exhaustive of all the airport projects that are needed through 2030. Several larger system airports including Phoenix Sky Harbor International, Yuma International, Laughlin/Bullhead City International, and Scottsdale currently have master plans underway. Improvement costs that will come from these master plans are not included in this SASP. Many airports also do not provide project costs throughout the entire system plan's forecast period (through 2030). Most master plans only provide costs through a 15 or 20-year period.

Also, pricing in many construction-related aspects has increased, decreased, and increased again in recent years due to economic conditions worldwide. These rising construction costs impact original project cost estimates developed in the state CIP or the airport master plans including pavement projects, runway and taxiway extensions, and apron projects. The cost estimates provided for these types of projects in older master plans tended to be lower than the costs actually needed to perform the project today.

TOTAL FUTURE DEVELOPMENT FUNDING NEEDS

Figure 8-8 presents the additional project costs identified in the state CIP and published airport master plans by near-term, mid-term, and long term time periods. For the near-term alone, approximately $2.8 billion has been identified for projects from the SASP, additional system costs, other state CIP costs, and other master plan costs. This indicates that in addition to the $934 million identified to meet system plan recommendations in the near term, an additional $1.8 billion could be needed to meet all airport needs through 2014 alone.

Figure 8-8: Total Airport Development Costs 2010-2030 (in millions)

Cost Category	*Near Term 2010-2014*	*Mid-Term 2015-2019*	*Long-Term 2020-2030*	*Total*
SASP Implementation Costs	$933.79	$542.38	$975.17	$2,451.34
Additional System Costs*	$87.90	$24.72	$57.55	$170.17
Other State CIP Costs	$504.35	$0	$0	$504.35
Other Master Plan Costs	$1,241.22	$1,847.36	$3,506.47	$6,595.04
Total Costs	$2,767.27	$2,414.45	$4,539.19	$9,720.91

Sources: WSA, Airport Master Plans, ADOT Aeronautics
Note:*includes costs developed for the construction and maintenance of new airports, the development and maintenance of the AWOS Network Center, and future state system planning needs.

Although the longer term funding needs are uncertain, if near term funding needs continue into the future, it is estimated that an additional $2.4 billion will be incurred in the mid-term (2015 to 2019) and $4.5 billion in the long-term (2020 to 2030). Throughout the forecast period it is estimated that $9.7 billion will be needed to fund Arizona airports. This equates to an average annual need of $486 million to fund system-wide development.

Between 2010 and 2030, the approximate annual cost to raise the level of performance of airports to meet system plan objectives would be at least $122.6 million. However, when other desired airport projects are considered as well, the annual costs are estimated to reach $486 million on average over the 20-year forecast period. Due to incomplete information on funding needs, especially from larger airports who do not conduct long-term capital development planning to this level of detail, the long term costs are considered incomplete and probably understated. The following discussion provides an overview of the funding currently available to Arizona's airports and a summary of the anticipated shortfall through the 20-year forecast period.

FUNDING SOURCES

Funding for airport improvement projects is an important issue when considering the future of Arizona's aviation system. In order to meet user needs, airports typically rely on funding sources beyond their own revenue. Airport development is typically driven by the ability of individual airport sponsors to identify funding sources and to successfully obtain funding.

There are various sources of funding available to airports in Arizona; however, each year, the funding requested far outweighs available funding. In general, funding for capital improvement projects can be secured from the following sources: federal, state, local, or private funds. Implementation of the recommendations presented in the SASP will require significant effort on the part of all funding agencies. A brief description of each source of funding is presented in the following sections.

Federal Funding Sources

The FAA, through Airport Improvement Plan (AIP) grants, distributes federal funds to the nation's airport system from the Aviation Trust Fund. The Aviation Trust Fund was originally established in 1970 and has since been amended on numerous occasions. The Aviation Trust Fund establishes a source of funds, collected only from the users of the nation's airport system that can be used to fund airport improvements. Only airports included in the National Plan of Integrated Airport Systems (NPIAS) are eligible to apply for FAA funding. Fifty-nine of Arizona's 83 system airports are currently part of the NPIAS and are eligible for federal funding.[1]

Figure 8-9 presents total AIP funding for all eligible U.S. airports for the fiscal years 2000 through 2009.

Figure 8-9: All U.S. Historical AIP Funding (Billions)

	FY 2002	*FY 2003*	*FY 2004*	*FY 2005*	*FY 2006*	*FY 2007*	*FY 2008*	*FY 2009*
Total AIP Funding	$3.3	$3.4	$3.4	$3.5	$3.6	$3.7	$3.6	$3.6

Source: FAA Airports Financial Assistance Division

Vision 100 was signed into law in December 2003 and reauthorized the AIP Program through 2007. Because Vision 100 expired at the end of FY2007 and a long term reauthorization is not in place at the time of the SASP writing, there have been no funding targets for 2008 and beyond. While FY2008 and FY2009 funding was eventually appropriated at the FY 2006 level of $3.6 billion, the future of the AIP is largely unknown without a program reauthorization. The future AIP program may include changes to federal share amounts, non-primary entitlements, set-asides, and passenger facility charges (PFCs), among other items.

Commercial Service Entitlement Funding for Arizona

Commercial service airports receive entitlement funds based on the number of passengers they enplane during the prior calendar year. Entitlement funding is based on a graduated methodology that provides a lower per enplanements entitlement as the total enplanement level increases. This process is used to offset funding disparity that results from the vastly different levels of enplanements occurring at U.S. airports. The minimum passenger

[1] However, it was noted during the inventory effort of the SASP that that Ganado Airport is now closed. Although Ganado is included in the FAA NPIAS, it was not included in SASP analysis.

entitlement for Primary Airports (those airports enplaning at least 10,000 passengers per year) is $1 million. In Arizona, nine airports were considered Primary Airports in FY2009 including Laughlin/Bullhead City International, Flagstaff-Pulliam, Grand Canyon National Park, Grand Canyon West, Page, Phoenix Sky Harbor International, Phoenix Mesa Gateway, Tucson International, and Yuma International. According to the FAA, these airports received $16.3 million in Primary Entitlements in FY2007 (the most recent data available from the FAA). Not all of this money is spent in the year it is received. Commercial service airports may also receive cargo entitlement funding based on the landed weight of cargo aircraft. Phoenix Sky Harbor will receive $1.4 million in Cargo Entitlements in FY2009 and Tucson International will receive over $200,000.

State Apportionment & Non-Primary Entitlement Funding for Arizona

General aviation airports (included in the NPIAS) are eligible for State Apportionment funds and Non-Primary Entitlement funds. State Apportionment funds are allocated to states based on a formula using population and geographic size. Those funds are distributed to airports based on FAA prioritization of projects. According to the FAA, Arizona non-primary airports will receive approximately $8.3 million in State Apportionment funds in FY2009 for federally funded projects at non-primary airports only.

General aviation airports are also eligible for up to $150,000 in Non-Primary Entitlement funds. To obtain the funds, airports must have a 5-Year CIP with eligible projects that meet AIP funding guidelines. In FY2009, 48 Arizona airports received Non-Primary Entitlement funds for a total of $7.0 million.

Federal Discretionary Funding for Arizona

General aviation and commercial service airports also compete for Federal Discretionary funds, which are awarded based on priority ratings given to each potential project by the FAA. The prioritization process ensures that (from the FAA's viewpoint) the most important and most beneficial projects are the first to be completed, given the availability of adequate discretionary funds. This source of funding is over and above entitlement funding, and is provided to airports for projects that have a high federal priority for enhancing safety, security, and capacity of the airport, and would be difficult to fund otherwise. The dollar amounts of individual grants vary and can be significant in comparison to entitlement funding.

Between FY2006 and the first six months of FY2009, the discretionary funding for Arizona airports from the FAA Western Pacific Region was over $135 million. The following Arizona airports received discretionary funds during the three and a half year period:

- Avi Suquilla ($5.5m)
- Bagdad ($0.3m)
- Bisbee Municipal ($1.1m)
- Chandler Municipal ($2.4m)
- Flagstaff Pulliam ($11.6m)
- Grand Canyon West ($24.0m)
- Kayenta ($5.8m)
- Laughlin/Bullhead City ($10.3m)
- Marana Regional ($3.3m)
- Mesa Falcon Field ($1.7m)
- Nogales International ($1.4m)
- Page Municipal ($1.0m)
- Phoenix Deer Valley ($12.1m)
- Phoenix Goodyear ($19,000)
- Phoenix Mesa Gateway ($20.0m)
- Phoenix Sky Harbor ($3.0m)
- Scottsdale ($2.5m)
- Sedona ($1.0m)
- Show Low Regional ($0.1m)
- Springerville Municipal ($1.6m)
- Tucson International ($21.7m)
- Winslow Regional ($0.1m)
- Yuma International ($5.0m)

American Recovery and Reinvestment Act (ARRA) of 2009

President Barack Obama signed the $787 billion American Recovery and Reinvestment Act (ARRA) of 2009 in February 2009. This one time economic stimulus package included $48.1 billion in domestic spending on infrastructure improvements. Of this, $1.1 billion was provided to the FAA for airport projects. Priority was given to projects that were ready to go (also referred to as shovel ready) and could be completed within two years. Six Arizona airports were awarded one of these 100 percent federal funded grants for a total of $28.7 million. These airport projects include the following:

- Phoenix-Sky Harbor International taxiway rehabilitation ($10.5m)
- Sierra Vista Municipal/LAA runway rehabilitation ($6.0m)
- Kingman apron rehabilitation ($5.0m)
- Taylor runway rehabilitation ($3.5m)
- Avi Suquilla taxiway rehabilitation ($1.8m)
- Tucson International security enhancements ($1.85m)

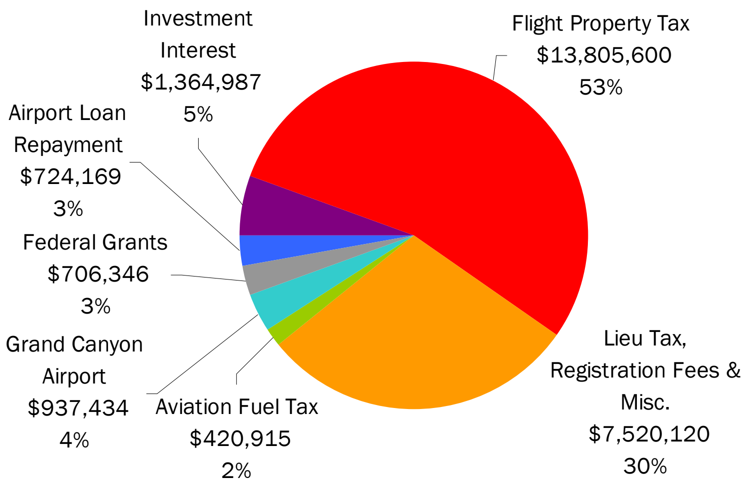
Summary

Federal funding is limited to development that is justified to meet aviation demand, according to FAA standards. Each airport development project, including those recommended in the SASP, will be subject to eligibility and justification requirements in the normal AIP funding process.

State Funding

In support of the state aviation system, the state of Arizona also participates in airport improvement projects through its own grant program. State funding is available for all publicly-owned airports in Arizona, excluding Native American-owned airports. The source for state airport improvement funds is the Arizona Aviation Fund administrated by the Arizona Department of Transportation (ADOT) Aeronautics Division and funded mainly through flight property taxes, aircraft lieu taxes and registration fees, and aviation fuel taxes. **Figure 8-10** presents the sources of the aviation fund in FY2008. In FY2008, $25.5 million was deposited into the State Aviation Fund.

Figure 8-10: Arizona Aviation Fund Sources FY 2008 - $25.5 million



Source: ADOT Aeronautics

State aviation funding is "non-dedicated." Aeronautics relies on two annual appropriations from the Arizona Legislature each year: one for the operating budget of the Aeronautics Division and Grand Canyon National Park Airport and the other for the airport projects including matching grants for FAA funding, pavement preservation, airport loans, and other state projects. Between FY2001 to FY2009, the Arizona Aeronautics Division received a total of $144 million from the State Aviation Fund for aviation projects:

- 2001-$9.9 million
- 2002- $7.1 million
- 2003- $25.9 million
- 2004- $8.7 million
- 2005- $15.5 million
- 2006- $24.9 million
- 2007- $28.4 million
- 2008- $20.8 million
- 2009- $2.8 million
- 2010E- $3.5 million

In FY2008, the Legislature moved $18.1 million from the State Aviation Fund to help balance the state budget. This sweep moved dedicated grant money from planned airport projects. In FY2009, the State Aviation Fund will be swept by another $22.5 million to the Legislature, terminating 28 approved airport projects. It is uncertain when the State Aviation Fund will once again be dedicated for use for aviation-related projects only. Based on this uncertainty, the Aeronautics Division is anticipating funding just $3.5 million in federal matching grants in FY2010.

The State Transportation Board establishes the policies for distribution of the State Aviation Fund across the following categories of airport development assistance:

- Federal/State/Local Grants
- State/Local Grants
- Airport Pavement Management System (APMS) (including projects maintaining and protecting aviation pavement surfaces)
- System Planning

- Airport Loan Program (including economic development/revenue generating loans, grant match loans, and grant advance loans)

These programs are discussed in more detail below.

Federal/State/Local and State/Local Grant Programs

The state's Airport Development Grants Program is designed to provide 50 percent of the local share for projects receiving federal AIP funding. These are referred to as Federal/State/Local grants. Current sponsor obligations on federal projects for most airports are five percent of a project's total cost, making the state share 2.5 percent. However, the local share of federal projects for Phoenix Sky Harbor International is 25 percent and the local share for Tucson International is nine percent, making the state share 12.5 and 4.47 percent, respectively.

Projects must be included in ADOT's Capital Improvement Program (CIP) and require approval by the STB in order to receive the matching funds for Federal/State/Local grants. The Arizona Revised Statutes and STB policy provides guidance on funding limits and eligibility. Types of projects eligible for this funding as well as State/Local grants include planning, design, development, land acquisition, construction, and improvement of publicly-owned and operated airport facilities. There is currently a cap on the maximum annual state grant funding that an individual airport can receive; effective October 1, 2009, an eligible airport can receive grant monies from the Aviation Fund up to an amount equal to 10 percent of the average fund revenue for the past three years.

The state also participates in State/Local grants. The state funds 90 percent of projects at state-defined primary airports and 95 percent of the project cost of secondary airports. These projects must also be included in ADOT's CIP and approved by the STB. Due to limited funding in FY 2009 and FY2010, the state was not able to fund any State/Local grants in those years.

Airport Pavement Management System (APMS)

Arizona's Airport Pavement Management System also may fund up to 90 percent of a primary airport pavement maintenance project and 95 percent of a secondary airport pavement project (primary and secondary are Arizona airport classifications) which is not eligible for AIP funding, such as crack seals, slurry seals, pavement overlays, and pavement markings. The APMS is updated every three years and provides an eight-year list of needed projects.

Airport Loan Program

ADOT Aeronautics Division has an Airport Loan Program, established to enhance the utilization of state funds and provide a flexible funding mechanism to assist airports in funding improvement projects. Eligible projects include runways, taxiways, aircraft parking ramps, aircraft storage facilities (hangars), fueling facilities, general aviation terminal buildings or pilot lounges, utility services (power, water, sewer, etc.) to the airport runway or taxiway lighting, approach aids (electronic or visual), ramp lighting, airport fencing, airport drainage, land acquisition, planning studies, and under certain conditions, the preparation of plans and specifications for airport construction projects. Projects not eligible for funding under other programs but are designed to improve an airport's ability to be financially self-sufficiency may also be considered.

There are three types of loans available through the program: matching fund loans, revenue generating loans, and economic development loans. The matching fund loans are provided to meet the local matching fund requirement for securing federal airport improvement grants. This loan is available for construction projects and projects must be included in the ADOT five-year CIP. These loans cannot be repaid with future airport development grant funds. The revenue generating loan funds are provided for airport related construction projects, which are not eligible for funding, in whole or part, under other programs and are designed to improve airport financial self-sufficiency. Economic development loans are available for projects that promote airport self-sufficiency but are not considered a direct revenue-producing project.

Summary

Due to the uncertainty of available funds, sweeps of the Aviation Fund make programming for aviation capital needs difficult, particularly for high-priority, high-cost and multi-year projects. Needs exceed available funds. Increased construction expenses exacerbate the funding dilemma.

Local Funding

Local airport sponsors are responsible for costs associated with airport development projects that remain after federal and state shares have been applied. Beginning in 2004, the local and state match for federal projects is 2.5 percent. However, the local share of state projects for Phoenix Sky Harbor International is 12.5 percent and the local share for Tucson International is 4.47 percent. For state projects, the local share has varied from 10 percent to 50 percent, depending on the nature of the improvement.

Local government funding of airport development projects is derived from the following sources:

- General Fund Revenues
- Bond Issues
- Airport-Generated Revenues
- Private Funding

Of these, general fund revenues and general obligation bonds are by far the most common funding sources. Revenue bonds supported by airport generated revenues are seldom used because most general aviation airports do not generate enough money to pay operating expenses and the debt service of capital funding requirements.

General Fund Revenues

Capital development expenditures from general fund revenues have been somewhat difficult to obtain in recent years. One reason for this difficulty is the seemingly universal shortfall in local general fund revenues. Budgetary problems have created an environment where local funding is uncertain. The amount of general fund support for airport improvement projects varies by airport and is based upon the local tax base, priority of the development project, historical funding trends, and, of course, local attitudes concerning the importance of aviation.

Bond Funds

Airport authorities can issue bonds without approval from the city or county. However, they must use their own revenue to repay the bonds. Airport revenue istypically used to repay these bonds.

A city or county can also operate an airport. For these airports, bond issues funding the local share of airport development projects must compete with bond issues for other types of community improvements such as schools, highways, and sewer systems. As with the general fund apportionment, bond issues supporting airport development depend greatly on the priority assigned to such projects by the local community.

Airport-Generated Revenues

It is not uncommon for revenues generated by an airport operation, in particular a general aviation airport operation, to fail to match the expense of the operation. In such cases, the airport sponsor subsidizes the operating and the capital improvement expenses of the airport.

Commercial service airports, via the collection of revenue from landing fees, space rental, auto parking, fuel sales and/or fuel flowage fees, concession fees, etc., are more likely to generate the revenue necessary for operating and capital improvement expenses.

Commercial service airports may also impose a Passenger Facility Charge (PFC) to generate revenue to pay approved capital improvement expenses. The PFC program included in the Aviation Safety and Capacity Expansion Act of 1990 requires the U.S. Department of Transportation to issue regulations for the PFC program. Those regulations allow an airport sponsor to charge a PFC up to $4.50 per enplaned passenger. The proceeds from the PFC program are used to finance eligible projects, in whole or in part, and to pay debt-service and finance expenses incurred with an approved project. PFCs can be used in combination with grant funds to complete a project and as the sponsor's share for a federal grant for an approved project. An estimated $97 million in PFCs were collected by Arizona airports in 2007. Those airports and their PFCs are

- Flagstaff Pulliam $3.00
- Grand Canyon West $3.00
- Phoenix Mesa Gateway $4.50
- Phoenix Sky Harbor International $4.50
- Tucson International $4.50
- Yuma International $4.50

Private Funds

Items such as storage and maintenance hangars, fuel systems, and pay parking lots are not typically eligible for federal or state grant funding at public airports because they generate income for the airport. Communities sometimes work FBOs or other local businesses to fund these types of improvements.

Funding Summary

Figure 8-11 presents a summary provided by ADOT Aeronautics and the FAA of total funding for airports in Arizona over the last five fiscal years (July 1 through June 30). The funding includes federal, state, and local funding for this time period. Projects that use 100 percent of local funds or PFC funding are not included. On average between FY2004 and FY2008, funding for Arizona airports has been nearly $100 million, considerably less than the needs of the system presented above. As shown in Figure 8-11, due largely to state funding cuts, FY2009 total funding was estimated to be just $68.3 million, well below the $100 million average of the previous five years. If the total funding level from FY2009 of $68.3m is compared to the future annual funding needs developed in the beginning of this chapter, ($486 million per year), this equates to an annual shortfall of approximately $417 million.

Figure 8-11: Arizona Airport Historic Funding FY2004-2009E

Project Type *Source*	*FY2004*	*FY2005*	*FY2006*	*FY2007*	*FY2008*	*FY2009E*
Federal/State/Local						
Federal						
Entitlement	$26,720,416	$28,699,722	$28,464,159	$32,011,370	$29,152,343	$25,000,000
Discretionary	$57,573,182	$50,362,308	$41,303,198	$36,379,767	$38,738,304	$38,000,000
Federal Total	*$84,293,598*	*$79,062,030*	*$69,767,357*	*$68,391,137*	*$67,890,647*	*$63,000,000*
Local Match	$3,012,812	$2,519,266	$1,965,907	$2,235,419	$2,325,214	$2,487,674
State Match	$1,201,868	$1,433,836	$1,522,461	$6,684,138	$1,069,318	$2,487,674
Total	$88,508,278	$83,015,132	$73,255,725	$77,310,694	$71,285,179	$67,975,347
State/Local						
State	$1,945,476	$9,752,682	$17,937,687	$21,703,979	$19,667,548	$0
Local	$212,497	$1,892,083	$2,249,242	$2,626,163	$2,178,613	$0
Total	$2,157,973	$11,644,765	$20,186,929	$24,330,142	$21,846,161	$0
APMS						
State	$3,424,888	$4,256,517	$3,328,179	$0	$0	$0
Local Match	$380,541	$0	$151,105	$0	$0	$0
Total	$3,805,429	$4,256,517	$3,479,284	$0	$0	$0
State	$2,104,566	$2,104,567	$2,155,000	$0	$85,000	$277,359
Total Funding	$96,576,246	$101,020,980	$99,076,938	$101,640,836	$93,216,340	$68,252,706
Total State Funding	$8,676,798	$17,547,602	$24,943,327	$28,388,117	$20,821,866	$2,765,033

Source: ADOT Aeronautics
Note: E=estimate

RETURN ON INVESTMENT

Arizona is continually facing increasing demand for limited financial resources. The SASP identified the importance of addressing safety and capacity related projects in the near and mid-term. The challenge is to prioritize which additional airport capital investment projects should be funded with state assistance. Factors considered in the decision-making process include aviation activity (i.e., aircraft operations and based aircraft), emergency access, and economic development (business attraction and retention). From an economic development perspective, the objective is to identify how the greatest benefit can be achieved given aviation's role compared to many other economic development factors, such as labor (availability, skill levels and rates), taxes, accessibility, etc.

A 2002 study completed by the Arizona Department of Transportation for public airports in Arizona concluded that there are an estimated 395,000 jobs throughout the state that are linked directly to the airports and their operations. Total economic output contributed by the public-use airports included in the SASP was over $38.5 billion in 2002.

While the results of the airport economic impact analysis are extremely useful in illuminating the importance of Arizona's aviation industry, they do not shed light on the potential return on investment (ROI) of aviation as a whole. The return on investment goes beyond the airport itself, and extends into the local and regional economies that they operate within. Without the availability of airports, the ability of the local or regional economy to expand is impacted. Airports serve an important role in providing access for the local business, as well as access for visitors and vendors of the business that is not easily quantified as a specific return on investment.

When a company is looking to expand or relocate, there are many factors that affect their decision-making process. In a survey conducted as part of the SASP of more than 2,500 Arizona businesses, the survey asked the business to rank the importance of the following factors when considering expansion or relocation. The factors are listed from most important to least in terms of the results:

- Convenient highway access
- Availability of trained workforce
- Cost of living
- *A commercial service airport*
- Tax incentives
- Proximity of suppliers
- An urban business district
- Academic or cultural centers
- Universities or R&D centers
- *Airport with international flights*
- *A general aviation airport*
- Historic location of business
- Raw materials/natural resources
- Rail transportation facilities

As shown, the location of a commercial service airport ranks very high (fourth out of 14 factors), indicating the economic value of commercial airline service to businesses and the overall economy. Proximity to a general aviation airport ranks 11th in the listing, just below airport with international flights.

The survey confirmed that many businesses depend on the state's airports for the transport of employees, clients, and suppliers, as well as goods. Without access to commercial and general aviation airports, some companies would be forced to cut employment or possibly locate outside the state. It is the off-airport, value added benefit that non-aviation businesses gain through their use of aviation that is extremely difficult to quantify.

Role of the Airport in Economic Development

Airports are often catalysts for economic development; however, investment in airport infrastructure does not necessarily stimulate economic development. Airport investment (development) is more often an important facilitator of growth, not the origin, or the cause of growth. Within any market area, rising demand for goods and services stimulates economic growth, and subsequently the need to invest in and grow airports.

Rising demand for goods and services is most often linked to growth in population and employment, capital investment (public and private), and/or technological progress. These three measures are not easily quantified. Studies have shown that when a market area has certain characteristics, there is a greater propensity for rising demand for goods and services. Rising demand for goods and services equates to the need to invest in and grow airport facilities. When certain characteristics are present in a market area, these characteristics generally indicate a higher demand for aviation services and hence a greater potential for return when investment is made in airports. It is more often the characteristics of an airport's market area, and not the airport specific development project, which determine if there will be a positive off-airport return on investment.

SUMMARY

The Arizona State Airports System Plan has identified costs to elevate the overall performance of the state's airport system and to enable individual airports in the system to fulfill their designated roles. Through 2030, the approximate annual average cost to raise the level of performance of airports throughout Arizona to meet SASP recommendations alone would be at least $123 million. When additional funding needs are considered based on airport CIPs, ADOT's current CIP, and airport master plans, the annual level of need is estimated to jump to $486 million or a total of $9.7 billion over the 20-year forecast period.

Historically and prior to FY 2009, when federal, state, and local funding sources are all considered each year an average of approximately $100 million has been invested in the Arizona airport system. With an estimated $486 million in annual estimated need, this results in a deficit of $386 million per year in funding shortfall. Immediate action is needed at all levels to help ensure that Arizona's airports can be appropriately maintained and improved. State funding for Arizona's airport system has been cut drastically in the last two fiscal years. ADOT Aeronautics relies on funds appropriated from the Legislature to maintain a healthy and safe statewide aviation system. With the recent State Aviation Fund sweeps, the limited funding has made it difficult for the state just to match federal grants. In addition, this limits the ability of the state to fund any special programs, including airport pavement maintenance. Aside from funds to match federal grants, additional dedicated state funding is needed for the maintenance and development of public airports in Arizona.

The importance of Arizona's airports to the economies of the state, cities, and counties is undeniable. The system must be maintained and justifiably expanded not only to meet the needs of the aviation community but also the economic objectives of the state. The return on the investment in Arizona's airports can be great, if the funding is in place to maintain and support its system.

CHAPTER NINE: RECOMMENDED PLAN & POLICIES

INTRODUCTION

With analysis of Arizona's future airport system needs and the costs to implement the recommendations complete, the steps associated with implementation can be determined. This final chapter of the Arizona State Airports System Plan (SASP) provides an overview of the analysis and recommendations identified throughout the planning process. This plan was developed so that it is consistent with Arizona's goals for development, economic support, safety and standards, and environmental sensitivity and stewardship. The Arizona SASP was developed using a process that results in the identification, preservation, and enhancement of an aviation system to meet the state's long-term needs. This chapter also presents a summary of policy issues related to implementing recommendations and action items for the stakeholders of the system.

The SASP provides a 20-year outlook (through 2030) for the state's aviation needs. The system planning process was developed to ensure that ADOT remains responsive to air transportation needs by identifying roles and characteristics for existing and new airports. Airports in Arizona continue to evolve to respond to changes in the communities they serve and the aviation industry trends. The facility and service objectives established in this plan are a general guide and frame of reference for balanced development. More detailed design, planning, and environmental analysis for airports will be accomplished as part of individual master plans. Actual development is driven by local needs and decisions. Any airport project will be required to meet eligibility and justification guidelines before being eligible for funding.

The SASP provides ADOT with an important tool to monitor the ability of airports to meet customer needs. The plan also provides a means to measure the effects of investment on the performance of the Arizona airports system. Over the next 20 years, federal, state, local, and private funding will be needed to ensure that the aviation system meets goals established in this study. It is estimated that at least $2.5 billion will be needed over the next 20 years if airports in Arizona are to respond to objectives set by the SASP. This does not include additional airport needs not identified in the SASP but currently identified in airport-specific planning efforts.

Information from the SASP may be used to update the FAA's National Plan for Integrated Airport Systems (NPIAS) that is provided to Congress on a biannual basis, especially the identification of funding needs for the system. The SASP may also be used by individual airports to update master plans and airport layout plans (ALPs).

In future years, the plan will enable ADOT to measure the change in system performance. By tracking key indicators for the airport system (presented in this report in the form of performance measures) it will be possible for ADOT and FAA to formulate strategies for responding to Arizona's air transportation needs. The SASP provides a guide for the state and its communities to ensure that the vision established for the Arizona airports system can be achieved as the system continues to develop in the future.

SUMMARY OF SASP PROJECT RECOMMENDATIONS

It was estimated that it will cost $2.45 billion over the next 20 years just to meet the goals developed for the SASP. To recap, the goals include:

- Development – Arizona should provide an airport system that is adequately maintained to meet current and projected demand and is easily accessible from both the ground and the air.
- Economic Support – Arizona should advance a system of airports that is supportive of Arizona's economy, ensuring that the airport system is matched to Arizona's socioeconomic and demographic characteristics.
- Safety and Security – Arizona should provide for a safe airport system, as measured by compliance with applicable safety and security standards to support health, welfare, and safety-related services and activities.
- Environmental Sensitivity and Stewardship – Arizona should promote a system of airports that is considerate of the environment and supports aviation programs and outreach opportunities in Arizona.

Through the use of performance measures under each of these goal categories and the development of airport roles, system performance was evaluated. With the evaluation complete and outside influences considered, recommendations for improving the airport system were developed. Highlights of SASP findings and recommendations include:

- Safety-Related Projects – Safety is by far the most important priority for ADOT Aeronautics. The state and its airports have devoted a great deal of effort and resources to continue to improve safety at their facilities. However, the SASP showed that additional improvements are needed to meet FAA standards. As presented in Chapter Six, Figure 6-47, just 67 percent of airports have clear approaches to their primary runways. In additional, just 60 percent of airports meet FAA standards for RPZs, RSAs, and runway-taxiway separation. (See Figures 6-49, 6-50, 6-51.) Although no specific projects were recommended for these measures due to the in-depth analysis required to identify needed improvements, it is recommended that the state work closely with the airports to improve performance of these measures in the near-term.

- Land Use Planning Recommendations – ADOT also recognizes the importance of having appropriate land-use planning in place to protect its airport resources. Just 31 percent of system airports noted that they have a published disclosure area compliant with Arizona statutes. (Shown in Figure 6-34.) In addition, less than half of system airports have FAR Part 77 height zoning in place. ADOT should work closely with airports to improve the performance of these measures.

- Operational Capacity Concerns – As discussed in Chapter Six and presented in Figure 6-29, 11 system airports (13 percent) currently exceed the demand/capacity ratio of 60 percent, the point at which the FAA suggests airport planning for improved operational capacity. Six more airports will exceed this ratio by 2030 based on SASP projections of activity. While there are a few airports with plans for capacity improvements, the state should continue to work with airports, especially those in the Phoenix and Tucson metro areas, to find solutions to improve operational capacity.

- Pavement Maintenance – Chapter Eight noted that the cost of maintaining existing pavements in Arizona over the next 20 years accounts for 50 percent of the all SASP-related costs ($1.2 billion). This points to the large need just to maintain existing facilities and the importance of a continued statewide pavement program.

As a result of the projected shortfall between the total development costs shown in the SASP and actual funding levels, it is important to prioritize spending on projects recommended by the SASP in order to direct available funding to projects that will improve the system's performance the most. For example, if an airport meets the approach facility objective, it may also help improve the performance of several measures including percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach, percent of population and area within a 30-minute drive time of a system airport meeting business user needs, percent of airports capable of supporting emergency medical transport aircraft, and percent of population within a 30-minute drive time of an all weather runway.

FUTURE NPIAS CONSIDERATIONS

Airports included in the FAA's NPIAS are eligible to compete for project funding from the federal Airport Improvement Program (AIP). According to the FAA's 2009-2013 NPIAS published September 30, 2008, there are 59 airports in Arizona included in the NPIAS.[1]

Appendix C presents the criteria used by the FAA to determine whether or not an airport qualifies for the NPIAS. These criteria were applied to several non-NPIAS airports in Arizona to examine their ability to currently meet FAA NPIAS qualifications. This information is developed for informational purposes only. The state and non-NPIAS airport sponsors should continue to monitor airport activity and each airport's ability to meet other eligibility criteria for inclusion in the NPIAS.

As Arizona grows and demand for aviation resources increases, the airport system may also need to grow and expand. If the system grows as projected, certain airports may become good candidates for NPIAS standing. In SASP analysis, several areas in the state were recognized as potentially needing new or replacement airports. In all instances, this need had already been identified or was in the process of being studied through state or locally supported airport feasibility/site selection studies. The SASP recognized the need for additional or replacement airports in the following areas of the state:

- Pinal County- City of Maricopa Airport (new)
- Superior- Superior Airport (replacement)
- Tribal Airports
    - Navajo Reservation - Ganado (replacement), Pinon (new), and Lukachukai/Teec Nos Pos area (new)
    - Hopi Reservation - Polacca (replacement)
    - White Mountain Apache Reservation - Cibecue (replacement)

If Maricopa and Superior airports are developed in the future, facilities and services should be commensurate with the SASP objectives outlined for the General Aviation-Community airports. Depending on final development of the airports and the status of the FAA's program, these airports could be considered by the airport sponsor for eligibility in the NPIAS in the future.

[1] It should be noted that Ganado Airport, which is closed, is included in the FAA's 2009-2013 NPIAS.

Although the tribal airports are not currently eligible for state funding participation, it is recommended that these airports be developed in accordance with the SASP's GA-Rural airport facility and service objectives. Polacca and Cibecue airports are currently and should continue to be included in the NPIAS when replaced. Consideration of the ability of the Navajo airports to meet NPIAS criteria such as based aircraft should be evaluated to determine if they could also achieve NPIAS status.

In addition to new system airports, the SASP concluded that activity at and conditions near Rolle Airport should be monitored for the airport's possible inclusion in the NPIAS. Although the airport does not currently meet the based aircraft criteria for inclusion, Yuma International Airport is the only other airport with a NPIAS designation in the region. Yuma is projected to experience large demographic growth through 2030. In addition, Yuma International was operating at 66 percent of capacity in 2007 and is projected to reach 91 percent by 2030. The Marine Corps Air Station (MCAS), located at Yuma International, has also noted plans to expand in its five-year plan. Yuma international Airport has recognized that an improved general aviation airport nearby, namely Rolle, could help relieve future congestion. Monitoring of the conditions in this area is warranted to determine if Rolle could be considered by the FAA for NPIAS inclusion.

FUTURE RELIEVER CONSIDERATIONS

Reliever airports are NPIAS airports designated by the FAA to relieve congestion at commercial service airports and to provide improved general aviation access to the overall community. Criteria for a Reliever airport includes current activity levels of at least 100 based aircraft or 25,000 annual itinerant operations. A Reliever airport must relieve a commercial service airport that serves a metropolitan area with a population of at least 250,000 persons or at least 250,000 annual enplaned passengers. The relieved airport also must operate at or below 60 percent of its capacity. Currently, there are nine airports in Arizona that have reliever status including:

- Phoenix Sky Harbor International Reliever Airports
  - Chandler Municipal
  - Glendale Municipal
  - Phoenix Deer Valley
  - Phoenix Goodyear
  - Phoenix-Mesa Gateway[2]
  - Mesa Falcon Field
  - Scottsdale
- Tucson International Reliever Airports
  - Marana Regional
  - Ryan Field

Despite the current presence of seven reliever airports in Greater Phoenix, projections of future aviation demand due largely to the recent and projected population growth of the Phoenix Metropolitan Statistical Area may require greater reliever capacity. Buckeye Municipal and the proposed Maricopa Airport were included in an analysis of Reliever candidate airports found in Appendix D. This analysis is presented for informational purposes and airport sponsors must pursue FAA-defined Reliever status.

[2]It should be noted that while the most recent FAA NPIAS (2009-2013) still shows Phoenix-Mesa Gateway as a Reliever airport, that the airport should be classified as a Primary Commercial Service Airport. This airport has maintained commercial airline service and has surpassed the 10,000 annual enplanement mark.

It was noted in the analysis that neither Buckeye Municipal nor the proposed Maricopa Airport (if and when developed) meets the current activity criteria for consideration as FAA Reliever airports. Activity at these airports and other airports near Phoenix Sky Harbor and Tucson International should be monitored for future consideration as Reliever airports.

IMPLEMENTATION OF SASP RECOMMENDATIONS

ASM Database Coordination

An important component of the SASP is the inclusion of key pieces of data in the comprehensive ADOT Airports System Manager (ASM) database. This system allows ADOT to track comprehensive data related to the planning and evaluation of its aviation facilities. Currently, project funding, Airport Capital Improvement Plan (ACIP) information, and aircraft registration are all included in the ASM database. The following information from the SASP is also included in the ASM upon conclusion of the study:

- All information from the 12-page inventory forms completed through the on-site inventory process has been uploaded into ASM. Much of this information is presented in Chapter Three of the SASP and was used to perform the system performance analysis presented in Chapter Six. The database includes the following items collected during the inventory effort of the SASP :
    - Airport information (sponsor name, contact, phone number, hours attended)
    - Aeronautical activity (based aircraft, operational mix, design\critical aircraft, recreational aircraft)
    - Aeronautical services
    - Scheduled airline activity
    - Air cargo activity
    - Activities (business, training, sport and recreational)
    - Airside facilities
    - Landside facilities and ground access
    - Landing aids
    - Weather/communications
    - Approach minima and protection standards
    - Ordinances (enacted locally)
    - Land use/regulatory
    - Airspace/obstructions (constraints and design standards)
    - Ownership/management
    - Capital improvements
    - Operations/maintenance
    - Emergency services
    - Special aviation uses (such as military, pilot training, firefighting support, skydiving operations, glider operations, etc.)
    - Major airport users
    - Security measures
- Bar charts presented in Chapter Six, Current System Performance, and the corresponding data has been integrated into ASM. This will allow ADOT to monitor and track improvements in performance as airports implement recommendations related to the SASP.

- Recommended project lists developed for each airport in the analysis of system needs that are associated with improving performance have been included in ASM. These projects are associated with SASP performance measures and have costs relative to the improvements. These project lists will be helpful to ADOT as the agency works with airports in determining priorities for both the state and the local airport sponsors.

It is intended that ADOT will frequently update the database when new information is received from airports and as projects are completed. It is likely that ADOT will routinely request, either annually or biannually, updated information from the airports as the agency tries to maintain accurate data on the existing system and its needs. The data included in the ASM database will be easily updatable for future system analysis, including evaluation of investment in the aviation system and its relationship to improved system performance.

Continuous Planning

The state recognizes the importance of continuous planning as a way to measure the success of the airport system to meet the goals established in this SASP. This study draws many comparisons to the previous system plan, the 2000 State Aviation Needs Study (SANS), and recorded the changes that have occurred since the previous plan. The system performance changes since 2000 were documented in Chapter Six. As part of the continuous planning effort, system performance can be monitored and additional studies undertaken.

Monitoring System Performance

One element of the continuous planning process addresses needed updates. The final section of this report has identified steps for keeping the SASP current in accordance with objectives established in this study. In addition to these updates, the following actions are also recommended as part of the continuous planning process.

- Annual SASP Data Updates – As conditions at system airports change and improvements are realized, it is recommended that ADOT update the airport-specific data included in the SASP. ADOT's ASM database provides a mechanism for keeping the data used in the SASP current. Using ASM capabilities, ADOT could provide an electronic survey to each airport to review the data included in the SASP and allow them to make changes and corrections.

- Future Airports System Plans – The SASP provides ADOT with a blueprint for the development of its airport system over the next 20 years. As the aviation industry changes over time, Arizona's airports grow, and the state's socioeconomic and demographic characteristics change, the system plan should again be updated. It is recommended that ADOT consider updating the system plan in 5-year intervals with the next update in the 2014-2015 timeframe.

- Master Plans - The SASP concluded that it was desirable for all airports to have current master plans and ALPs. It is the recommendation of this plan that each of the airports in Arizona consider updating their master plans/ALPs every five to seven years. It should be noted that recent FAA guidance indicates that funding of master plans will be based on changes at an airport that warrant airport improvements, not just on a set timeframe.

Special Studies

There is often a need for follow on special studies that are desirable to address needs identified during the system planning process. As part of the continuous system planning process, the need for the following special studies has been identified:

- Airport Operational Capacity and Airspace Capacity Study – The Arizona aviation system should provide ample operational capacity. The SASP performed a cursory review of operational capacity at the system airports. Most airports in the Arizona system currently operate well below the capacity threshold and will continue to operate below the threshold throughout the 20-year forecast period. As noted in Chapter Seven, 17 system airports are expected to exceed the FAA demand/capacity trigger of 80 percent, including nine airports in the Phoenix Metro area and three airports in the Tucson Metro area. No capacity-related targets were established in the SASP due to the level of analysis and the need for individual airports to determine their ability to increase capacity. It is recommended that a state study that will further investigate increasing capacity, including the possible development of new system airports, be considered as operational delays continue to increase.

  In addition to operational capacity, airspace congestion continues to be a major issue in Arizona. While the FAA, not the state, has influence over changes to airspace patterns, the state can provide appropriate information to appropriate stakeholders. In addition to airspace congestion in the major metropolitan areas, congestion in areas near and around the military facilities and ranges has been of particular concern. The advent of unmanned aerial vehicles (UAVs) over the last few years also has potential to impact airspace in Arizona as well. A comprehensive examination of what the integration of UAV activity means to the state's airspace may be appropriate.

- Economic Impact Study – An economic impact study was prepared for the Arizona airports in 2002. The data in this study is now dated, especially given the changes in the economy and the aviation industry. It is a recommendation of the continuous planning process that a comprehensive economic impact study be conducted for the airports in Arizona. This study would identify current jobs, payroll, and annual economic activity attributable to each system airport. This study can also help airports have a better understanding of their airport users and the qualitative contribution of each airport to the community and region it serves. It is recommended that airports are provided with their individual information for use in their local communities.

- Land Use Compatibility Guidance – In 2007, The Governor's Advisory Council on Aviation (GACA) noted the need for the state to further commit to compatible land use planning through airport legislation. The SASP noted that incompatible land use in the airport environment has the potential to limit the future growth and development of airports in Arizona. Recognizing this fact, follow-on steps should be taken to update the guidelines for land use compatibility. Land use compatibility can generally be described as the compatibility of the area around each airport where the height of objects should be limited so as not to impede safe airport operations, where noise impacts could most logically be expected, and where typical aircraft traffic patterns would occur. Additional guidance for community adoption of compatible land use code could be used by all system airports to enable them to better meet the system plan's safety objectives.

- Runway Approach Obstruction Study – One of the objectives for the Arizona airport system is for all system airports to have clear approaches to both ends of their primary runway. Just over half of the system airports currently meet this objective. To meet this objective, it is recommended that a follow-on study be conducted. Coordination and meetings with each of the airports and municipalities would be included as part of this follow-on study. ADOT could confirm the extent of the obstructions at each of the airports that do not have clear approaches to both ends of the primary runway as noted in the SASP. If an airport has additional runways, analysis should also be conducted for these runway ends as well. The study could also include the development of a model height zoning ordinance that would be taken to each municipality. The objective would be to have all municipalities tailor the model zoning ordinance to their particular situation, and for each to adopt a height zoning ordinance, while ensuring unobstructed approaches to each airport's primary runway. Follow-on study is needed to identify where obstructions cannot be resolved and to determine where obstructions have been mitigated through lighting. If a state study is not feasible, the state should consider the inclusion of obstruction analysis in state-funded projects.

- Pavement Management Plan (Continuous) – One of the objectives for the system plan is for all airports to have a pavement condition index (PCI) of at least 70 on their primary runways. ADOT currently has the Arizona Pavement Preservation Program (APPP) to meet and maintain this objective. This program has not been funded for several years. It is a recommendation of the continuous planning process that as part of the APPP, the Airport Pavement Management System (APMS), which evaluates the pavement conditions, continue to be conducted on a regular basis. This will identify current pavement condition, possible maintenance or rehabilitation projects, and costs attributable to each system airport. The last year that APMS was conducted for ADOT was in 2007 and will need to be conducted again in 2010.

- Regional Aviation System Plan for Pinal County – As noted in Chapter Seven, the population of Pinal County, located between the Phoenix and Tucson Metro areas along I-10, is the fastest growing county in Arizona and experienced the third- highest rate of population growth in the U.S. between 2006 and 2007. The population of Pinal County is expected to triple through the 2030 forecast period. It is recommended that a detailed study regarding the impact of this growth on aviation be undertaken. A regional aviation system plan (RASP) for Pinal County airports could provide guidance and recommendations for accommodating the future growth in this region.

POLICY RECOMMENDATIONS

Arizona's aviation system is governed, regulated, and monitored according to Arizona Revised Statutes (ARS), State Transportation Board (STB) Aviation Policies, and guidelines included ADOT's Five-Year Airport Capital Improvement Program (ACIP). Policy considerations relative to each of these three areas are provided below.

Arizona Revised Statutes Title 28 – Chapter 25 Aviation

ARS Title 28, Chapter 25 addresses aviation. The eight articles in the ARS address issues ranging from the operation of the Aeronautics Division to aircraft operation, aircraft registration and taxation, aircraft dealers, airports, airport zoning and regulation, and joint powers airport authorities.

Grand Canyon National Park Airport

One of the most challenging of the statutes requires the ADOT director to operate and maintain the Grand Canyon National Park Airport. While operating and maintaining the airport in and of itself can be accomplished, the funding for the airport is included in the State Aviation Fund which is subject to the annual legislative appropriations cycle. This airport is the only one in the state operated by ADOT and funded strictly through the State Aviation Fund. In addition, one of the articles (*Article 28-8204, State owned airports; fees)* sets the framework for the types of fees that can be charged at the airport. The airport is subjected to regulatory processes imposed on other state agencies. All of the employees are state employees, placing limitations on the salary structure compared to other airports of comparable size and complexity. Other regulatory process issues include the process to procure necessary equipment and contracting for services.

The ownership and maintenance of the Grand Canyon National Park Airport has been evaluated in the past and at one time an airport authority was established to address these issues. However, the same regulatory issues were applied to the airport authority, limiting the ability of the organization to change the airport's structure significantly. Consideration continues to be given to possibly changing the responsibility for management and operation of the airport. A similar position was posed as part of the 2007 Governor's Advisory Council on Aviation Final Report.

Compatible Land Use Planning

Finally, through ARS–Title 28, Chapter 25, the option of the state or the governing body of a political subdivision to establish an airport influence area is provided. The statute identifies property in the vicinity of the airport "that is currently exposed to aircraft noise and overflight and that either has a day-night average sound level of 65 decibels or higher or is within such geographical distance from an existing runway that exposes the area to aircraft noise and overflights as determined by the airport owner or operator" as potentially included in the airport influence area. After notification and conducting a hearing, the political entity that has established an airport influence area must file a record of the area in the office of the county recorder in each county that contains property in the airport influence area. As part of the record, owners or potential purchasers of property in the airport influence area will receive notification that property in the area is currently subject to aircraft noise and aircraft overflights.

This statute provides a means for airports to educate those in their environs of the potential noise and overflight issues associated with airports. There are separate statutes that address military airports and their disclosure and these have been widely implemented. While many airports may have airport influence areas, less than 30 have taken the next step in implementing public disclosure through the Arizona Department of Real Estate (ADRE). *Article 7, 28-8486. Public airport disclosure; definitions* denotes that the ADRE "shall have and make available to the public on request a map showing the exterior boundaries of each territory in the vicinity of a public airport." The ADRE is to work with each public airport and affected local government "as necessary to develop a map that is visually useful in determining whether property is located in or outside of a territory in the vicinity of a public airport."

While these two statutes provide for some airport zoning and regulation, there are no requirements and no penalties for not implementing airport influence areas or public airport disclosure. Because of this, encroachment is worsening around airports, limiting expansion potential and creating additional impacted areas. Consideration of additional aviation legislation was proposed by the Governor's Advisory Council on Aviation to address compatible land use planning related to airports.

Tribal Airport Funding Eligibility

Historically, airports owned by Native American communities have not been eligible to receive ADOT funding, even though some of the airports are eligible for FAA funding (due to their inclusion in the NPIAS). This lack of funding has meant limited maintenance and development of many of the Native American owned and operated airports. These airports are typically located in less populated areas of the state. Several of the airports are used primarily for transport of physicians and patients for medical purposes and access to these more rural and sometimes remote areas. For those reasons, these airports do contribute to Arizona's aviation system and have been included in the SASP for analysis of statewide needs.

The eligibility for Native American airports has been considered through legislative action in the past but to date, these airports remain ineligible. Continued consideration of the importance of these airports to the system and to their communities should be pursued as part of the aviation funding policies.

Arizona STB Aviation Policies

As noted, the ARS establishes the laws that govern the state's aviation system. Arizona's State Transportation Board is responsible for developing rules to administer the ARS and create statewide transportation policies. There are six State Transportation Board policies applicable to the State Airports System, which were adopted as current policy on October 18, 2002 (Fiscal Year 2003). ADOT is currently evaluating potential revisions to the FY 2003 STB policies; therefore this analysis presents issues only as they relate to the SASP's potential affect on the policies.

The 2003 STB Aviation Policies includes a definition of the State Aviation System. This definition is important as it describes the division of airports into two systems for planning and administrative purposes. It also describes airport categories within the two systems. As part of the SASP, updated airport roles or classifications have been identified. These roles or classifications could be utilized in the definitions of the system for the proposed policies.

The six STB Aviation policies are:

- Loan program
- Airport pavement management program
- Planning guidelines
- Priority rating system
- Resource allocation
- Small Community Air Service Pilot Program

Based upon the results of this SASP, several modifications could be considered within these policies.

Planning Guidelines

The current STB policies contain guidelines related to the development of airports within the primary and secondary airport systems. Through the SASP process, new airport roles or classifications were developed based on an analysis of how each airport functions within the system. A quantitative process was used to evaluate each airport according to over 20 different measurable factors that relate an airport's function to the goals of the system. Through this process five airport role categories were defined, each with facility and service objectives specific to the category. The airport roles and facility and service objectives developed during the SASP could be considered to be "updated planning guidelines" for purposes of STB or ADOT Aeronautics policy and procedures.

Priority Rating System

Through the SASP, a review of the current priority rating system and a summary of other states' systems were conducted. This review complemented the SASP's analysis of the system's performance and the costs of improving system performance through 2030, providing a comprehensive analysis of future needs and information for assessing the priority rating system. Based on the results of the SASP, several potential considerations for changes to the priority rating system were noted:

- Point System Structure –The point system structure for ranking projects currently favors airports that can score high on certain factors that may be completely unrelated to the specific project funding request. Therefore, ADOT Aeronautics could consider changing the point system to ensure all points awarded are applicable to the project that they are supporting. Examples would include eliminating points for a high ratio of operations to 60 percent annual service volume (ASV) on a landside project, but keeping it on airfield-related projects which truly address capacity such as a secondary runway. A similar example is the waiting-list-to-based-aircraft ratio and enplanement levels. These factors should not be considered on projects with no relationship to these factors. In addition, the waiting list and enplanement figures may be misrepresentative of any ACIP needs at an airport. The points for these factors and the points assigned for airport operations may also skew the priority rankings among projects.

- Project Definitions –Today, many project components lack a specific definition to help sponsors determine if their project aligns with the purpose of the project component. This is important to the state to ensure that a project is truly eligible for the point value assigned to that component. Specific examples include fire protection with 80 points and security fencing with 60 points, which are two of the high-point value projects that lack a clear definition. Fire protection may be funded for its high priority point value, but the actual improvement might offer more to enhance utility infrastructure if there is little need for fire protection. Each project component should have a definition that spells out the "what and why" of each project so the sponsor understands the eligibility of the project before including it in the online ACIP. This effort should not fully eliminate the flexibility in funding projects, but it should help separate and elevate the more critical projects. This effort should also help minimize the time and effort that ADOT Aeronautics spends in addressing project component errors in the ACIP and sponsor questions about the same.

- Eligibility of Sponsor/Project For Land Use Concerns – It is recommended that airport sponsors be held more accountable for incompatible land use development, but in a more proactive manner that requires the sponsor define, implement, and enforce land use controls just as they would with any other important development area in the community. In the future, when considering specific project funding, ADOT could base eligibility on the airport's implementation of land use protection. The goal should be to better educate sponsors on the importance of protecting their airport environs so it becomes important to them, particularly under the umbrella of their own community-wide needs, financial constraints and politics, rather than placing more responsibility on the state to enforce something that the sponsors do not fully understand.

Resource Allocation

Distribution of the State Aviation Fund begins with the state legislature's allocation of funds for ADOT's aviation-related operational costs. Monies are allocated to ADOT's Motor Vehicle Division for expenses associated with the aircraft registration function, to the Multi-Modal Transportation Planning Division for the Aeronautics Group's airport development task, and to the Transportation Services Group's Physical Plant Operations section for the operation of the Grand Canyon National Park Airport. Subsequently, the legislature allocates funds to the Aeronautics Group for its airport development program and state aviation planning services. The airport development program includes federal/state/local matching grants, state/local grants, loans, and the airport pavement preservation program.

Per the current STB policy, state/local grant funds are divided into three categories: commercial service/reliever airports, other primary airports and secondary airports. The allocation formula currently in place directs 80 percent of available funds to the commercial service/reliever airports. Other primary airports receive 18 percent of available funds and secondary airports receive two percent.

The SASP determined financial needs based on updated airport roles and performance measures. Using those standards, the financial needs of airports generally correlate well with the existing distribution of funds among the state's airports. The SASP did, however, identify specific costs by performance measure. Consideration could be given to developing programs, such as the current statewide Airport Pavement Preservation Program, with funding being allocated to those programs before it's assigned to the airport categories.

Because the pavement preservation program has been so successful at helping to manage pavement maintenance priorities on a statewide basis, consideration could be given to creating similar programs that would help manage other performance issues on a system-wide basis. Such changes would be more effective in combination with changes to the system point structure, which will be discussed later.

A program that could be beneficial to the implementation of SASP recommendations, enabling project prioritization from a system standpoint instead on an airport standpoint, is safety. Safety projects could compete against each other for priority, without regard for airport-specific point ratings. This could cause safety projects to be considered solely based upon their importance to the system and the particular airport. Other programs that might be similarly considered are AWOS, land acquisition, security and capacity.

An advantage to a programmatic approach is a program project would be prioritized within the system rather than being considered after funding had been allocated to the three different airport categories. This process would enable projects to be prioritized based upon their importance to the system and the airport.

Small Community Air Service Pilot Program

A STB policy was created to address air service throughout Arizona and to maximize funding that may be provided through the USDOT for the Small Community Air Service Development Program. Based on grants that were provided by USDOT to several of Arizona's smaller commercial service airports, this policy allowed for matching funds to be dedicated to air service improvement. This policy has not been utilized in several years by any Arizona airport and it is dependent on the federal program's long-term availability. At the present time, this federal program is being considered for deletion, thereby making the STB policy unnecessary.

Five-Year ACIP Guidelines

The Five-Year ACIP allocates funds for eligible projects from the State Aviation Fund and distributes these funds across four major funding categories: the Airport Development Grants Program; Airport Loan Program; Airport System Planning; and the Airport Preventive Maintenance Services. The guidelines used to distribute the funds in each of these categories have resulted in Arizona's current aviation system development. The guidelines implement the STB policies which are currently under review. At such time as the STB policies are revised, the Five-Year ACIP Guidelines should be revisited to provide additional information to airports.

CONSIDERATION FOR ADDITIONAL PROGRAM FUNDING

The state of The State of Arizona has long recognized the importance of its system of airports to the state's economy and its citizens' quality of life. To support the airport system, a dedicated source of revenue to fund airport improvements has been in place since 1970. During FY2008, Arizona's airports benefited from $20.8 million of state funded improvement projects. However, in FY2009, due to state budget issues, only $2.5 million was available. Budget issues continue to threaten the State Aviation Fund and airport grants.

Although FAA grants provide much-needed additional funding to improve the airport system, they will not provide enough funding to support the development of projects identified in the state CIP, individual airport CIPs and master plans, and through the system planning process.

Between FY2010 and FY2030, the SASP estimates that approximately $2.5 billion will be necessary to improve Arizona's airport system based on system objectives alone. If all other airport needs are included, an estimated $9.7 billion or $486 million per year will be needed. If approximately $100 million is available from federal, state and local sources in each of those years, a total of $2.0 billion will be available to respond to the needs. This assumes that future sweeps of the State Aviation Fund will not occur. As presented in Figure 9-1, the gap between estimated needs and available funding through 2030 could reach $7.7 billion

Figure 9-1: Estimate of Funding Shortfall 2010-2030 (in millions)

Estimated Funding Requests for SASP Needs 2010-2030	$2,451.82
Plus Additional Airport/State Needs 2010-2030	$7,269.56
Equals Total Need 2010-2030	**$9,721.38**
Minus Estimated Available Funding by FAA/State/Local	$2,000.00
Equals Estimated State Shortfall 2010-2030	**$7,721.38**

Source: Wilbur Smith Associates

It is apparent that additional funding is critical to Arizona's airport system. If sweeps of the State Aviation Fund continue, it will be extremely detrimental to the system. A dedicated and protected State Aviation Fund is needed to ensure that the existing system will continue to be maintained and meet the state and local objectives into the future.

SUMMARY

Besides being a critical transportation link locally, regionally, nationally and internationally, airports are important economic catalysts. Employers throughout Arizona agree that commercial and general aviation airports are vital to business attraction, development and retention. By responding to performance measures, benchmarks and facility/service objectives outlined in the Arizona State Airport Systems Plan, Arizona will have a flight plan that will take it through 2030 and beyond

It is important to note that the Arizona State Airports System Plan is not a programming or implementation document. The SASP is a resource document that ADOT can follow to provide an aviation system that will meet the air transportation needs for Arizona, now and into the future. The SASP is a "top down" planning analysis. Findings from this plan must still be implemented by individual airports from the "bottom up."

Over the next 20 years, this plan has shown that an annual average of $486 million will be needed to raise the performance of the Arizona airports system and to respond to the needs that the airports themselves have identified. Arizona is expected to experience a great deal of population and employment growth. A well-maintained and developed aviation system is an important component of the state's multi-modal transportation system.

ARIZONA

STATE AIRPORTS SYSTEM PLAN




Arizona Airports: Connecting, Moving, and Supporting our State

ADOT

EXECUTIVE SUMMARY

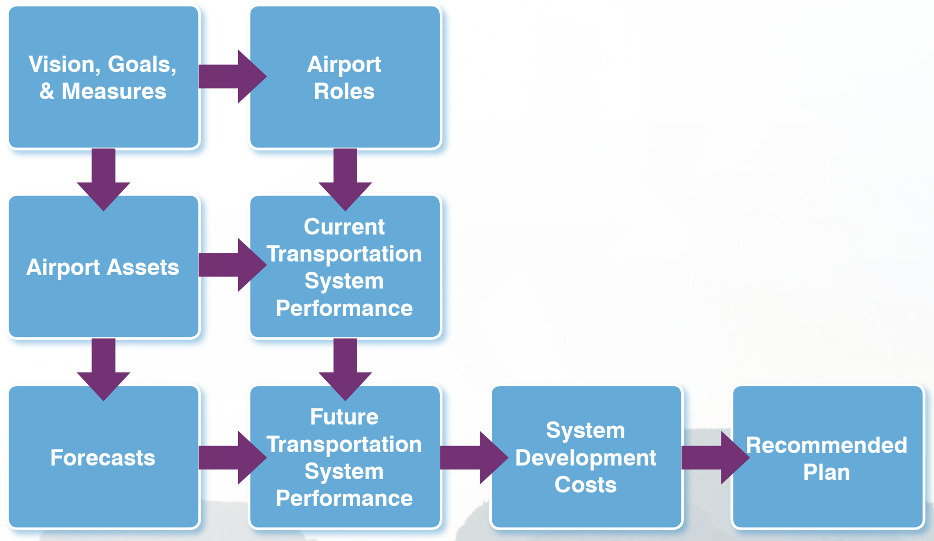
Arizona's aviation system is diverse….as diverse as the state itself. From Arizona's major cities to its mountains, deserts, and world renowned tourist destinations, Arizona's airports provide important **connections**.

Arizona's airports move people and goods. Arizona businesses and residents rely on the airport system to transport them to destinations around the world. The airports in Arizona also provide domestic and international visitors with convenient access to Arizona tourist attractions. The airport system also **moves** packages, parts, and supplies to all areas of the state.

Airports throughout Arizona **support** quality of life by accommodating recreational, health, welfare, and safety-related services. Critical firefighting activities, search and rescue missions, patient transport, news and traffic reporting, and recreational opportunities are just a few of the aviation related services provided.

OVERVIEW OF THE PLAN

In order to ensure Arizona's airport system continues to effectively connect, move, and support the state's needs, the Arizona Department of Transportation Aeronautics Division initiated the Arizona State Airports System Plan (SASP). The SASP provides direction for state aviation system planning for years to come. The purpose of this plan is to provide a framework for the integrated planning, operation, and development of Arizona's aviation assets.



The plan was guided by a Project Advisory Committee that was comprised of representatives from Arizona airports, the Federal Aviation Administration (FAA), regional associations of governments, League of Cities and Towns, aviation related businesses, and various airport and aircraft associations around the state.

SYSTEM VISION AND GOALS

Establishing goals and measures is important to setting a future course for the airport system and for assessing its current performance. Members of the Project Advisory Committee helped identify current issues facing the system and translate those issues into goals and objectives to guide the system's future performance. Given the importance of airports and aviation to employers throughout Arizona, over 2,000 businesses and 4,000 pilots in Arizona were contacted to secure input on airport issues and needs.

The vision established for the 2008 Arizona State Airports System Plan led to the development of four goals, which were established for the airport system that serves Arizona. These goals are used to evaluate each airport's role in the statewide system and determine the performance of Arizona's airports.

VISION

"Provide an airport system that accommodates demand, supports economic and transportation needs, and maximizes funding resources"

GOALS

Development:

Arizona should provide an airport system that is adequately maintained to meet current and projected demand and is easily accessible from both the ground and the air.

Economic Support:

Arizona should advance a system of airports that is supportive of Arizona's economy, ensuring that the airport system is matched to Arizona's socioeconomic and demographic characteristics.

Safety and Standards:

Arizona should provide for a safe airport system, as measured by compliance with applicable safety standards, which supports health, welfare, and safety-related services and activities.

Environmental Sensitivity and Stewardship:

Arizona should promote a system of airports that is sensitive to and considerate of the environment. The system shoud support aviation outreach opportunities.

ARIZONA'S AIRPORT SYSTEM

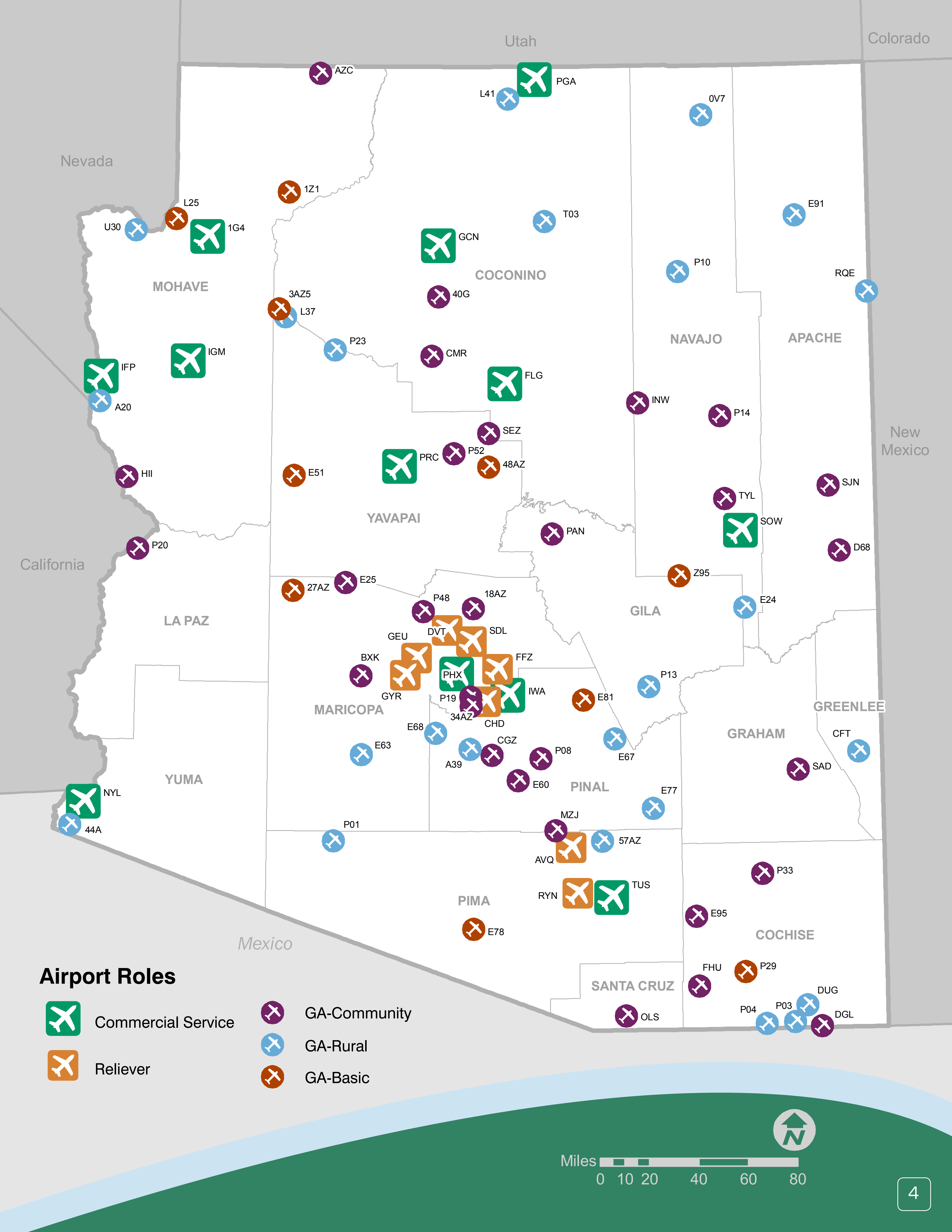
There are over 200 airports in Arizona, however, the analysis in the SASP focused primarily on public use airports. For purposes of the SASP, 83 airports, including 11 privately owned airfields and 14 Native American owned airports, were identified as the "system of airports". These 83 airports vary in size and serve different functions in meeting Arizona's aviation and economic needs. Because all airports do not serve the same needs, a method of determining roles among the airports is necessary for evaluating the system. The airports were assigned to one of five SASP roles following an in-depth analysis of 21 factors. Some of these factors included:

- Population Served
- Businesses Served
- Number of Pilots Served
- Retail Sales
- Hotel Rooms Nearby
- Type of Aviation Services Offered
- Airside and Landside Facilities
- Current Demand
- Expansion Potential
- Zoning Controls
- Community Support
- Community Outreach Efforts

Scores were derived for each of the factors and summed for comparison. Based on scores, the 83 airports were classified into one of the five following roles:

- Commercial Service
- Reliever
- General Aviation-Community
- General Aviation-Rural
- General Aviation-Basic

Airport Code	Associated City	Airport Name	Airport Role
27AZ	Aguila	Eagle Roost	GA-Basic
P01	Ajo	Eric Marcus Municipal	GA-Rural
E51	Bagdad	Bagdad	GA-Basic
E95	Benson	Benson Municipal	GA-Community
P04	Bisbee	Bisbee Municipal	GA-Rural
BXK	Buckeye	Buckeye Municipal	GA-Community
IFP	Bullhead City	Laughlin/Bullhead International	Commercial Service
A20	Bullhead City	Sun Valley	GA-Rural
18AZ	Carefree	Sky Ranch at Carefree	GA-Community
CGZ	Casa Grande	Casa Grande Municipal	GA-Community
CHD	Chandler	Chandler Municipal	Reliever
34AZ	Chandler	Memorial Airfield	GA-Community
P19	Chandler	Stellar Airpark	GA-Community
E91	Chinle	Chinle Municipal	GA-Rural
Z95	Cibecue	Cibecue	GA-Basic
CFT	Clifton/Morenci	Greenlee County	GA-Rural
AZC	Colorado City	Colorado City Municipal	GA-Community
P08	Coolidge	Coolidge Municipal	GA-Community
P52	Cottonwood	Cottonwood	GA-Community
P03	Douglas	Cochise College	GA-Rural
DGL	Douglas	Douglas Municipal	GA-Community
DUG	Douglas Bisbee	Bisbee Douglas International	GA-Rural
E60	Eloy	Eloy Municipal	GA-Community
FLG	Flagstaff	Flagstaff Pulliam	Commercial Service
E63	Gila Bend	Gila Bend Municipal	GA-Rural
GEU	Glendale	Glendale Municipal	Reliever
P13	Globe	San Carlos Apache	GA-Rural
GYR	Goodyear	Phoenix Goodyear	Reliever
GCN	Grand Canyon	Grand Canyon National Park	Commercial Service
40G	Grand Canyon	Valle	GA-Community
P14	Holbrook	Holbrook Municipal	GA-Community
0V7	Kayenta	Kayenta	GA-Rural
E67	Kearny	Kearny	GA-Rural
IGM	Kingman	Kingman	Commercial Service
HII	Lake Havasu City	Lake Havasu City	GA-Community
AVQ	Marana	Marana Regional	Reliever
MZJ	Marana	Pinal Airpark	GA-Community
L41	Marble Canyon	Marble Canyon	GA-Rural
E68	Maricopa	Estrella Sailport	GA-Rural
L25	Meadview	Pearce Ferry	GA-Basic
FFZ	Mesa	Falcon Field	Reliever
IWA	Mesa	Phoenix-Mesa Gateway	Commercial Service
OLS	Nogales	Nogales International	GA-Community
PGA	Page	Page Municipal	Commercial Service
P20	Parker	Avi Suquilla	GA-Community
PAN	Payson	Payson	GA-Community
L37	Peach Springs	Grand Canyon Caverns	GA-Rural
1G4	Peach Springs	Grand Canyon West	GA-Rural
3AZ5	Peach Springs	Hualapai	GA-Basic
P48	Peoria	Pleasant Valley	GA-Community
DVT	Phoenix	Phoenix Deer Valley	Reliever
A39	Phoenix	Phoenix Regional	GA-Rural
PHX	Phoenix	Phoenix Sky Harbor International	Commercial Service
P10	Polacca	Polacca	GA-Rural
PRC	Prescott	Ernest A. Love Field	Commercial Service
48AZ	Rimrock	Rimrock	GA-Basic
SAD	Safford	Safford Regional	GA-Community
44A	San Luis	Rolle Airfield	GA-Rural
E77	San Manuel	San Manuel	GA-Rural
SDL	Scottsdale	Scottsdale	Reliever
SEZ	Sedona	Sedona	GA-Community
P23	Seligman	Seligman	GA-Rural
E78	Sells	Sells	GA-Basic
SOW	Show Low	Show Low Regional	Commercial Service
FHU	Sierra Vista	Sierra Vista Municipal-Libby AAF	GA-Community
D68	Springerville	Springerville Municipal	GA-Community
SJN	St Johns	St Johns Industrial Air Park	GA-Community
E81	Superior	Superior Municipal	GA-Basic
TYL	Taylor	Taylor	GA-Community
U30	Temple Bar	Temple Bar	GA-Rural
P29	Tombstone	Tombstone Municipal	GA-Basic
T03	Tuba City	Tuba City	GA-Rural
57AZ	Tucson	La Cholla Airpark	GA-Rural
RYN	Tucson	Ryan Field	Reliever
TUS	Tucson	Tucson International	Commercial Service
E24	Whiteriver	Whiteriver	GA-Rural
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip	GA-Basic
E25	Wickenburg	Wickenburg Municipal	GA-Community
P33	Willcox	Cochise County	GA-Community
CMR	Williams	H.A. Clark Memorial Field	GA-Community
RQE	Window Rock	Window Rock	GA-Rural
INW	Winslow	Winslow-Lindbergh Regional	GA-Community
NYL	Yuma	Yuma International	Commercial Service


Utah
Colorado
Nevada
California
New Mexico
Mexico
MOHAVE
COCONINO
NAVAJO
APACHE
YAVAPAI
LA PAZ
GILA
MARICOPA
GREENLEE
GRAHAM
YUMA
PINAL
PIMA
COCHISE
SANTA CRUZ
AZC
PGA
L41
0V7
1Z1
L25
U30
1G4
T03
E91
GCN
P10
RQE
3AZ5
L37
40G
P23
CMR
IFP
IGM
FLG
A20
INW
P14
SEZ
PRC
P52
48AZ
HII
E51
SJN
TYL
SOW
PAN
D68
P20
Z95
27AZ
E25
P48
18AZ
E24
DVT
SDL
GEU
BXK
FFZ
PHX
P13
GYR
P19
IWA
E81
34AZ
CHD
E68
CGZ
CFT
E63
A39
P08
E67
SAD
E60
NYL
E77
44A
MZJ
P01
57AZ
AVQ
P33
RYN
TUS
E95
E78
FHU
P29
DUG
P03
P04
DGL
OLS
Airport Roles
Commercial Service
Reliever
GA-Community
GA-Rural
GA-Basic
Miles
0 10 20 40 60 80

FUTURE AVIATION DEMAND

For Arizona to achieve the vision for the aviation system, the system should be matched to future demand levels. The SASP used several methodologies, compiled national and state aviation trends, and analyzed state and regional socioeconomic trends in order to forecast aviation demand through 2030. Demand was projected on a statewide level and for each airport in the system. Projections were then compared to FAA and local planning documents where available.

Projections of demand were developed for the following components:

Enplanements: number of people boarding commercial airlines (including air tours)

Based Aircraft: number of aircraft permanently stored at an airport

Total Operations: number of takeoffs and landings by all aircraft types

General Aviation Operations: number of takeoffs and landings by non-commercial, general aviation aircraft

Cargo: tonnage transported in commercial aircraft

	2007	2012	2017	2030
Enplanements *(Including Air Tours)*	23.2M *(2008)*	25.3M	29.0M	41.1M
Based Aircraft	8,043	8,757	9,523	11,892
General Aviation Operations	3.84M	4.21M	4.63M	5.93M
Total Operations *(including military)*	4.84M	5.23M	5.75M	7.32M
Cargo Tonnage	0.17M	0.19M	0.22M	0.32M

M=million

SYSTEM PERFORMANCE

The SASP used a performance-based analysis to evaluate the system of airports. The four study goals were translated into performance measures. These measures were used to develop a "report card" for the existing airport system. Over 45 performance measures were developed for the SASP to produce the report card and evaluate the system for its current performance. A few of the performance measures include the following:

- Percent of population within 30 minutes of a SASP airport
- Percent of airports meeting zoning and land use control goals
- Percent of population within 30 minutes of SASP airport meeting business user needs
- Percent of airports meeting FAA safety area requirements
- Percent of system airports that have a Storm Water Pollution Prevention Plan (SWPPP)
- Percent of system airports supporting flight training

With the existing system evaluation complete, target performance of the future airport system was analyzed. Prior to initiating the future system analysis, other factors that may influence aviation activity, independent of the state airport system, were considered. The SASP reviewed these outside influences to determine how they may impact future system performance. These non-aviation outside influences included:

- Extensive Population Growth
- Major Employment Growth
- High-Technology and Aerospace Industry Growth
- Tourism
- Retirement/Seasonal Residency
- Major Surface Transportation Improvements

Specific performance measures were developed within each goal category to assess the total system's performance. It is important to note that this evaluation was developed for the state to provide a "big picture" overview of overall system performance.

A sampling of the performance measures used to evaluate the system, by goal category, is presented on the following pages.

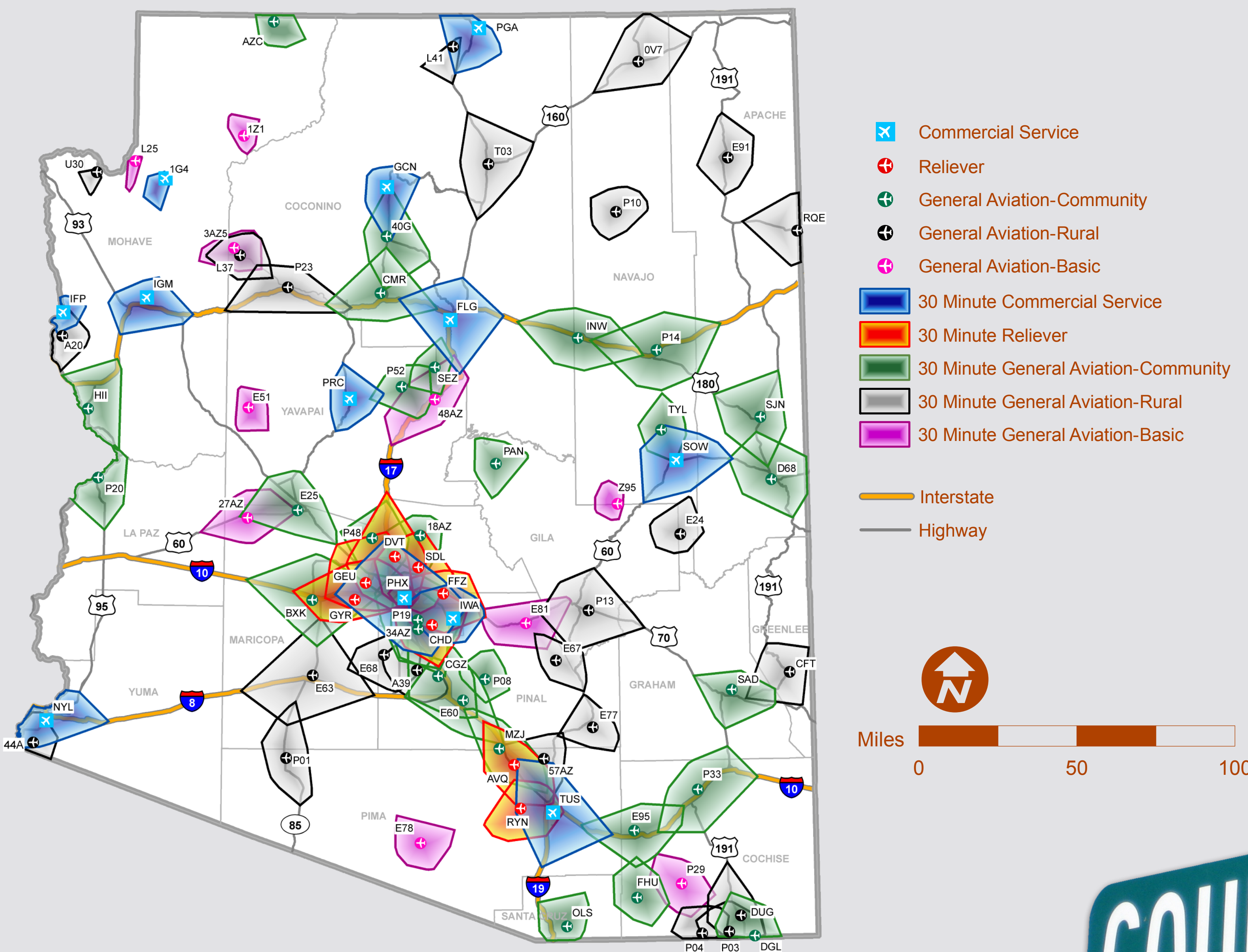
GOAL CATEGORY: DEVELOPMENT

Measure: Percent of population within 30 minutes of a SASP airport

It is essential for Arizona to have a strategy that provides the state with a system of airports that provides reasonably convenient access. The system of airports should serve existing demand, as well as be capable of accommodating Arizona's anticipated population and economic growth.

Current Performance: 86% of statewide population within 30 minutes

Recommendation: Based on a review of airport access provided to the current and projected population, it was determined that no changes in airport roles appear warranted at this time. The existing system serves the state well in terms of access, especially given population concentration and the amount of underdeveloped land. The construction of new airports/closure of existing airports and demographic growth throughout the state may impact future coverage provided by the airport system. Monitoring growth and other changes is needed.



Measure: Percent of airports meeting zoning and land use control goals

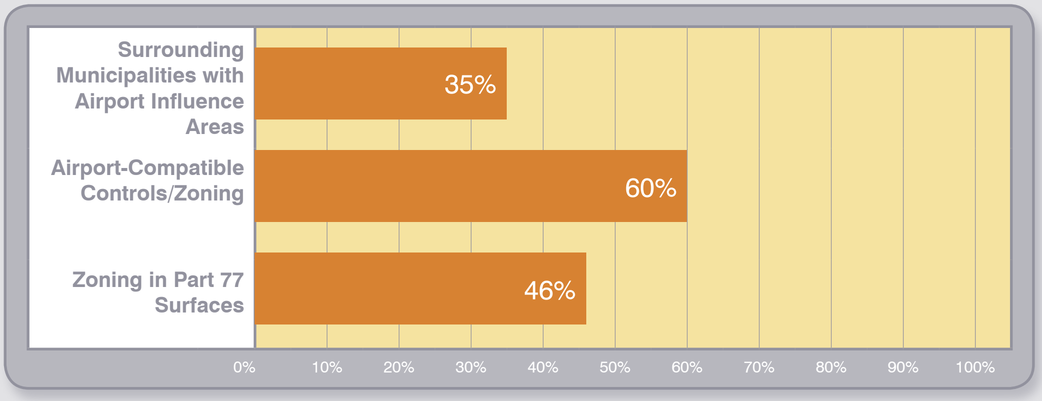
Airport zoning and land use controls are critical to safety and the long-term viability of airports. Measures to control development near airports protect people on the ground and in the air. In addition, these measures are important to minimize the impact of aircraft noise in a community, especially during aircraft takeoffs and landings. Analysis of adoption of airport influence areas (as defined in enacted A.R.S. § 28-8485 and 8486 in 1999 and referenced as disclosure areas) and zoning ordinances related to airports (both land use and height controls) was conducted in the SASP.

Current Performance:

35% of system airports have adopted airport influence areas

60% of system airports have adopted airport-compatible land use zoning

46% of system airports have adopted height zoning to meet FAA's Part 77 regulation



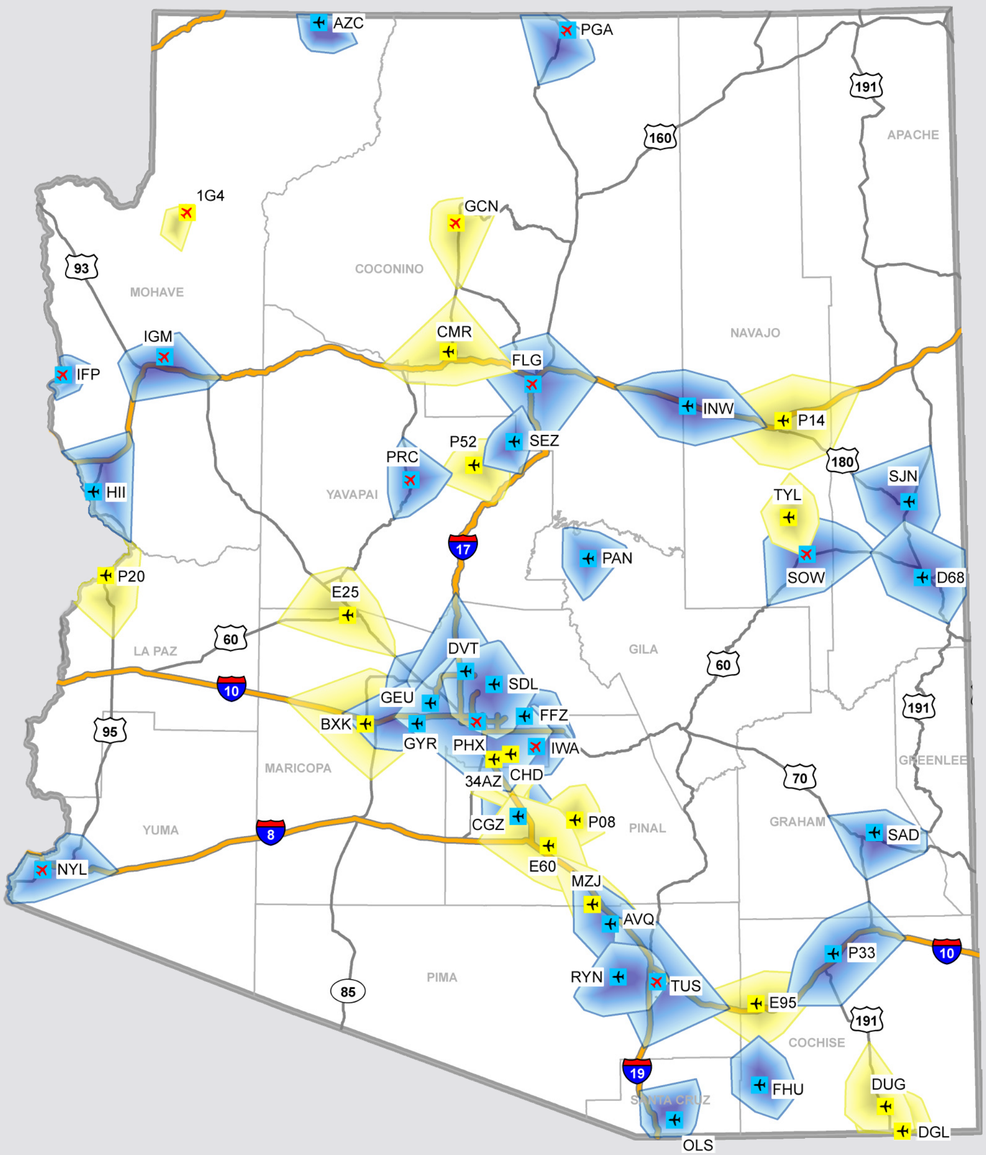
Recommendation: Airport influence areas, airport-compatible land use zoning and controls, and height zoning to address FAA Part 77 regulations are recommended for all of Arizona's publicly owned and Native American owned airports.

Measure: Percent of population within 30 minutes of SASP airport meeting business user needs

Businesses which have the propensity to use aviation must not only have reasonable access to airports, but those airports must also meet the specific needs that business aviation presents. The following five objectives are sought by businesses that typically operate aircraft:

5,000-foot long runway	Instrument approach	Jet fuel	Terminal facilities	Ground transportation

With increased reliance on aviation by many businesses, it is important for Arizona's airports to serve these needs. By enhancing airports to meet business-related objectives, Arizona's economy is strengthened.



Current Performance:
35% of airports covering 79% of statewide population

Recommendation:
55% of airports covering 82% of statewide population

Commercial Service Airport

General Aviation Airport

30 Minute Drive Time of Airport that Meets Business User Needs

30 Minute Drive Time of Airport Targeted to Meet Business User Needs

Miles

0 50 100

GOAL CATEGORY: SAFETY AND STANDARDS

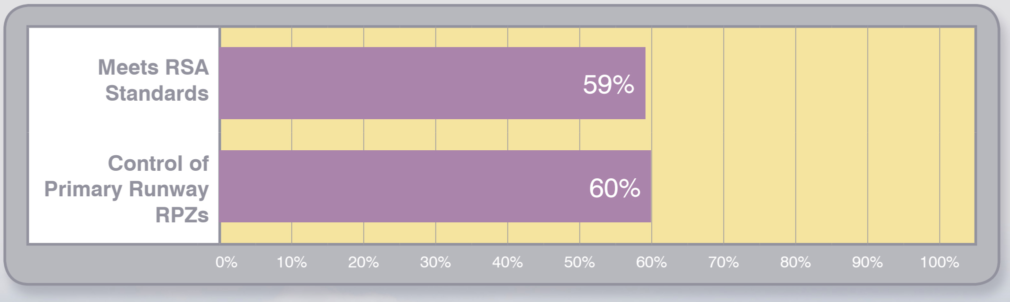
Measure: Percent of airports meeting FAA safety area requirements

To ensure safety is maintained at the highest levels, the FAA implemented standards for airport development. These standards relate to specific criteria for areas off of the end of runways to be kept undeveloped for protection purposes. These include runway safety areas (RSAs), which are close to the runway area, and runway protection zones (RPZs), which are off the ends of the runways and extend out to protect aircraft on approach to and departure from the runway. It should be noted that if an airport does not meet the FAA safety area requirements, it does not preclude safe airport operations. However, there may be additional steps the airport can take to comply with FAA standards.

Current Performance:

59% of system airports fully meet RSA standards

60% of system airports have full control of RPZs

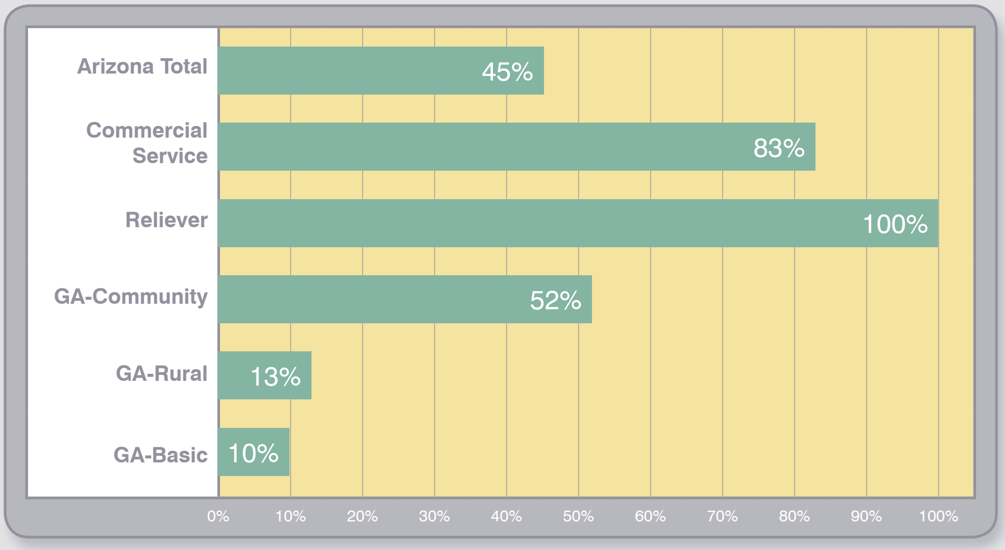


Recommendation: The target for the performance of RSA and RPZ compliance is for all publicly owned airports to strive to meet the FAA safety-related standards. Additional analysis of the ability of each airport to meet these standards is typically performed as part of airport planning and development.

GOAL CATEGORY: ENVIRONMENTAL SENSITIVITY AND STEWARDSHIP

Measure: Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)

The FAA and Arizona Department of Environmental Quality require airports to meet storm water regulations set by the Environmental Protection Agency. Any facility that could potentially pollute storm water runoff is recommended to maintain a SWPPP.



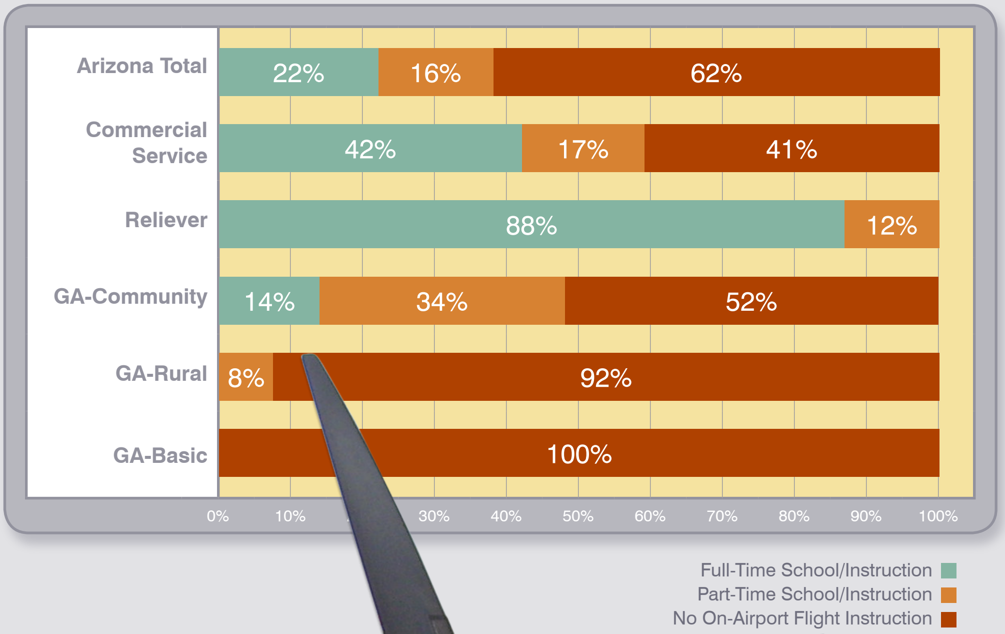
Current Performance: 45% of system airports

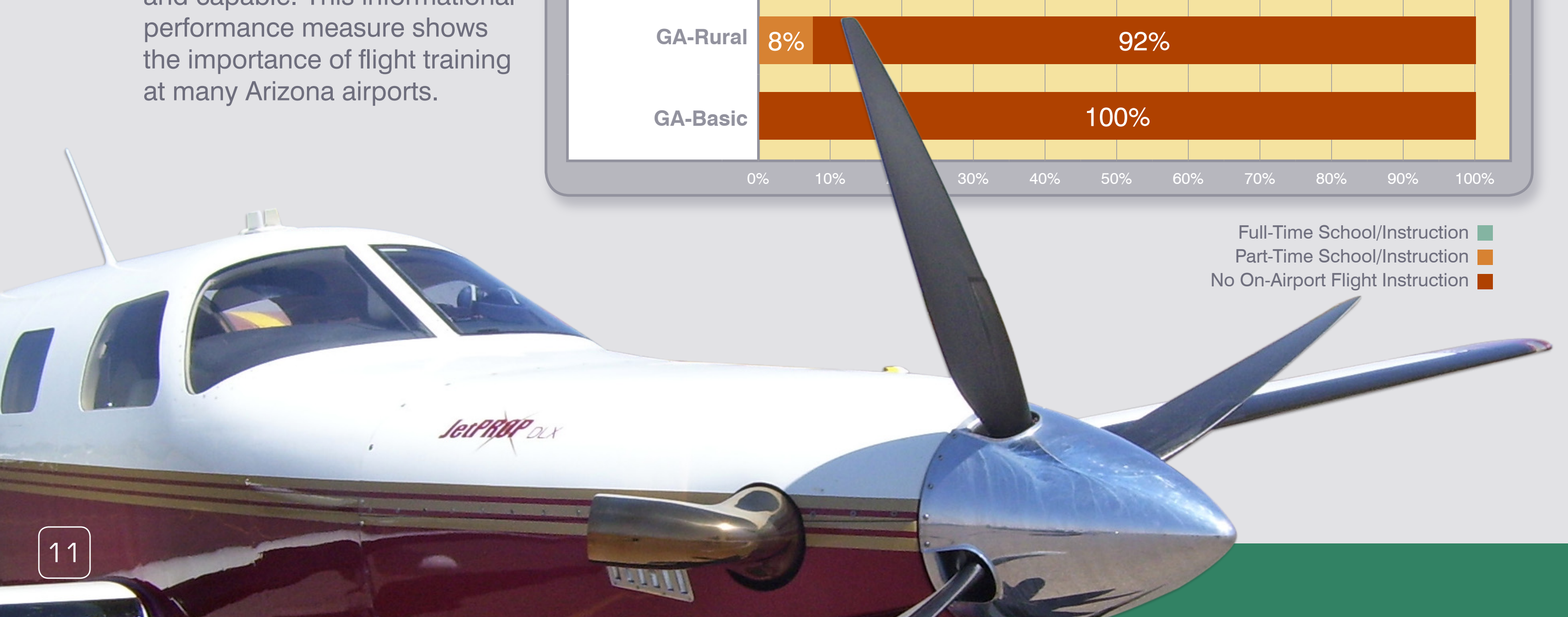
Recommendation: The target performance for this measure is for all airports or 100 percent of the system to maintain a current SWPPP.

Measure: Percent of system airports supporting flight training

Current Performance: 38% of system airports

Recommendation: The current performance indicates that a high percentage of the state's population has the ability to undertake flight training if they are interested and capable. This informational performance measure shows the importance of flight training at many Arizona airports.





RECOMMENDED PLAN

The SASP identifies many actions needed to ensure that Arizona has a system of airports to meet its needs. Most of those actions rest with individual airport sponsors and owners. It is imperative that, as airports update their individual master plans and airport layout plans, they consider the findings and recommendations of this study. Since the Arizona Department of Transportation is not the owner or the operator of airports in the state airport system, except for the Grand Canyon National Park Airport, action items identified by this plan must be implemented from the bottom up by individual airports.

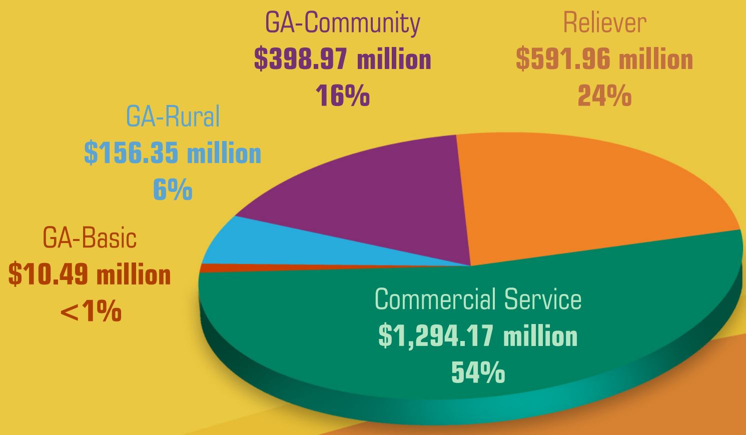
There are, however, other key actions identified by this study that can be pursued by ADOT to enhance the airport system's performance. These include:

KEY ACTIONS

- Regularly update data gathered during the SASP and integrate data into the state's aviation database to provide current information on airport activities
- Airport Operational Capacity and Airspace Capacity studies to address congestion issues in major metropolitan areas
- Update Economic Impact Studies to assess aviation's impact on Arizona's economy
- Initiate Runway Approach Obstruction Study to ensure continued safety for aircraft operations
- Continue updating Pavement Management Plans to determine and meet maintenance needs

Based on the recommendations of the SASP, estimates of costs that could be incurred to respond to future needs were analyzed by goal category and airport role. To meet SASP goals alone, more than $2.45 billion is needed through 2030.

SUMMARY OF SASP COSTS BY ROLE 2010-2030



SUMMARY OF SASP COSTS BY GOAL CATEGORY 2010-2030

Total SASP Needs: **$2.45 billion**

The SASP estimated total needs to meet the goals of the study, but also considered individual airport development plans that are above and beyond SASP goals. When all of these airport needs are considered it is likely that the 20-year funding needs for all commercial and general aviation airports could approach $10 billion. This translates to an average annual funding need of at least $486 million for each of the next 20 years. Adequate funding is essential to the success of this plan.

One of the most critical policy issues facing airports is the loss of funding dedicated to aviation. Between 1998 and 2004, the State Aviation Fund lost over $40 million in revenue due to legislative mandate. In fiscal years 2008 and 2009, an additional $42 million was diverted from the State Aviation Fund to the General Fund. The loss of more than $82 million has negatively impacted the ability of Arizona's airports to meet development needs, make safety improvements, and complete other enhancements.

In addition to funding needs, in order to support the recommendations in this study changes to current policy and/or legislation may be required. This study's analysis recommends changes to the following policies/legislation:

- Grand Canyon National Park Airport funding through State Aviation Fund
- Additional aviation legislation to address compatible land use planning
- Eligibility of Native American owned airports for State Aviation Fund grants

SUMMARY

The SASP provides an outlook of the state's aviation needs through 2030. The system planning process was developed to ensure that ADOT remains responsive to air transportation needs by identifying roles and characteristics for existing and new airports. As airports in Arizona continue to evolve to respond to changes in the communities they serve and aviation industry trends, the performance measures established in this plan can serve as a general guide and frame of reference for balanced development. More detailed design, planning, and environmental analysis for airports will be accomplished as part of individual master plans. All airport projects will be required to meet eligibility and justification guidelines before being eligible for funding.

Airports are economic catalysts. Investment is necessary for airports to continue to meet the needs of residents, visitors, and businesses throughout the state and the world. The reliance on aviation by a wide range of businesses from banks to restaurants, flower shops to hospitals, and hotels and attractions shows the importance of accommodating business needs and tourism throughout Arizona.

According to a 2004 study, Arizona's airports support over 470,000 jobs that have an annual payroll estimated at $14.7 billion. Total annual economic activity or output associated with Arizona's airports is estimated at $38.5 billion. An annual investment of $486 million in federal, state, and local funds for improvements to a system that generates $38.5 billion in annual economic benefit is an incredible value.

It is critical that Arizona's airports continue to serve their role in Moving, Connecting, and Supporting the state.

Arizona Department of Transportation
Multimodal Planning Division
Aeronautics Group
206 S. 17th Avenue
Phoenix, Arizona 85007
602.712.8223
www.azdot.gov/aviation

Prepared by:
Wilbur Smith Associates
1475 N. Scottsdale Road, Suite 480
Scottsdale, Arizona 85257
480.477.8651
www.wilbursmith.com

WilburSmith ASSOCIATES

ADOT

GLOSSARY OF TERMS

ABBREVIATIONS

A&P	-	Aircraft & Powerplant
AAAE	-	American Association of Airport Executives
AC	-	Advisory Circular
ACA	-	Governor's Advisory Council on Aviation
ACC	-	Airport Consultants Council
ACI	-	Airports Council International
ACIP	-	Airport Capital Improvement Program
ADEQ	-	Arizona Department of Environmental Quality
ADG	-	Airplane Design Group
ADOT	-	Arizona Department of Transportation
ADRE	-	Arizona Department of Real Estate
AEP	-	Airport Emergency Plan
AGL	-	Above Ground Level
AIP	-	Airport Improvement Program
AIR-21	-	Aviation Investment and Reform Act for the 21st Century
ALP	-	Airport Layout Plan
ALRIS	-	Arizona Land Resource Information System
ALS	-	Approach Lighting System
ALSF-1	-	Approach Light System with Sequence Flasher Lights
AMSL	-	Above mean sea level
AOPA	-	Aircraft Owners and Pilots Association
APA	-	Arizona Pilots Association
APMS	-	Airport Pavement Management System
APPP	-	Arizona Pavement Preservation Program
APV	-	Approach Procedures with Vertical Guidance
ARC	-	Airport Reference Code
ARCA	-	Arizona Rural Consortium of Airports
ARFF	-	Airport Rescue and Fire Fighting
ARS	-	Arizona Revised Statutes
ARTCC	-	Air Route Traffic Control Center
ASCET	-	Airport Small Community Economic Development & Transportation Program
ASAC	-	Aviation Advisory Committee
ASOS	-	Automated Surface Observation System
ASM	-	Airports System Manager Database
ASM	-	Available Seat Miles
ASU	-	Arizona State University
ASV	-	Annual Service Volume
ATC	-	Air Traffic Control
ATCT	-	Air Traffic Control Tower
ATIS	-	Automated Terminal Information System
AvGas	-	Aviation Gasoline
AWOS	-	Automatic Weather Observation System
AzAA	-	Arizona Airports Association
BLM	-	Bureau of Land Management

CAASD	-	Center for Advanced Aviation Development
CAGR	-	Compound Average Growth Rate
CASPP	-	Continuous Airport System Planning Process
CIP	-	Capital Improvement Program
CM	-	Commercial Service Airport
CTAF	-	Common Traffic Advisory Frequency
DME	-	Distance Measuring Equipment
DNL	-	Day-Night Sound Levels
DHS	-	Department of Homeland Security
DOT	-	Department of Transportation
DW	-	Dual Wheel
EA	-	Environmental Assessment
EAA	-	Experimental Aircraft Association
EAS	-	Essential Air Service
EIS	-	Environmental Impact Statement
EMS	-	Emergency Medical Services
EPA	-	The United States Environmental Protection Agency
FAA	-	Federal Aviation Administration
FAR	-	Federal Aviation Regulation
FBI	-	Federal Bureau of Investigation
FBO	-	Fixed Base Operator
FMS	-	Flight Management System
FSS	-	Flight Service Station
FY	-	Fiscal Year
GA	-	General Aviation
GAMA	-	General Aviation Manufacturers Association
GACA	-	Governor’s Advisory Council on Aviation
GBAS	-	Ground Based Approach Systems
GIS	-	Geographic Information Systems
GPS	-	Global Positioning System
GS	-	Glide Slope
HAI	-	Helicopter Association International
HAT	-	Height Above Threshold
HIRL	-	High Intensity Runway Lights
HITL	-	High Intensity Taxiway Lights
ICAO	-	International Civil Aviation Organization
IDS	-	Intrusion Detection System
IFR	-	Instrument Flight Rules
ILS	-	Instrument Landing System
IMC	-	Instrument Meteorological Conditions
INM	-	Integrated Noise Model
IR	-	IFR Military Training Routes
LAAS	-	Local Area Augmentation System

LAWRS	-	Limited Aviation Weather Reporting Station
LCC	-	Low-Cost Carrier
LEO	-	Law Enforcement Officer
LIRL	-	Low Intensity Runway Lights
LLWAS	-	Low Level Wind Shear Alert System
LNAV	-	Lateral Navigation
LOC	-	Localizer Beam
LPV	-	Localizer Performance with Vertical guidance
LTL	-	Less-Than-Truckload
MAG	-	Maricopa Association of Governments
MALS	-	Medium Intensity Approach Light System
MALSF	-	Medium Intensity Approach Light System with Sequence Flashing Lights
MALSR	-	Medium Intensity Approach Light System with Runway Alignment Indicators
MCAS	-	Marine Corp Air Station
MDA	-	Minimum Descent Altitude
MIRL	-	Medium Intensity Runway Lights
MITL	-	Medium Intensity Taxiway Lights
MOA	-	Military Operations Area
MoGas	-	Motor Gasoline
MSL	-	Mean Sea Level
NADIN	-	National Airspace Data Interchange Network
NAFTA	-	North American Free Trade Agreement
NAICS	-	North American Industry Classification System
NAS	-	National Airspace System
NASAO	-	National Association of State Aviation Officials
NATA	-	National Air Transportation Association
NAVAID	-	Navigational Aid
NBAA	-	National Business Aircraft Association
NDB	-	Non-Directional Beacon
NEPA	-	National Environmental Policy Act
NOTAM	-	Notice to Airmen
NPA	-	Non-Precision Approach
NPI	-	Non-Precision Instrument Approach
NPIAS	-	National Plan of Integrated Airport Systems
NTSB	-	National Transportation Safety Board
O&D	-	Origination/Destination
OAG	-	Official Airline Guide
ODALS	-	Omni-Directional Approach Lighting System
OFA	-	Object Free Area
OFZ	-	Obstacle Free Zone
OPBA	-	Operations Per Based Aircraft
PAC	-	Project Advisory Committee
PAG	-	Pima Association of Governments
PAPI	-	Precision Approach Path Indicator
PCI	-	Pavement Condition Index
PFC	-	Passenger Facility Charge
PIR	-	Precision Instrument Runway

PR - Primary Service Airport

RASP - Regional Airport System Plan
RCO - Remote Communications Outlet
REIL - Runway End Identifier Lights
RL - Reliever Airport
RNAV - Area Navigation
RNP - Required Navigation Performance
ROI - Return on Investment
RPM - Revenue Passenger Miles
RSA - Runway Safety Area
RPZ - Runway Protection Zone
RTM - Revenue Ton Miles
RW - Runway

SANS 2000 - State Aviation Needs Study 2000
SASP - State Airports System Plan
SBAS - Satellite Based Approach Systems
SCASDP - Small Community Air Service Development Program
STB - State Transportation Board
SW - Single Wheel
SWPPP - Storm Water Pollution Prevention Plan

TACAN - Tactical Air Navigation
TAF - Terminal Area Forecasts
TDWR - Terminal Doppler Weather Radar
TRACON - Terminal Radar Approach Control
TSA - Transportation Security Administration
TSAAC - TSA Access Certificate
TW - Taxiway

UA - University of Arizona
UAV - Unmanned Aerial Vehicle
UNICOM - Universal Integrated Communication
USDOT - United States Department of Transportation
USPA - United States Parachute Association
USPS - United States Postal Service

VASI - Visual Approach Slope Indicator
VFR - Visual Flight Rules
VGSI - Visual Glide Slope Indicator
VHF - Very High Frequency
VLJ - Very Light Jet
VNAV - Vertical Navigation
VR - VFR Military Training Routes
VOR - Very High Frequency Omni-Directional Range Navigation System
VORTAC - Very High Frequency Omni-Directional Range/Tactical Air Navigation

WAAS - Wide Area Augmentation System

DEFINITIONS

Ad-Hoc/On-Demand Carriers – Unscheduled charter flights carrying freight or mail.

Advisory Circular (AC) – A series of FAA publications providing guidance and standards for the design, operation, and performance of aircraft and airport facilities.

Aeronautics Division (ADOT Aeronautics) – Division of ADOT that promotes aviation in the state, licenses aircraft dealers, assists in the development of public airport projects, and manages Grand Canyon National Park Airport.

Air Cargo – Commercial freight (including packages and mail) transported by passenger and all-cargo airliners.

Air Carrier – A commercial airline with published schedules operating at least five round trips per week. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

Air Freight – Items principally transported by all-freight carriers and as belly freight on scheduled passenger services, including heavy-weight items as well as routine palletized shipments.

Air Mail – Items carried as belly freight on some commercial carriers and carried as freight by freight forwards (i.e. FedEx) under contract with the US Postal Service (USPS).

Air Route Traffic Control Center (ARTCC) – An FAA facility established to provide air traffic control service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace during the en route portion of flight.

Air Taxi – An aircraft operator who conducts operations for hire or compensation in accordance with FAR Part 135 in an aircraft with 30 or fewer passenger seats and a payload capacity of 7,500 pounds or less. An air taxi operates on an on-demand basis and does not meet the “scheduled-flight" qualifications of a commuter.

Air Traffic Control (ATC) – A service operated by the appropriate authority to promote the safe, orderly, and expeditious flow of air traffic. The ATC system includes ARTCCs, Towers, airport ground radar and other elements such as navigational aids to pilots.

Air Traffic Control Tower (ATCT) – The airport traffic control facility located on an airport that is responsible for traffic separation within the immediate vicinity of the airport and on the surface of the airport.

Aircraft Approach Category – An element of the ARC. A grouping of airplanes based on wingspan, per the following:

Category A -	Speed less than 91 knots
Category B -	Speed 91 knots or more, but less than 121 knots
Category C -	Speed 121 knots or more, but less than 141 knots
Category D -	Speed 141 knots or more, but less than 166 knots
Category E -	Speed 166 knots or more.

Aircraft Mix – The classification of aircraft into groups which are similar in size and operational characteristics.

Aircraft Operations – Airborne movements of aircraft at an airport including aircraft landings (arrivals) at and takeoffs (departures). These operations can be further defined by the following:

- *Local Operations* include those performed by aircraft that operate in the local traffic pattern or within sight of the airport; and/or are known to be departing for or arriving from a local practice area.
- *Itinerant Operations* are all others.

Airplane Design Group (ADG) – An element of the ARC. A grouping of airplanes based on wingspan, per the following:

Group I -	Up to, but not including 49 feet
Group II -	49 feet up to, but not including, 79 feet
Group III -	79 feet up to, but not including, 118 feet
Group IV -	118 feet up to, but not including, 171 feet
Group V -	171 feet up to, but not including, 214 feet
Group IV -	214 feet up to, but not including, 262 feet

Airport Capital Improvement Program (ACIP) – The ACIP serves as the primary planning tool for systematically identifying, prioritizing and assigning funds to critical airport development and associated capital needs of an airport. The FAA relies on the ACIP to serve as the basis for the distribution of limited grant funds under the Airport Improvement Program.

Airport Elevation – The highest point on an airport's usable runways, expressed in feet above mean sea level (MSL).

Airport Improvement Program (AIP) – A congressionally mandated program through which FAA provides funding assistance for the development and enhancement of airport facilities. AIP is periodically reauthorized by Congress through appropriations from the Aviation Trust Fund, which is funded through excise taxes on airline tickets, aviation fuel, etc.

Airport Layout Plan (ALP) – A scaled drawing of existing and proposed land and facilities necessary for the operation and development of the airport. The ALP shows boundaries and proposed additions to all areas owned or controlled by the airport operator for airport purposes, the location and nature of existing and proposed airport facilities and structures, as well as the location of existing and proposed non-aviation areas and improvements on the airport.

Airport Master Plan – A standard planning document that presents a concept of the ultimate development of an airport, including the research and logic from which the plan was evolved, as well as the plan in graphic and written formats. An airport master plan is normally presented to the FAA for approval and would typically also be approved and adopted by the airport sponsor.

Airport Pavement Management Program (APMP) – program in Arizona that helps preserve airport infrastructure, protects the initial investment used to fund critical aircraft pavement projects and extends to the maximum amount the useful life of the airport system's pavement.

Airport Reference Code (ARC) – An FAA design criteria based upon the approach speed (aircraft approach category) and wing span (airplane design group) of an aircraft which produces a minimum annual 500 operations per year at an airport.

Airport Sponsor – A public agency that is authorized to own and operate an airport, to obtain property interests, to obtain funds, and to be legally, financially, and otherwise able to meet all applicable requirements of current laws and regulations.

Airside – The portion of the airport meant for taxiing, takeoff, landing, parking, loading and unloading, or any other aircraft operation, including the aircraft parking aprons, taxiways, runways, and safety areas.

Airspace – The area above the ground in which aircraft travel. It is divided into corridors, routes and restricted zones for the control and safety of aircraft operations.

All-Cargo Carrier - An air carrier certificated in accordance with FAR Part 121 to provide scheduled air freight, express, and mail transportation over specific routes, as well as the conduct of nonscheduled operations that may include passengers.

Annual Service Volume (ASV) – An FAA planning tool that reflects the ability of airfield facilities (i.e. runways, taxiways, and approach aids) to accommodate aviation demand that includes commercial, general aviation, and military operations. It accounts for differences in runway use, aircraft mix, weather conditions, etc. that would encountered over a year's time.

Approach End of Runway – The near end of the runway as viewed from the cockpit of a landing aircraft.

Approach Lighting System (ALS) – An ALS is a lighting system installed on the approach end of an airport runway and consists of a series of light bars, strobe lights, or a combination of the two that extends outward from the runway end. ALS usually serves a runway that has an instrument approach procedure associated with it and allows the pilot to visually identify the runway environment once he or she has arrived at a prescribed point on an approach.

Approach Minimums – The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

Approach Surface – An FAR Part 77 imaginary surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface.

Arizona Department of Transportation (ADOT) – Arizona state government agency charged with managing the state's highway system, public transportation, overseeing the aviation transportation system, and managing the Grand Canyon National Park Airport.

Arizona Revised Statutes (ARS) – document that provides the governing framework for the laws by which citizens are expected to obey and live by. Title 28 – Chapter 25 establishes the guidance and requirements for the Aeronautics Division and the Director of Aviation to follow in order to encourage and advance the safe and orderly development of aviation in the state.

Assurance – An assurance (or grant assurance) is a provision contained in a Federal grant agreement to which the recipient of AIP funding has voluntarily agreed to comply with in consideration of the funding provided.

Automated Surface Observation System (ASOS) – The primary surface weather observing system in the U.S. that supports aviation operations and weather forecasting. An ASOS has automated sensors that record wind direction and speed, visibility, cloud ceiling, precipitation, etc and sends that data automatically to the National Weather Service. At many locations, a computer-generated voice broadcasts the minute-by-minute weather reports to pilots on a discrete radio frequency.

Automated Terminal Information Service (ATIS) – The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

Automated Weather Observing System (AWOS) – An automated weather reporting system that provides airport weather observations (i.e. cloud height, visibility, wind speed and direction, temperature, dew point, etc.) to pilots on a discrete radio frequency via a computer-generated voice. Less sophisticated than ASOS, it is oftentimes installed using state or local funding.

Available Seat Miles (ASMs) – A measure of airline capacity, equal to the number of seats available multiplied by the number of miles flown.

Avigation Easement – A form of limited property right purchase that establishes legal land-use control prohibiting incompatible development of areas required for airports and aviation-related purposes.

Based Aircraft – An aircraft that is "operational & air worthy," which is based at an airport for the majority of the year.

Belly Cargo – Freight which is carried in the hold of a commercial passenger aircraft below the main passenger deck.

Breakeven Load Factor – The number of seats airlines have to sell to cover operating expenses.

Capacity – A measure of the maximum number of aircraft operations that can be accommodated by an airport's airfield over a designated time period (i.e. hour or year).

Capital Improvement Program (CIP) – A schedule of planned projects and costs for an airport typically prepared and adopted by the airport sponsor and other public agencies.

Ceiling – The height above the ground of the base of the lowest layer of clouds or obscuring phenomena aloft that is reported as broken or overcast and not classified as scattered, thin, or partial. Ceiling figures in aviation weather reports may be determined as measured, estimated, or indefinite.

Charter – A nonscheduled flight offered by either a supplemental or certificated air carrier.

Circling Approach – An instrument approach procedure in which an aircraft executes the published instrument approach to one runway, then maneuvers visually to land on a different runway. Circling approaches are also used at airports that have published instrument approaches with a final approach course that is not aligned within 30 degrees of any runway.

Commercial Air Carrier – An air carrier certified in accordance with FAR Parts 121 or 127 to conduct scheduled services on specified routes. These air carriers may also provide nonscheduled or charter services as a secondary operation.

Commercial Service Airports – Publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled passenger aircraft service. It is a NPIAS classification. Commercial service airports are either one of the following:

– *Primary* - airport that enplanes more than 10,000 passengers annually
– *Nonprimary* - airport that enplanes between 2,500 and 10,000 passengers annually.

Commuter Air Carrier – An air carrier certified in accordance with FAR Part 135 that operates aircraft seating with a maximum of 60 passengers and provides at lease five scheduled round trips per week between two or more points, or carries mail.

Controlled Airspace – Airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification. Controlled airspace is designated as Class A, Class B, Class C, Class D, or Class E. Aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements as specified in FAR Part 91, depending upon the class of airspace in which they are operating.

– *CLASS A* - Airspace between 18,000 and 60,000 feet MSL over the conterminous United States. IFR clearances are required for all aircraft operating in CLASS A airspace.
– *CLASS B* - Airspace area around the busiest U.S. hub airports, typically to a radius of 20 nautical miles and up to 10,000 feet above ground level. Operations within CLASS B airspace require an ATC clearance and at least a Private pilot certificate (local waivers available), radio communication, and an altitude-reporting (Mode C) transponder.
– *CLASS C* - Airspace area around busy U.S. airports (other than CLASS B). Radio contact with approach control is mandatory for all traffic. Typically includes an area from the surface to 1,200 feet AGL out to 5 miles and from 1,200 to 4,000 feet AGL to 10 miles from the airport.
– *CLASS D* - Airspace around an airport with an operating control tower; typically to a radius of 5 miles from the surface to 2,500 feet AGL. Radio contact with the control tower required prior to entry.
– *CLASS E* - General controlled airspace comprising control areas, transition areas, Victor airways, the Continental Control Area, etc.
– CLASS F - International airspace designation not used in the U.S.
– *CLASS G* - Uncontrolled airspace, generally the airspace from the surface up to 700 or 1,200 feet AGL in most of the U.S., but up to as high as 14,500 feet in some remote Western and sparsely populated areas.

Crack Spread – the difference between crude and jet fuel cost per barrel.

Decision Height (DH) – During a precision approach, the height (or altitude) at which a decision must be made to either continue the approach or execute a missed approach.

Demand – Level of activity that needs to be accommodated.

Demand Management – The art or science of controlling demand as a strategy to avoid congestion.

Design Aircraft – An aircraft whose dimensions and/or other operational requirements make it the most demanding aircraft currently using an airport's facilities (i.e. runways and taxiways). The design aircraft must be an aircraft that has or is expected to conduct 500 or more annual operations (250 landings) at a given airport, and is used as the basis for airport planning and design at that airport.

Displaced Threshold – A threshold that is located at a point on the runway other than the designated beginning of the runway, often for the purpose of avoiding obstructions on approach. The portion of pavement behind a displaced threshold may be available for takeoffs in both directions and landings from the opposite direction.

Distance measuring equipment (DME) – A flight instrument that measures the line-of-sight distance of an aircraft from a navigational radio station in nautical miles.

Easement – The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

Enplanements - The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

Enroute System – That part of the National Airspace System where aircraft are operating between origin and destination airports.

Entitlement Funds – Federal aid funds (see AIP) apportioned to each airport for authorized and approved projects, based on a statutory formula that takes into account the airport's passenger enplanements and cargo.

Environmental Assessment (EA) – A concise document that assesses the environmental impacts of a proposed Federal Action. It discusses the purpose and need for the proposed action and alternatives, as well as their environmental impacts. An environmental assessment should provide sufficient evidence and analysis for a Federal determination whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EA process.

Environmental Impact Statement (EIS) – An EIS is a document that provides a discussion of the significant environmental impacts which would occur as a result of a proposed project, and informs decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts. Public participation and consultation with other Federal, state, and local agencies is a cornerstone of the EIS process.

Essential Air Service (EAS) – Program administered by the U.S. Department of Transportation is designed to ensure that selected small communities that were served by one or more air carriers prior to airline deregulation would retain a minimum level of scheduled airline service, even if such service requires the payment of subsidy.

Federal Aviation Administration (FAA) – A branch of the U.S. Department of Transportation responsible insuring the safe and efficient use of the nation's airspace, for fostering civil aeronautics and air commerce, and for supporting the requirements of national defense. In addition to regulating airports, aircraft manufacturing and parts certification, aircraft operation and pilot certification, the FAA operates Air Traffic Control, purchases and maintains navigation equipment, certifies airports and aids airport development, among other activities. The FAA also administers the AIP that provides for airport development.

Federal Aviation Regulations (FARs) – The body of Federal regulations relating to aviation, published as Title 14 of the Code of Federal Regulations.

Final Approach – The flight path of an aircraft which is inbound to the airport on an approved final instrument approach course, beginning at the point of interception of that course and extending to the airport or the point where circling for landing or missed approach is executed.

Fixed Base Operator (FBO) – Any aviation business duly licensed and authorized by written agreement with the airport owner to provide aeronautical activities at the airport under strict compliance with such agreement and pursuant to these regulations and standards. Typically provide services such as hangar space, fuel, flight training, repair, and maintenance to general aviation airport users.

Fixed Wing – Any aircraft not considered to be a rotorcraft.

Flight Service Station (FSS) – Air traffic facility operated by the FAA to provide flight service assistance such as pilot briefings, en route communications, search and rescue assistance and weather information.

Fractional Ownership – An aircraft ownership concept whereby multiple companies can partially own an aircraft through use of a common aircraft management company used to maintain the aircraft and administer the leasing of the aircraft among the owners. The aircraft owners participating in the program agree not only to share their aircraft with others having an ownership interest in that aircraft, but also to lease their aircraft to other owners in the program.

Freight Forwarder – A company that accepts small packages from shippers and consolidates them into container loads. These loads are then transferred to the non-integrated carrier or a passenger airline to deliver to an agent or subsidiary at another airport.

General Aviation (GA) – All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remunerations or hire. Often misunderstood to be only small, propeller-driven aircraft; even a large jet or cargo plane operated under FAR Part 91 can be a general aviation aircraft.

General Aviation Airports – Those airports not classified as commercial service.

Glider – An aircraft that does not use an engine, but flies by floating on air currents. Gliders or sailplanes are heavier-than-air aircraft primarily intended for unpowered flight.

Glideslope (GS) – Provides vertical guidance for aircraft during approach and landing. Generally a 3-degree angle of approach to a runway established by means of airborne instruments during instrument approaches, or visual ground aids for the visual portion of an instrument approach and landing.

Geographic Information Systems (GIS) – An information system that is designed for storing, integrating, manipulating, analyzing, and displaying data referenced by spatial or geographic coordinates.

Global Positioning System (GPS) – Satellite-based navigation system operated by Department of Defense, providing extremely accurate position, time, and speed information to civilian and military users. Based on a "constellation" of 24 satellites, GPS will replace ground-based navigation systems (VOR, ILS) as the primary worldwide air navigation system in the 21st Century.

Hazard to Air Navigation – An object which, as a result of an aeronautical study, the FAA determines will have a substantial adverse effect upon the safe and efficient use of navigable airspace by aircraft, operation of air navigation facilities, or existing or potential airport capacity.

Instrument Approach – A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR) – Rules from Federal Aviation Regulations (14 CFR 91) that govern the procedures for conducting instrument flight. Pilots are required to follow these rules when operating in controlled airspace during Instrument Meteorological Conditions (i.e. visibility of less than three miles and/or ceiling lower than 1,000 ft). These procedures may also be used under visual conditions and provide for positive control by ATC.

Instrument Landing System (ILS) – ILS is designed to provide an exact approach path for alignment and descent of aircraft. Generally consist of a localizer, glide slope, outer marker, middle marker, and approach lights. There are three types of ILS:

- *Cat I* – Category I ILS which provides for approach to a height above touchdown of not less than 200 feet and with visibility of not less than ½ mile or a Runway Visual Range of not less than 2400 (RVR 1800 with operative touchdown zone and runway centerline lights).
- *Cat II* – Category II ILS approach procedure which provides for approach to a height above touchdown of not less than 100 feet and with a Runway Visual Range of not less than 1200.
- *Cat III* – Category III ILS approach procedure which provides for approaches to minima less than CAT II.

Instrument Runway – A runway equipped with electronic and visual navigation aids for which a precision or non-precision approach procedure having straight-in landing minimums has been approved.

Integrated Express Carrier – Operators move the customer's goods door-to-door, providing shipment collection, transport via air or truck, and delivery. Integrated express operators include FedEx Express, UPS, and DHL.

Integrated Noise Model (INM) – A computer model developed, updated and maintained by the FAA to predict the noise exposure generated by aircraft operations at an airport.

Itinerant Operation – All aircraft operations at an airport other than local.

Joint Use Airport - Airport with existing formal written joint use agreement between the military and the local civilian sponsor.

Land Use Compatibility – The ability of land uses surrounding the airport to coexist with airport-related activities with minimum conflict.

Landside – The general public common use areas of the airport such as terminals, public roadways, parking lots and buildings which are not contained in the airside area.

Large Airplane – An airplane of more than 12,500 pounds (5,700 kg) maximum certificated takeoff weight (MTOW).

Leakage – Refers to passengers that travel outside their market area to access airline services.

Load Factor –The ratio of how much of an airline's carrying capacity is used, calculated using the ratio of revenue passenger miles to available seat miles on a particular flight.

Local Area Augmentation System (LAAS) – An enhancement of the Global Positioning System (GPS) providing greater navigation accuracy and system integrity for civilian operations.

Local Operation – Includes aircraft operating in the local air traffic pattern or within sight of the air traffic control tower; aircraft that are known to be departing for, or arriving from local practice areas located within a 25-mile radius of the ATCT; or aircraft making simulated instrument approaches or low passes at the airport.

Localizer – The component of an ILS which provides course guidance to the runway.

Mean Sea Level (MSL) – The average height of the surface of the sea for all stages of the tide over a 19 year period; used as a reference for elevations.

Military Operations Area (MOA) – Depicted on navigational charts, MOAs are airspace in which military flight operations (training and practice combat) are conducted. They may be transited by VFR civilian traffic, but special vigilance is recommended.

Minimum Standards – The qualifications or criteria established by an airport sponsor as the minimum requirements to be met by businesses engaged in on-airport aeronautical uses as a condition for the right to conduct those activities.

MOgas – The everyday gasoline used in cars. Motor gasoline, MOgas, distinguishes automobile fuel from aviation gasoline or AVgas.

National Airspace System (NAS) – The common network of U.S. airspace, includes air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, manpower and material.

National Plan of Integrated Airport Systems (NPIAS) – FAA planning document that identifies more than 3,300 airports that are significant to national air transportation and thus eligible to receive Federal grants under the Airport Improvement Program (AIP). It also includes estimates of the amount of AIP money needed to fund infrastructure development projects that will bring these airports up to current design standards and add capacity to congested airports. FAA is required to provide Congress with a 5-year estimate of AIP eligible development every 2 years. The NPIAS comprises all commercial service airports, all reliever airports, and selected general aviation airports.

National Transportation Safety Board (NTSB) – The independent federal agency charged with investigating and finding "probable cause" of transportation accidents.

Navigational Aids (NAVAIDs) – A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.).

Noise Abatement – A measure or action that minimizes the amount of impact of noise on the environs of an airport. Noise abatement measures include aircraft operating procedures and use or disuse of certain runways or flight tracks.

Noise Contour Map – A map representing average annual noise levels summarized by lines connecting points of equal noise exposure.

Non-Directional Beacon (NDB) – A radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to and from the station. When the radio beacon is installed in conjunction with the ILS marker, it is normally called a compass locator.

Non-Precision Approach Procedure – A standard instrument approach procedure with only horizontal guidance or area-type navigational guidance for straight-in approaches, and no electronic vertical guidance (i.e. glideslope) is provided, such as VOR, TACAN, NDB, or LOC.

Non-Towered Airport – An airport without a control tower, which encompasses the majority of America's 13,000 airports (only approximately 680 airports have control towers). Note that Non-Towered airports are far from being "uncontrolled" in that pilots follow traffic pattern procedures and self-announce positions and intentions using the Common Traffic Advisory Frequency (CTAF), usually called the UNICOM frequency.

Notice to Airmen (NOTAM) – A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. NOTAMs are distributed via two methods: telecommunications (Class I) and/or postal services (Class 11).

Object Free Area (OFA) – An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ) – The OFZ is the airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway, and for missed approaches. The OFZ is sub-divided as follows:

- *Runway OFZ* - The airspace above a surface centered on the runway centerline.
- *Inner-approach OFZ* - The airspace above a surface centered on the extended runway centerline. It applies to runways with an approach lighting system.
- *Inner-transitional OFZ* - The airspace above the surfaces located on the outer edges of the runway OFZ and the inner-approach OFZ. It applies to runways with approach visibility minimums lower than ¾ statute mile.

Obstruction to Air Navigation – An object of greater height than any of the heights or surfaces presented in Subpart C of Code of Federal Regulation (14 CFR), Part 77. Obstructions to air navigation are presumed to be hazards to air navigation until an FAA study has determined otherwise.

Operation – A take-off or landing of an aircraft. Every aircraft flight requires at least two operations, a take-off and landing.

Origination/Destination (O&D) – A measure of the point of origination of a passenger to the final destination that comprises that passenger's actual trip, regardless of changing flights/planes during the journey.

Outer Marker – An ILS navigation facility in the terminal area navigation system located four to seven miles from the runways edge on the extended centerline indicating the beginning of final approach.

Overflight – Aircraft whose flights originate or terminate outside the metropolitan area that transit the airspace without landing.

Part 61, 141, 142 – The parts of FARs covering pilot certification and flight school operations: the pilot certification and standard flight school (Part 61), the integrated curriculum type school (Part 141) requiring slightly fewer flying hours, and Part 142 program allowing replacement of more flight time with advanced flight simulators.

Part 77 – The part of Federal Aviation Regulations (FARs) covering objects affecting navigable airspace. It provides for the establishment of "imaginary surfaces" on and around an airport to identify potential aeronautical hazards in order to prevent or minimize the adverse impacts to the safe and efficient use of navigable airspace. Imaginary surfaces include the primary surface, approach surfaces, transitional surfaces, the horizontal surface, and the conical surface.

Part 91, 121, 125, 135 – The parts of Federal Aviation Regulations (FARs) covering non-commercial operations (Part 91), major scheduled air carriers (Part 121), commuters (Part 125), non-scheduled carriers and air taxis (Part 135).

Passenger Facility Charges (PFCs) – Airport user fees regulated under 14 C.F.R. Part 158.

Pavement Condition Index (PCI) – Numerical index between 0 and 100 used to indicate the condition of a selected portion of pavement with 100 representing excellent pavement.

Peak Hour – Part of the day with the busiest traffic.

Precision Approach Path Indicator (PAPI) – Provides visual approach slope guidance to aircraft during an approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

Precision Approach Procedure – A standard instrument approach procedure in which an electronic glide slope is provided, such as an ILS. GPS precision approaches may be operational in the future.

Prohibited Area – An airspace area where flight is prohibited except by prior arrangement with the controlling agency. An example is the P-56 area over downtown Washington, D.C., prohibiting flight over the White House.

Public Use Airport – An airport open to public use without prior permission, and without restrictions within the physical capabilities of the facility. It may or may not be publicly owned.

Priority Rating System – A rating system utilized to numerically score individual airport development projects requested by system eligible airports. This numerical rating system is designed to assist the Aeronautics Division in recommending the allocation of funds to the highest priority airport development projects within the statewide airport system.

Private-Use Airport – Typically, a privately-owned airport not open to the public or operated for the public benefit.

Reliever Airport – A public use airport that relieves airport congestion at a commercial service airport and provides general aviation access to the overall community. It is a NPIAS classification.

Remote Communications Outlet (RCO) – An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

Restricted Area – Airspace which (when "Active" or "Hot") usually excludes civilian aircraft, oftentimes for military training/operations (i.e. rocket flights, practice air-to-air combat or ground-based artillery practice). Temporary restricted areas are established for events such as forest fires, natural disasters or major news stories. Flight through a restricted area may be authorized by the "controlling agency" or by FAA.

Revenue Passenger Miles (RPMs) – One fare-paying passenger carried one mile.

Revenue Ton Miles (RTMs) – One ton of cargo carried one mile.

Rotocraft – A heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors. Includes helicopters and gyroplanes.

Rules and Regulations – Directions approved and enforced by an airport sponsor to protect public health, safety, interest, and welfare on the airport, as well as to augment any ordinances and resolutions pertaining to the airport.

Runway (RW) – A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes.

Runway End Identifier Lights (REIL) – Two synchronized flashing lights (one on each side of the runway threshold) that identify the approach end of the runway.

Runway Protection Zone (RPZ) – An area off the runway end to enhance the protection of people and property on the ground. The RPZ is a trapezoidal shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

Runway Safety Area (RSA) – A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Segmented Circle – A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

Small Airplane – An airplane of 12,500 pounds or less maximum certificated takeoff weight.

Special Use Airspace – All airspace in which restrictions or prohibitions to flight are imposed for military or government needs (See MOA, Restricted Area, Prohibited Area).

State Aviation Fund – A separately established program for airport construction and development is that derives funds from taxes on aviation goods and services. Flight property taxes, aircraft lieu tax, registration fees and aviation fuel tax are the primary sources of revenue for the State Aviation Fund.

State Transportation Board (STB) – has policy powers and duties in addition to serving in an advisory capacity to the Director of the Arizona Department of Transportation. The Board awards contracts and monitors the status of c projects and has the exclusive authority to issue revenue bonds for financing needed transportation improvements throughout the state.

Super Unicom – FAA certified for altimeter settings and other weather data required for instrument approach implementation.

T-Hangar – An aircraft hangar in which aircraft are parked alternatively tail to tail, each in the T-shaped space left by the other row of aircraft or aircraft compartments.

Tactical Area Navigation (TACAN) – the military equivalent of the VOR/DME system, and provides both distance and direction guidance.

Taxilane (TL) – The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

Taxiway (TW) – A defined path established for the taxiing of aircraft from one part of an airport to another.

Terminal Area Capacity – The ability of an airport terminal area to accommodate aircraft, passengers, and cargo. Individual elements within terminal areas that comprise the overall terminal capacity typically include airline gate positions, airline apron areas, cargo apron areas, general aviation apron areas, airline passenger terminals, general aviation terminals, cargo buildings, automobile parking and aircraft maintenance facilities, among others.

Terminal Area Forecast (TAF) – The official forecast of aviation activity at FAA facilities, which are prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public. The TAF includes forecasts for the following:

- *FAA towered airports*
- *Federally contracted towered airports*
- *Nonfederal towered airports*
- *Non-towered airports.*

Terminal Radar Approach Control (TRACON) – An FAA Air Traffic Control Facility which uses radar and two-way communication to provide separation of air traffic within a specified geographic area in the vicinity of one or more airports. TRACONs control IFR and participating VFR flights.

Tie-down – An apparatus used to secure an aircraft while parked on the apron.

Touch-and-Go Operation – A flight training operation in which a landing approach is made, the aircraft touches-down on the runway, but does not fully reduce speed to turn off the runway. Instead, after the landing, full engine power is applied while still rolling and a takeoff is made, thereby practicing both maneuvers as part of one motion. It counts as two separate aircraft operations

Traffic Pattern – The traffic flow for aircraft landing and departure at an airport. Typical components of the traffic pattern include: upwind leg, crosswind leg, downwind leg, base leg, and final approach.

Transportation Security Administration (TSA) – U.S. government agency is a component of the Department of Homeland Security and is responsible for security of the nation's transportation systems.

Turbojet Aircraft – An aircraft having a jet engine in which the energy of the jet operates a turbine which in turn operates the air compressor.

Turboprop Aircraft – An aircraft having a jet engine in which the energy of the jet operates a turbine which drives the propeller.

Uncontrolled Airspace – Generally the airspace from the surface up to 700 or 1,200 feet AGL in most of the U.S., but up to as high as 14,500 feet in some remote Western and sparsely populated areas. Uncontrolled airspace is designated as Class G airspace by the FAA.

Unmanned Aerial Vehicle (UAV) – An unpiloted aircraft that can be controlled remotely using GPS or other satellite guidance, or flown autonomously based on pre-programmed flight plans or more complex dynamic automation systems. UAVs are currently primarily used in a number of military roles, but are also used in a small but growing number of civil applications such as firefighting, police observation of civil disturbances and crime scenes, and reconnaissance support in natural disasters.

Very High Frequency Omni-directional Range (VOR) – A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

Very High Frequency Omni-directional Range Station with Tactical Air Navigation (VORTAC) – A navigational aid providing VOR azimuth and TACAN distance measuring equipment (DME) at one site.

Very Light Jet (VLJ) – A small jet aircraft approved for single-pilot operation, seating 4-8 people, with a maximum take-off weight of under 10,000 pounds. They are lighter than what is commonly termed business jets.

Visual Approach – An approach conducted on an IFR flight plan, operating in VFR conditions under the control of an air traffic facility and having an air traffic control authorization, may proceed to destination airport under VFR.

Visual Approach Slope Indicator (VASI) – A visual aid for the final approach to the runway threshold consisting of two wing bars of lights located in tandem on either side of the runway. Each bar produces a split beam of light – the upper segment is white, the lower is red.

Visual Flight Rules (VFR) – Rules and procedures specified in 14 CFR 91 for aircraft operations under visual meteorological conditions, or weather conditions with a ceiling of 1,000 feet above ground level and visibility of three miles or greater. Under VFR, it is the pilot's responsibility to maintain visual separation and not that of the air traffic controller.

Visual Glide Slope Indicator (VGSI) – system of lights on the side of the runway threshold near the touchdown zone that help to ensure that any obstructions in the approach area are cleared by indicating if the aircraft is higher than or lower than the appropriate glide slope angle. The two most common types of VGSI are PAPI and VASI.

Visual Runway – A runway without an existing or planned straight-in instrument approach procedure.

Wide Area Augmentation System (WAAS) – An enhancement to the GPS system providing greater navigation accuracy and system integrity and permitting GPS to be used for precision instrument approaches to most airports.

Wind Coverage – Percent of time for which aeronautical operations are considered safe due to acceptable crosswind components.

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APPENDIX A: AIRPORT CODE REFERENCE TABLES

Figure A-1: Arizona Airport Code Reference Table, Numerical/Alphabetical by Airport Code

FAA ID	Associated City	Airport Name	FAA ID	Associated City	Airport Name
00AZ	Cordes	Cordes	E95	Benson	Benson Municipal
04AZ	Chinle	Chinle	FFZ	Mesa	Falcon Fld
0V7	Kayenta	Kayenta	FHU	Fort Huachuca	Sierra Vista Municipal
18AZ	Carefree	Sky Ranch At Carefree	FLG	Flagstaff	Flagstaff Pulliam
1AZ0	Mobile	Mobile	GBN	Gila Bend	Gila Bend-AF Aux.
1G4	Peach Springs	Grand Canyon West	GCN	Grand Canyon	Grand Canyon National Park
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip	GEU	Glendale	Glendale Municipal
20AZ	Picacho	Eds Field	GYR	Goodyear	Phoenix Goodyear
27AZ	Aguila	Eagle Roost Airpark	HII	Lake Havasu City	Lake Havasu City
34AZ	Chandler	Gila River Memorial Airport	IFP	Bullhead City	Laughlin/Bullhead International
39AZ	Lukachukai	Lukachukai	IGM	Kingman	Kingman
3AZ5	Hualapai	Hualapai	INW	Winslow	Winslow-Lindbergh Regional
40G	Grand Canyon	Valle	IWA	Mesa	Phoenix-Mesa Gateway
41AZ	Maricopa	Ak-Chin	L25	Meadview	Pearce Ferry
44A	San Luis	Rolle Airfield	L37	Peach Springs	Grand Canyon Caverns
44E	Wickenburg	Forepaugh	L41	Marble Canyon	Marble Canyon
45AZ	Pine Springs	Pine Springs	L50	Tuweep	Tuweep
46AZ	Pinon	Pinon	LGF	Yuma	Laguna AAF
48AZ	Rimrock	Rim Rock	LUF	Litchfield Park	Luke AFB
49AZ	Rock Point	Rock Point	MZJ	Marana	Pinal Airpark
4AZ7	San Carlos	San Carlos	NYL	Yuma	Yuma Mcas/Yuma International
50AZ	Rocky Ridge	Rocky Ridge	OLS	Nogales	Nogales International
51AZ	Roosevelt	Grapevine	P01	Ajo	Eric Marcus Municipal
53AZ	Shonto	Shonto	P03	Douglas	Cochise College
57AZ	Tucson	La Cholla Airpark	P04	Bisbee	Bisbee Municipal
5AZ3	Queen Creek	Pegasus Airpark	P08	Coolidge	Coolidge Municipal
85V	Ganado	Ganado	P10	Polacca	Polacca
A09	Bullhead City	Eagle Airpark	P13	Globe	San Carlos Apache
A20	Bullhead City	Sun Valley	P14	Holbrook	Holbrook Municipal
A39	Phoenix	Phoenix Regional	P18	Scottsdale	Papago AAF
AVQ	Marana	Marana Regional	P19	Chandler	Stellar Airpark
AZC	Colorado City	Colorado City Municipal	P20	Parker	Avi Suquilla
BXK	Buckeye	Buckeye Municipal	P23	Seligman	Seligman
CFT	Clifton/Morenci	Greenlee County	P29	Tombstone	Tombstone Municipal
CGZ	Casa Grande	Casa Grande Municipal	P33	Willcox	Cochise County
CHD	Chandler	Chandler Municipal	P48	Peoria	Pleasant Valley
CMR	Williams	H.A. Clark Memorial Field	P52	Cottonwood	Cottonwood
D68	Springerville	Springerville Municipal	PAN	Payson	Payson
DGL	Douglas	Douglas Municipal	PGA	Page	Page Municipal
DMA	Tucson	Davis-Monthan AFB	PHX	Phoenix	Phoenix Sky Harbor International
DUG	Douglas Bisbee	Bisbee Douglas International	PRC	Prescott	Ernest A. Love Field
DVT	Phoenix	Phoenix Deer Valley	RQE	Window Rock	Window Rock
E24	Whiteriver	Whiteriver	RYN	Tucson	Ryan Field
E25	Wickenburg	Wickenburg Municipal	SAD	Safford	Safford Regional
E51	Bagdad	Bagdad	SDL	Scottsdale	Scottsdale
E60	Eloy	Eloy Municipal	SEZ	Sedona	Sedona
E63	Gila Bend	Gila Bend Municipal	SJN	St Johns	St Johns Industrial
E67	Kearny	Kearny	SOW	Show Low	Show Low Regional
E68	Maricopa	Estrella Sailport	T03	Tuba City	Tuba City
E77	San Manuel	San Manuel	TUS	Tucson	Tucson International
E78	Sells	Sells	TYL	Taylor	Taylor
E81	Superior	Superior Municipal	U30	Temple Bar	Temple Bar
E91	Chinle	Chinle Municipal	Z95	Cibecue	Cibecue

Figure A-2: Arizona Airport Code Reference Table, Alphabetical by Associated City

FAA ID	*Associated City*	*Airport Name*	*FAA ID*	*Associated City*	*Airport Name*
27AZ	Aguila	Eagle Roost Airpark	OLS	Nogales	Nogales International
P01	Ajo	Eric Marcus Municipal	PGA	Page	Page Municipal
E51	Bagdad	Bagdad	P20	Parker	Avi Suquilla
E95	Benson	Benson Municipal	PAN	Payson	Payson
P04	Bisbee	Bisbee Municipal	L37	Peach Springs	Grand Canyon Caverns
BXK	Buckeye	Buckeye Municipal	1G4	Peach Springs	Grand Canyon West
A09	Bullhead City	Eagle Airpark	P48	Peoria	Pleasant Valley
IFP	Bullhead City	Laughlin/Bullhead International	DVT	Phoenix	Phoenix Deer Valley
A20	Bullhead City	Sun Valley	A39	Phoenix	Phoenix Regional
18AZ	Carefree	Sky Ranch At Carefree	PHX	Phoenix	Phoenix Sky Harbor International
CGZ	Casa Grande	Casa Grande Municipal	20AZ	Picacho	Eds Field
CHD	Chandler	Chandler Municipal	45AZ	Pine Springs	Pine Springs
34AZ	Chandler	Gila River Memorial Airport	46AZ	Pinon	Pinon
P19	Chandler	Stellar Airpark	P10	Polacca	Polacca
04AZ	Chinle	Chinle	PRC	Prescott	Ernest A. Love Field
E91	Chinle	Chinle Municipal	5AZ3	Queen Creek	Pegasus Airpark
Z95	Cibecue	Cibecue	48AZ	Rimrock	Rim Rock
CFT	Clifton/Morenci	Greenlee County	49AZ	Rock Point	Rock Point
AZC	Colorado City	Colorado City Municipal	50AZ	Rocky Ridge	Rocky Ridge
P08	Coolidge	Coolidge Municipal	51AZ	Roosevelt	Grapevine
00AZ	Cordes	Cordes	SAD	Safford	Safford Regional
P52	Cottonwood	Cottonwood	4AZ7	San Carlos	San Carlos
P03	Douglas	Cochise College	44A	San Luis	Rolle Airfield
DGL	Douglas	Douglas Municipal	E77	San Manuel	San Manuel
DUG	Douglas Bisbee	Bisbee Douglas International	P18	Scottsdale	Papago AAF
E60	Eloy	Eloy Municipal	SDL	Scottsdale	Scottsdale
FLG	Flagstaff	Flagstaff Pulliam	SEZ	Sedona	Sedona
FHU	Fort Huachuca	Sierra Vista Municipal	P23	Seligman	Seligman
85V	Ganado	Ganado	E78	Sells	Sells
E63	Gila Bend	Gila Bend Municipal	53AZ	Shonto	Shonto
GBN	Gila Bend	Gila Bend-AF Aux.	SOW	Show Low	Show Low Regional
GEU	Glendale	Glendale Municipal	D68	Springerville	Springerville Municipal
P13	Globe	San Carlos Apache	SJN	St Johns	St Johns Industrial
GYR	Goodyear	Phoenix Goodyear	E81	Superior	Superior Municipal
GCN	Grand Canyon	Grand Canyon National Park	TYL	Taylor	Taylor
40G	Grand Canyon	Valle	U30	Temple Bar	Temple Bar
P14	Holbrook	Holbrook Municipal	P29	Tombstone	Tombstone Municipal
3AZ5	Hualapai	Hualapai	T03	Tuba City	Tuba City
0V7	Kayenta	Kayenta	DMA	Tucson	Davis-Monthan AFB
E67	Kearny	Kearny	57AZ	Tucson	La Cholla Airpark
IGM	Kingman	Kingman	RYN	Tucson	Ryan Field
HII	Lake Havasu City	Lake Havasu City	TUS	Tucson	Tucson International
LUF	Litchfield Park	Luke AFB	L50	Tuweep	Tuweep
39AZ	Lukachukai	Lukachukai	E24	Whiteriver	Whiteriver
AVQ	Marana	Marana Regional	1Z1	Whitmore	Grand Canyon Bar Ten Airstrip
MZJ	Marana	Pinal Airpark	E25	Wickenburg	Wickenburg Municipal
L41	Marble Canyon	Marble Canyon	44E	Wickenburg	Forepaugh
E68	Maricopa	Estrella Sailport	P33	Willcox	Cochise County
41AZ	Maricopa	Ak-Chin	CMR	Williams	H.A. Clark Memorial Field
L25	Meadview	Pearce Ferry	RQE	Window Rock	Window Rock
FFZ	Mesa	Falcon Field	INW	Winslow	Winslow-Lindbergh Regional
IWA	Mesa	Phoenix-Mesa Gateway	LGF	Yuma	Laguna AAF
1AZ0	Mobile	Mobile	NYL	Yuma	Yuma Mcas/Yuma International

Figure A-3: Arizona Airport Code Reference Table, Alphabetical by Airport Name

FAA ID	*Associated City*	*Airport Name*	*FAA ID*	*Associated City*	*Airport Name*
41AZ	Maricopa	Ak-Chin	AVQ	Marana	Marana Regional
P20	Parker	Avi Suquilla	L41	Marble Canyon	Marble Canyon
E51	Bagdad	Bagdad	1AZ0	Mobile	Mobile
E95	Benson	Benson Municipal	OLS	Nogales	Nogales International
DUG	Douglas Bisbee	Bisbee Douglas International	PGA	Page	Page Municipal
P04	Bisbee	Bisbee Municipal	P18	Scottsdale	Papago AAF
BXK	Buckeye	Buckeye Municipal	PAN	Payson	Payson
CGZ	Casa Grande	Casa Grande Municipal	L25	Meadview	Pearce Ferry
CHD	Chandler	Chandler Municipal	5AZ3	Queen Creek	Pegasus Airpark
04AZ	Chinle	Chinle	DVT	Phoenix	Phoenix Deer Valley
E91	Chinle	Chinle Municipal	GYR	Goodyear	Phoenix Goodyear
Z95	Cibecue	Cibecue	A39	Phoenix	Phoenix Regional
P03	Douglas	Cochise College	PHX	Phoenix	Phoenix Sky Harbor International
P33	Willcox	Cochise County	IWA	Mesa	Phoenix-Mesa Gateway
AZC	Colorado City	Colorado City Municipal	MZJ	Marana	Pinal Airpark
P08	Coolidge	Coolidge Municipal	45AZ	Pine Springs	Pine Springs
00AZ	Cordes	Cordes	46AZ	Pinon	Pinon
P52	Cottonwood	Cottonwood	P48	Peoria	Pleasant Valley
DMA	Tucson	Davis-Monthan AFB	P10	Polacca	Polacca
DGL	Douglas	Douglas Municipal	48AZ	Rimrock	Rim Rock
A09	Bullhead City	Eagle Airpark	49AZ	Rock Point	Rock Point
27AZ	Aguila	Eagle Roost Airpark	50AZ	Rocky Ridge	Rocky Ridge
20AZ	Picacho	Eds Field	44A	San Luis	Rolle Airfield
E60	Eloy	Eloy Municipal	RYN	Tucson	Ryan Field
P01	Ajo	Eric Marcus Municipal	SAD	Safford	Safford Regional
PRC	Prescott	Ernest A. Love Field	4AZ7	San Carlos	San Carlos
E68	Maricopa	Estrella Sailport	P13	Globe	San Carlos Apache
FFZ	Mesa	Falcon Field	E77	San Manuel	San Manuel
FLG	Flagstaff	Flagstaff Pulliam	SDL	Scottsdale	Scottsdale
44E	Wickenburg	Forepaugh	SEZ	Sedona	Sedona
85V	Ganado	Ganado	P23	Seligman	Seligman
E63	Gila Bend	Gila Bend Municipal	E78	Sells	Sells
GBN	Gila Bend	Gila Bend-AF Aux.	53AZ	Shonto	Shonto
34AZ	Chandler	Gila River Memorial Airport	SOW	Show Low	Show Low Regional
GEU	Glendale	Glendale Municipal	FHU	Fort Huachuca	Sierra Vista Municipal
1Z1	Whitmore	Grand Canyon Bar Ten Airstrip	18AZ	Carefree	Sky Ranch At Carefree
L37	Peach Springs	Grand Canyon Caverns	D68	Springerville	Springerville Municipal
GCN	Grand Canyon	Grand Canyon National Park	SJN	St Johns	St Johns Industrial
1G4	Peach Springs	Grand Canyon West	P19	Chandler	Stellar Airpark
51AZ	Roosevelt	Grapevine	A20	Bullhead City	Sun Valley
CFT	Clifton/Morenci	Greenlee County	E81	Superior	Superior Municipal
CMR	Williams	H.A. Clark Memorial Field	TYL	Taylor	Taylor
P14	Holbrook	Holbrook Municipal	U30	Temple Bar	Temple Bar
3AZ5	Hualapai	Hualapai	P29	Tombstone	Tombstone Municipal
0V7	Kayenta	Kayenta	T03	Tuba City	Tuba City
E67	Kearny	Kearny	TUS	Tucson	Tucson International
IGM	Kingman	Kingman	L50	Tuweep	Tuweep
57AZ	Tucson	La Cholla Airpark	40G	Grand Canyon	Valle
LGF	Yuma	Laguna AAF	E24	Whiteriver	Whiteriver
HII	Lake Havasu City	Lake Havasu City	E25	Wickenburg	Wickenburg Municipal
IFP	Bullhead City	Laughlin/Bullhead International	RQE	Window Rock	Window Rock
39AZ	Lukachukai	Lukachukai	INW	Winslow	Winslow-Lindbergh Regional
LUF	Litchfield Park	Luke AFB	NYL	Yuma	Yuma Mcas/Yuma International

APPENDIX B: CURRENT FACILITY AND SERVICE OBJECTIVE COMPLIANCE

A variety of actions and recommendations are needed to enable system airports to meet target objectives established in the Arizona State Airports System Plan (SASP). Facility and service objectives for Commercial Service, Reliever, GA-Community, GA-Rural, and GA-Basic airports have been established to enable system airports to fulfill their functional roles and as identified in Chapter Five, Establish Existing Airport Roles. In many instances, system airports have identified similar facility and service needs as part of their individual master plans and capital improvement programs and are proceeding to address many of the facility and service-related needs identified in the SASP.

This appendix further identifies and expands on the facility and service objectives discussed in Chapter Six. The objectives are analyzed to determine current compliance. This appendix is divided into two sections. The first section describes each of the airside facilities that are objectives at each system airport. The second section identifies general aviation landside facilities and services that should be offered at those airports.

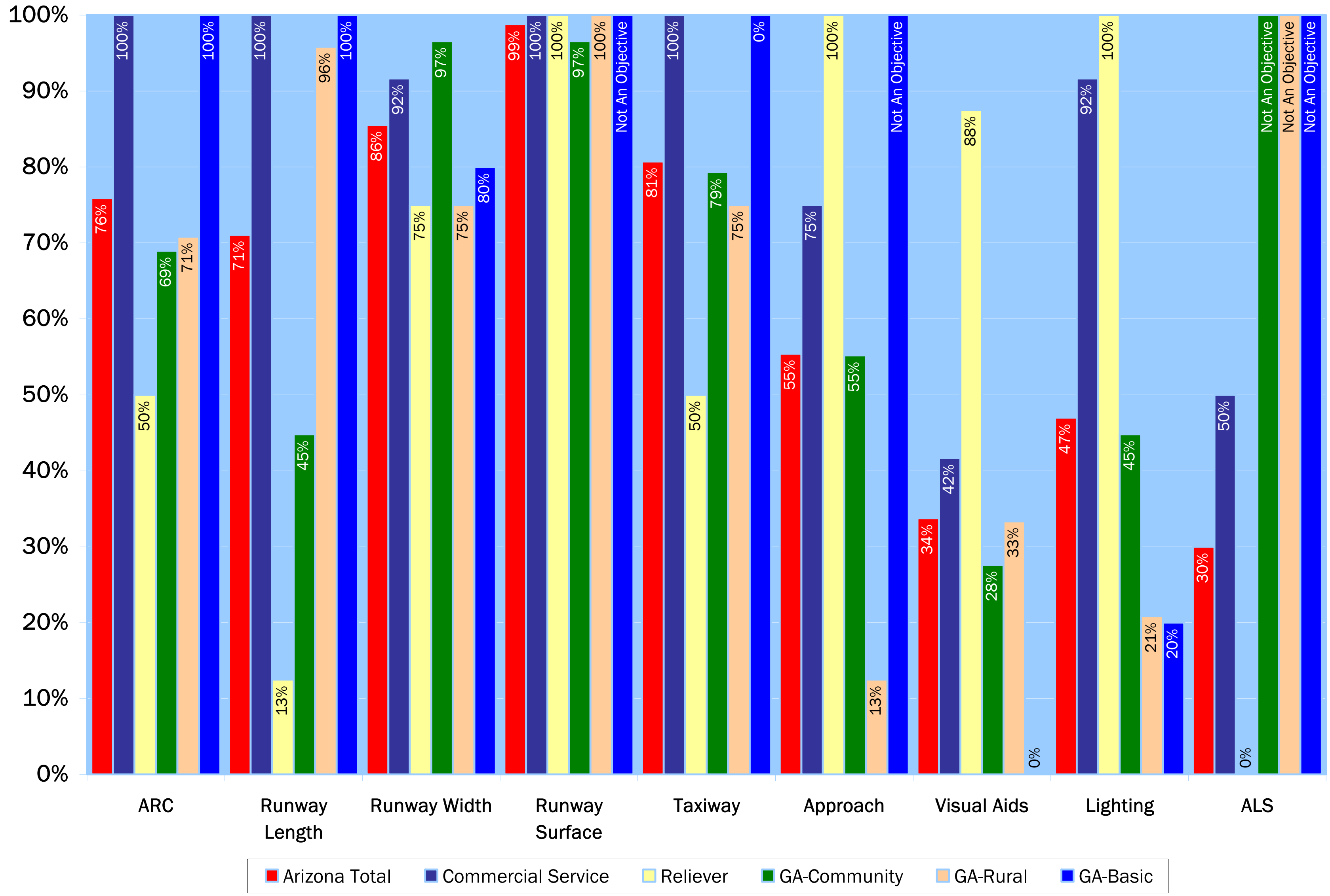
AIRSIDE FACILITIES

Airside facilities play the most significant role in the ability of the airports to support system needs. Airside facility objectives include the following items:

- Airport Reference Code (ARC)
- Primary runway length, width, and surface
- Taxiway type and width
- Approach type
- Visual aids
- Runway and taxiway lighting
- Approach lighting system (ALS)

Figure B-1 summarizes the system's compliance for each airside facility objective.

Figure B-1: Airside Facility Compliance Summary



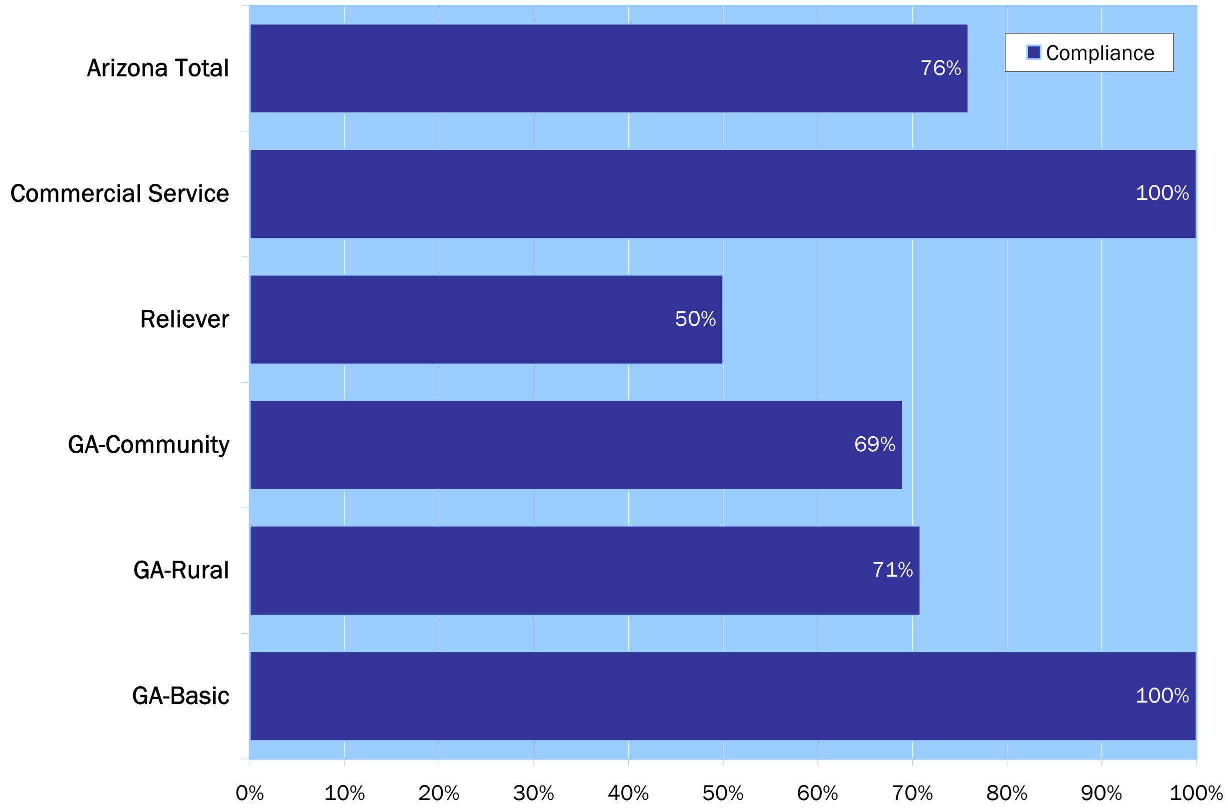
Airport Reference Code (ARC)

Each airport in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) is encouraged by the FAA to meet all applicable design and development standards. The most demanding aircraft that operates at the airport on a regular basis with at least 500 takeoffs and landings a year determines each airport's individual design standards and is known as the design or critical aircraft.

An airport's design standards are typically established during the development of an airport-specific master plan or airport layout plan (ALP). Each airport's design standards are related to the approach speed and the wingspan of its design aircraft. These two parameters are used to determine each airport's airport reference code (ARC); a letter, A, B, C, D, or E, is defined by the approach speed of the design aircraft, while a Roman numeral, I, II, III, IV, or V, is identified based on the wingspan of the design aircraft. A full discussion of ARCs is provided in Chapters Three and Five.

Figure B-2 summarizes ARC objectives at SASP airports. For the ARC objectives, 100 percent of Commercial Service, 50 percent of Reliever, 69 percent of GA-Community, 71 percent of GA-Rural, and 100 percent of GA-Basic airports meet the ARC objective set for them. System-wide, this accounts for 76 percent of airports included in the SASP that meet their ARC objective based on their existing role in the system. It is important to note that airports that are not included in the NPIAS are not required to meet FAA standards, however, the FAA standards have been developed to promote the safe and orderly development of all airports and provide a reference point regarding facility development at all airports. Figure B-3 details these results by individual airports.

Figure B-2: Percentage of Airports by Role Meeting ARC Objectives



Source: *Airport Inventory & Data Survey* 2008, Airport Records

Figure B-3: ARC Compliance by Airport

Associated City	*Airport Name*	*Existing ARC*	*Objective*	*Compliance*
Commercial Service: Objective - Consistent with Master Plan*				
Bullhead City	Laughlin/Bullhead International	C-III	D-IV	Yes
Flagstaff	Flagstaff Pulliam	C-III	C-III	Yes
Grand Canyon	Grand Canyon National Park	C-III	C-III	Yes
Kingman	Kingman	C-III	C-III	Yes
Mesa	Phoenix-Mesa Gateway	D-V	D-V	Yes
Page	Page	B-II	D-II	Yes
Peach Springs	Grand Canyon West	B-II	C-II	Yes
Phoenix	Phoenix Sky Harbor International	D-V	D-V	Yes
Prescott	Ernest A. Love Field	C-III	D-IV	Yes
Show Low	Show Low Regional	C-III	D-III	Yes
Tucson	Tucson International	D-IV	D-IV	Yes
Yuma	Yuma International Airport	E-VI	D-IV	Yes
Reliever: Objective - C-III				
Chandler	Chandler Municipal	B-II	C-III	No
Glendale	Glendale Municipal	B-II	C-III	No
Goodyear	Phoenix Goodyear	D-IV	C-III	Yes
Marana	Marana Regional	B-II	C-III	No
Mesa	Falcon Field	D-II	C-III	Yes
Phoenix	Phoenix Deer Valley	C-II	C-III	No
Scottsdale	Scottsdale	C-III	C-III	Yes
Tucson	Ryan Field	B-II	C-III	Yes
GA-Community: Objective - B-II				
Benson	Benson Municipal	B-I	B-II	No
Buckeye	Buckeye Municipal	B-II	B-II	Yes
Carefree	Sky Ranch at Carefree	B-I	B-II	No
Casa Grande	Casa Grande Municipal	B-II	B-II	Yes
Chandler	Memorial Airfield	D-IV	B-II	Yes
Chandler	Stellar Airpark	B-I	B-II	No
Colorado City	Colorado City Municipal	B-II	B-II	Yes
Coolidge	Coolidge Municipal	C-II	B-II	Yes
Cottonwood	Cottonwood	B-I	B-II	No
Douglas	Douglas Municipal	B-II	B-II	Yes
Eloy	Eloy Municipal	B-II	B-II	Yes
Grand Canyon	Grand Canyon Valle	A-I	B-II	No
Holbrook	Holbrook Municipal	B-I	B-II	No
Lake Havasu City	Lake Havasu City	C-III	B-II	Yes
Marana	Pinal Airpark	D-V	B-II	Yes
Nogales	Nogales International	C-II	B-II	Yes
Parker	Avi Suquilla	C-II	B-II	Yes
Payson	Payson	B-II	B-II	Yes
Peoria	Pleasant Valley	A-II	B-II	No
Safford	Safford Regional	B-II	B-II	Yes
Sedona	Sedona	B-I	B-II	No
Sierra Vista	Sierra Vista Municipal	D-IV	B-II	Yes
Springerville	Springerville Municipal	B-II	B-II	Yes
St Johns	St Johns Industrial Air Park	B-II	B-II	Yes

Figure B-3: ARC Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing ARC*	*Objective*	*Compliance*
GA-Community: Objective - B-II				
Taylor	Taylor	B-II	B-II	Yes
Wickenburg	Wickenburg Municipal	B-II	B-II	No
Willcox	Cochise County	B-II	B-II	Yes
Williams	H.A. Clark Memorial Field	B-II	B-II	Yes
Winslow	Winslow-Lindbergh Regional	C-II	B-II	Yes
GA-Rural: Objective - B-I				
Ajo	Eric Marcus Municipal	B-I	B-I	Yes
Bisbee	Bisbee Municipal	B-I	B-I	Yes
Bullhead City	Sun Valley	A-I	B-I	No
Chinle	Chinle Municipal	B-I	B-I	Yes
Clifton/Morenci	Greenlee County	B-II	B-I	Yes
Douglas	Cochise College	B-I	B-I	Yes
Douglas Bisbee	Bisbee Douglas International	C-I	B-I	Yes
Gila Bend	Gila Bend Municipal	B-II	B-I	Yes
Globe	San Carlos Apache	C-II	B-I	Yes
Kayenta	Kayenta	B-II	B-I	Yes
Kearny	Kearny	A-I	B-I	No
Marble Canyon	Marble Canyon	A-I	B-I	No
Maricopa	Estrella Sailport	A-I	B-I	No
Peach Springs	Grand Canyon Caverns	A-I	B-I	No
Phoenix	Phoenix Regional	B-I	B-I	Yes
Polacca	Polacca	A-I	B-I	No
San Luis	Rolle Airfield	B-I	B-I	Yes
San Manuel	San Manuel/Ray/Blair	B-I	B-I	Yes
Seligman	Seligman	B-I	B-I	Yes
Temple Bar	Temple Bar	A-I	B-I	No
Tuba City	Tuba City	B-II	B-I	Yes
Tucson	La Cholla Airpark	B-I	B-I	Yes
Whiteriver	Whiteriver	B-II	B-I	Yes
Window Rock	Window Rock	B-II	B-I	Yes
GA-Basic: Objective - A-I				
Aguila	Eagle Roost	A-I	A-I	Yes
Bagdad	Bagdad	B-I	A-I	Yes
Cibecue	Cibecue	B-II	A-I	Yes
Meadview	Pearce Ferry	A-I	A-I	Yes
Peach Springs	Hualapai	A-I	A-I	Yes
Rimrock	Rimrock	A-I	A-I	Yes
Sells	Sells	A-I	A-I	Yes
Superior	Superior Municipal	B-II	A-I	Yes
Tombstone	Tombstone Municipal	A-I	A-I	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	A-I	A-I	Yes

Sources: *Airport Inventory & Data Survey* 2008, Airport Records
*Commercial Service objectives are “Ultimate” goal from master plans. Not meeting this goal does not cause incompliance.

Runway Length

Adequate runway facilities, especially runway lengths, are important components of an aviation system. Facility and service objectives were developed for each of the classification levels based on the types of aircraft anticipated to operate at airports in these role classifications. In this analysis, the ability of the existing system to meet the identified minimum objective for primary runway length was examined using each airport's respective ARC and their role.

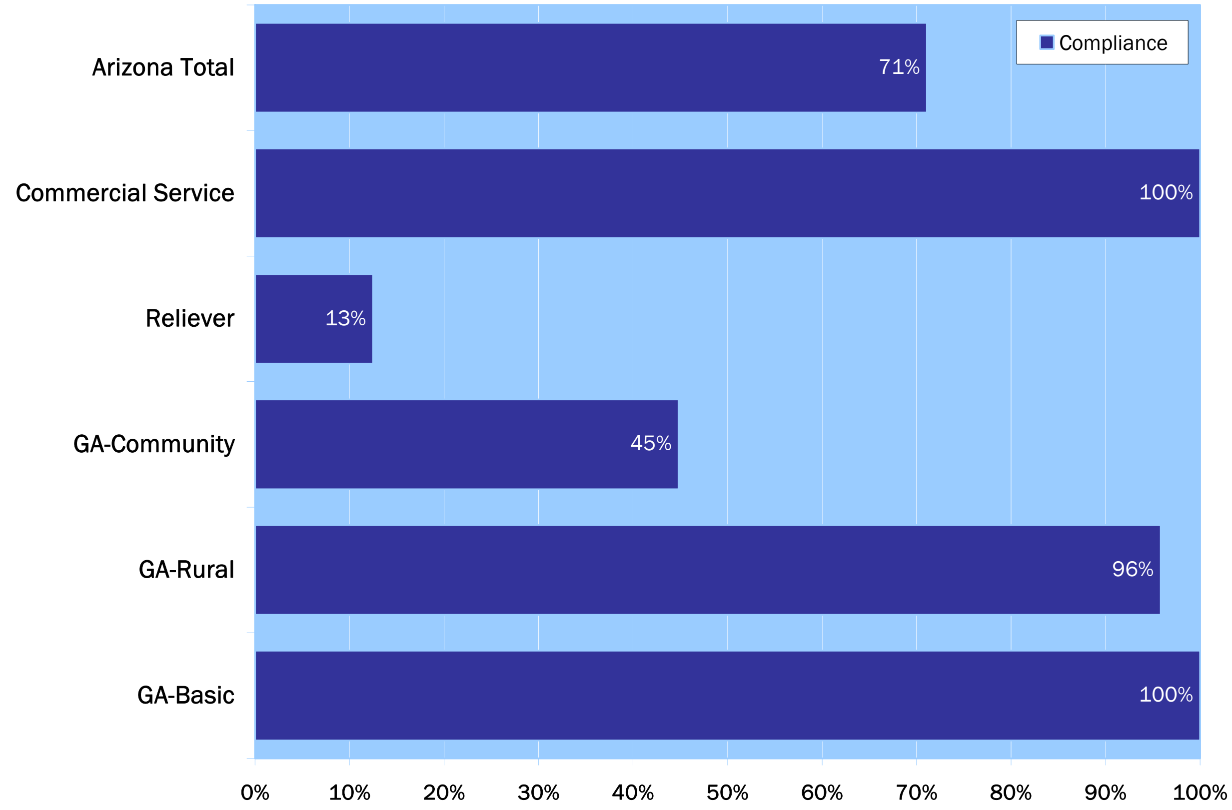
The FAA runway length model was used to calculate optimal lengths unique for Reliever, GA-Community, and GA-Rural airports. The model takes into account a number of factors such as mean maximum daily temperature during the hottest month and elevation or altitude of each airport. The model has several outputs depending on the type of aircraft and useful load the airport will accommodate. Based on input from ADOT, the five airport roles have the following objectives set for their primary runway lengths:

- Commercial Service: consistent with master plan
- Reliever: accommodate 75 percent of large aircraft at 90 percent useful load
- GA-Community: accommodate 75 percent of large aircraft at 60 percent useful load
- GA-Rural: accommodate 75 percent of small planes
- GA-Basic: maintain existing length

The SASP sets minimum primary runway lengths as a basis for evaluation. Airports that exceed the minimum primary runway length are recommended to maintain the additional length, as determined to be necessary.

As shown in Figure B-4, 71 percent of the system airports meet the minimum primary runway length objectives for their respective role. All Commercial Service airports are compliant with this objective. Based on the results of the FAA runway length model, only 13 percent of Reliever airports are compliant with runway length objectives, while 45 percent of GA-Community and 96 percent of GA-Rural airports are compliant. The low compliance of in the Reliever and GA-Community roles are due to the long runway length objectives noted by the FAA model needed to accommodate large general aviation aircraft, which takes into account the mean temperature, which is higher in much of Arizona, compared to other states. Because GA-Basic airports are recommended to maintain their current runway length, they show 100 percent compliance.

Figure B-4: Percentage of Airports by Role Meeting Primary Runway Length Objectives



Sources: FAA Runway Length Program. *Airport Inventory & Data Survey 2008*

An analysis of the primary runway length for each airport is presented in Figure B-5.

Figure B-5: Primary Runway Length Compliance by Airport

Associated City	*Airport Name*	*Primary Runway*	*Primary Runway Length*	*Objective Length*	*Compliance*
Commercial Service: Objective - Consistent with Master Plan*					
Bullhead City	Laughlin/Bullhead International	16/34	7,520	9,000	Yes
Flagstaff	Flagstaff Pulliam	03/21	8,800	8,800	Yes
Grand Canyon	Grand Canyon National Park	03/21	9,000	10,000	Yes
Kingman	Kingman	03/21	6,831	7,000	Yes
Mesa	Phoenix-Mesa Gateway	12R/30L	10,401	12,501	Yes
Page	Page	15/33	5,950	7,200	Yes
Peach Springs	Grand Canyon West	17/35	5,058	6,500	Yes
Phoenix	Phoenix Sky Harbor Intl	08/26	11,489	12,000	Yes
Prescott	Ernest A. Love Field	03R/21L	7,616	7,616	Yes
Show Low	Show Low Regional	06/24	7,200	8,600	Yes
Tucson	Tucson International	11L/29R	10,996	11,000	Yes
Yuma	Yuma International	03L/21R	13,300	13,299	Yes
Reliever: Objective - Accommodate 75% of large aircraft at 90% useful load					
Chandler	Chandler Municipal	04R\22L	4,850	8,110	No
Glendale	Glendale Municipal	01/19	7,150	8,270	No
Goodyear	Phoenix Goodyear	03/21	8,500	8,500	Yes
Marana	Marana Regional	04R/22L	5,102	8,320	No
Mesa	Falcon Field	07R/25L	8,208	8,410	No
Phoenix	Phoenix Deer Valley	03/21	8,249	8,680	No
Scottsdale	Scottsdale	12/30	6,901	8,130	No
Tucson	Ryan Field	06R/24L	5,500	8,480	No
GA-Community: Objective - Accommodate 75% of large aircraft at 60% useful load					
Benson	Benson Municipal	10/28	4,000	6,270	No
Buckeye	Buckeye Municipal	17/35	5,500	5,550	No
Carefree	Sky Ranch at Carefree	06/24	4,037	4,037	Yes
Casa Grande	Casa Grande Municipal	05/23	5,200	5,230	No
Chandler	Memorial Airfield	12/30	8,530	5,140	Yes
Chandler	Stellar Airpark	17/35	3,913	3,913	Yes
Colorado City	Colorado City Municipal	11/29	6,300	7,050	No
Coolidge	Coolidge Municipal	05/23	5,528	5,420	Yes
Cottonwood	Cottonwood	14/32	4,250	6,490	No
Douglas	Douglas Municipal	03/21	5,760	6,390	No
Eloy	Eloy Municipal	02/20	3,900	5,000	No
Grand Canyon	Grand Canyon Valle	01/19	4,199	4,199	Yes
Holbrook	Holbrook Municipal	03/21	6,698	7,280	No
Lake Havasu City	Lake Havasu City	14/32	8,000	5,480	Yes
Marana	Pinal Airpark	12/30	6,850	5,230	Yes
Nogales	Nogales International	03/21	7,199	7,430	No
Parker	Avi Suquilla	01/19	6,750	5,090	Yes
Payson	Payson	06/24	5,500	6,780	No
Peoria	Pleasant Valley	05C/23C	4,200	4,200	Yes
Safford	Safford Regional	12/30	6,015	5,970	Yes
Sedona	Sedona	03/21	5,132	7,710	No
Sierra Vista	Sierra Vista Municipal	08/26	12,001	7,840	Yes

Figure B-5: Primary Runway Length Compliance by Airport (Continued)

Associated City	*Airport Name*	*Primary Runway*	*Primary Runway Length*	*Objective Length*	*Compliance*
GA-Community: Objective - Accommodate 75% of large aircraft at 60% useful load					
Springerville	Springerville Municipal	03/21	8,417	7,700	Yes
St Johns	St Johns Industrial Air Park	14/32	5,322	7,050	No
Taylor	Taylor	03/21	7,200	8,080	No
Wickenburg	Wickenburg Municipal	05/23	6,100	6,280	No
Willcox	Cochise County	03/21	6,095	6,430	No
Williams	H.A. Clark Memorial Field	18/36	6,000	7,340	No
Winslow	Winslow-Lindbergh Regional	04/22	7,499	7,390	Yes
GA-Rural: Objective - Accommodate 75% of small airplanes					
Ajo	Eric Marcus Municipal	12/30	3,800	3,150	Yes
Bisbee	Bisbee Municipal	17/35	5,929	4,480	Yes
Bullhead City	Sun Valley	18/36	3,700	2,950	Yes
Chinle	Chinle Municipal	18/36	6,149	4,920	Yes
Clifton/Morenci	Greenlee County	07/25	4,970	4,010	Yes
Douglas	Cochise College	05/23	5,303	4,110	Yes
Douglas Bisbee	Bisbee Douglas International	17/35	7,311	4,130	Yes
Gila Bend	Gila Bend Municipal	04/22	5,200	2,980	Yes
Globe	San Carlos Apache	09/27	6,500	3,810	Yes
Kayenta	Kayenta	05/23	7,100	5,020	Yes
Kearny	Kearny	08/26	3,400	3,290	Yes
Marble Canyon	Marble Canyon	03/21	3,715	3,715	Yes
Maricopa	Estrella Sailport	6R/24L	2,520	2,520	Yes
Peach Springs	Grand Canyon Caverns	05/23	5,300	5,300	Yes
Phoenix	Phoenix Regional	03/21	4,000	3,120	Yes
Polacca	Polacca	04/22	4,200	4,920	No
San Luis	Rolle Airfield	17/35	2,800	2,730	Yes
San Manuel	San Manuel/Ray/Blair	11/29	4,200	3,790	Yes
Seligman	Seligman	04/22	4,800	4,770	Yes
Temple Bar	Temple Bar	18/36	3,500	3,170	Yes
Tuba City	Tuba City	15/33	6,230	4,380	Yes
Tucson	La Cholla Airpark	01/19	4,500	4,500	Yes
Whiteriver	Whiteriver	01/19	6,350	4,520	Yes
Window Rock	Window Rock	02/20	7,000	5,770	Yes
GA-Basic: Objective - Maintain existing					
Aguila	Eagle Roost	17/35	3,400	3,400	Yes
Bagdad	Bagdad	05/23	4,552	4,552	Yes
Cibecue	Cibecue	07/25	4,200	4,200	Yes
Meadview	Pearce Ferry	01/19	2,810	2,810	Yes
Peach Springs	Hualapai	07/25	4,790	4,790	Yes
Rimrock	Rimrock	05/23	2,184	2,184	Yes
Sells	Sells	04/22	5,830	5,830	Yes
Superior	Superior Municipal	04/22	3,250	3,250	Yes
Tombstone	Tombstone Municipal	06/24	4,610	4,610	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	16/34	4,300	4,300	Yes

Sources: FAA Runway Length Program, *Airport Inventory & Data Survey* 2008
Note: *Commercial Service objectives are "ultimate" goal from master plans. Not meeting this goal does not cause incompliance.

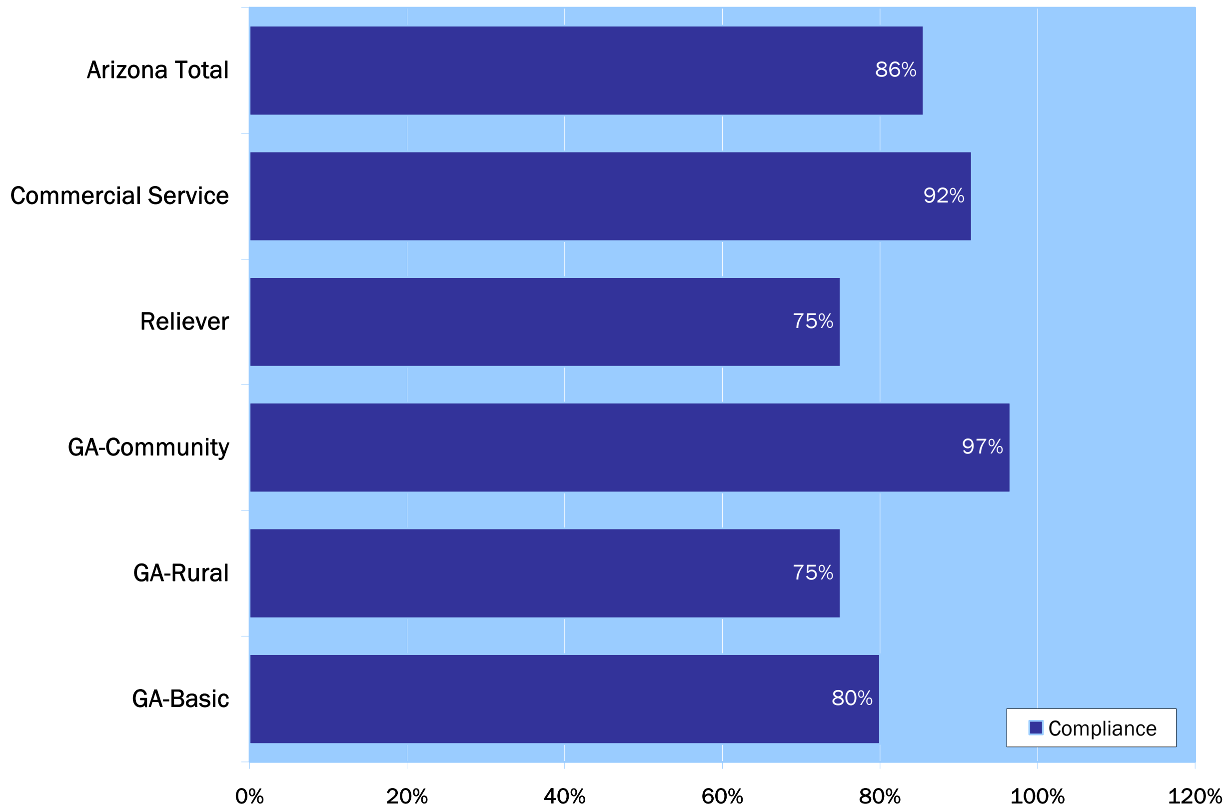
Runway Width

Another important component to the runway system is the width of the primary runway. It is important for runways to have adequate width that meet the minimum facility standards established as part of this study and meet FAA design standards. Objectives for runway widths were based on the recommended ARC of each airport and determined using FAA guidelines.[1]

As shown in **Figure B-6**, 86 percent of the system airports meet the primary runway width objectives for their respective role. Ninety-two percent of Commercial Service, 75 percent of Reliever, and 97 percent of GA-Community airports meet primary runway width objectives. Seventy-five percent of GA-Rural and 80 percent of GA-Basic airports meet this objective.

Figure B-7 shows each airport's adequacy in the primary runway width objective.

Figure B-6: Percentage of Airports by Role Meeting Primary Runway Width Objectives



Source: *Airport Inventory & Data Survey* 2008

[1] For airports with an ARC exceeding the recommended ARC, widths were based on the existing ARC.

Figure B-7: Primary Runway Width Compliance by Airport

Associated City	*Airport Name*	*Primary Runway*	*Primary Runway Width*	*ARC Objective Runway Width*	*Compliance*
Commercial Service: Objective - Consistent with Master Plan					
Bullhead City	Laughlin/Bullhead International	16/34	150	150	Yes
Flagstaff	Flagstaff Pulliam	03/21	150	150	Yes
Grand Canyon	Grand Canyon National Park	03/21	150	150	Yes
Kingman	Kingman	03/21	150	150	Yes
Mesa	Phoenix-Mesa Gateway	12R/30L	150	150	Yes
Page	Page	15/33	150	150	Yes
Peach Springs	Grand Canyon West	17/35	60	100	No
Phoenix	Phoenix Sky Harbor International	08/26	150	150	Yes
Prescott	Ernest A. Love Field	03R/21L	150	150	Yes
Show Low	Show Low Regional	06/24	100	100	Yes
Tucson	Tucson International	11L/29R	150	150	Yes
Yuma	Yuma International Airport	03L/21R	200	200	Yes
Reliever: Objective - Consistent with ARC, Minimum C-III					
Chandler	Chandler Municipal	04R\22L	75	100	No
Glendale	Glendale Municipal	01/19	100	100	Yes
Goodyear	Phoenix Goodyear	03/21	150	150	Yes
Marana	Marana Regional	04R/22L	100	100	Yes
Mesa	Falcon Field	07R/25L	100	100	Yes
Phoenix	Phoenix Deer Valley	03/21	100	100	Yes
Scottsdale	Scottsdale	12/30	100	100	Yes
Tucson	Ryan Field	06R/24L	75	100	No
GA-Community: Objective - Consistent with ARC, Minimum B-II					
Benson	Benson Municipal	10/28	75	75	Yes
Buckeye	Buckeye Municipal	17/35	75	75	Yes
Carefree	Sky Ranch at Carefree	06/24	50	50	Yes
Casa Grande	Casa Grande Municipal	05/23	100	75	Yes
Chandler	Memorial Airfield	12/30	300	100	Yes
Chandler	Stellar Airpark	17/35	60	60	Yes
Colorado City	Colorado City Municipal	11/29	75	75	Yes
Coolidge	Coolidge Municipal	05/23	150	75	Yes
Cottonwood	Cottonwood	14/32	75	75	Yes
Douglas	Douglas Municipal	03/21	75	75	Yes
Eloy	Eloy Municipal	02/20	75	75	Yes
Grand Canyon	Grand Canyon Valle	01/19	45	45	Yes
Holbrook	Holbrook Municipal	03/21	75	75	Yes
Lake Havasu City	Lake Havasu City	14/32	100	75	Yes
Marana	Pinal Airpark	12/30	150	150	Yes
Nogales	Nogales International	03/21	90	100	No
Parker	Avi Suquilla	01/19	100	75	Yes
Payson	Payson	06/24	75	75	Yes
Peoria	Pleasant Valley	05C/23C	100	100	Yes
Safford	Safford Regional	12/30	100	75	Yes
Sedona	Sedona	03/21	100	75	Yes
Sierra Vista	Sierra Vista Municipal	08/26	150	150	Yes

Figure B-7: Primary Runway Width Compliance by Airport (Continued)

Associated City	Airport Name	Primary Runway	Primary Runway Width	ARC Objective Runway Width	Compliance
GA-Community: Objective - Consistent with ARC, Minimum B-II					
Springerville	Springerville Municipal	03/21	75	60	Yes
St Johns	St Johns Industrial Air Park	14/32	75	75	Yes
Taylor	Taylor	03/21	75	75	Yes
Wickenburg	Wickenburg Municipal	05/23	75	75	Yes
Willcox	Cochise County	03/21	75	75	Yes
Williams	H.A. Clark Memorial Field	18/36	100	75	Yes
Winslow	Winslow-Lindbergh Regional	04/22	150	100	Yes
GA-Rural: Objective - Consistent with ARC, Minimum B-I					
Ajo	Eric Marcus Municipal	12/30	60	60	Yes
Bisbee	Bisbee Municipal	17/35	75	60	Yes
Bullhead City	Sun Valley	18/36	42	75	No
Chinle	Chinle Municipal	18/36	60	75	No
Clifton/Morenci	Greenlee County	07/25	75	75	Yes
Douglas	Cochise College	05/23	72	75	No
Douglas Bisbee	Bisbee Douglas International	17/35	100	60	Yes
Gila Bend	Gila Bend Municipal	04/22	75	75	Yes
Globe	San Carlos Apache	09/27	100	100	Yes
Kayenta	Kayenta	05/23	75	75	Yes
Kearny	Kearny	08/26	60	60	Yes
Marble Canyon	Marble Canyon	03/21	35	35	Yes
Maricopa	Estrella Sailport	6R/24L	30	30	Yes
Peach Springs	Grand Canyon Caverns	05/23	45	45	Yes
Phoenix	Phoenix Regional	03/21	50	75	No
Polacca	Polacca	04/22	50	75	No
San Luis	Rolle Airfield	17/35	60	60	Yes
San Manuel	San Manuel/Ray/Blair	11/29	75	60	Yes
Seligman	Seligman	04/22	75	75	Yes
Temple Bar	Temple Bar	18/36	50	75	No
Tuba City	Tuba City	15/33	75	75	Yes
Tucson	La Cholla Airpark	01/19	44	44	Yes
Whiteriver	Whiteriver	01/19	75	75	Yes
Window Rock	Window Rock	02/20	75	60	Yes
GA-Basic: Objective - Consistent with ARC, Minimum A-I					
Aguila	Eagle Roost	17/35	40	40	Yes
Bagdad	Bagdad	05/23	60	60	Yes
Cibecue	Cibecue	07/25	100	75	Yes
Meadview	Pearce Ferry	01/19	90	60	Yes
Peach Springs	Hualapai	07/25	30	60	No
Rimrock	Rimrock	05/23	75	75	Yes
Sells	Sells	04/22	48	60	No
Superior	Superior Municipal	04/22	75	75	Yes
Tombstone	Tombstone Municipal	06/24	65	60	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	16/34	33	33	Yes

Source: *Airport Inventory & Data Survey* 2008

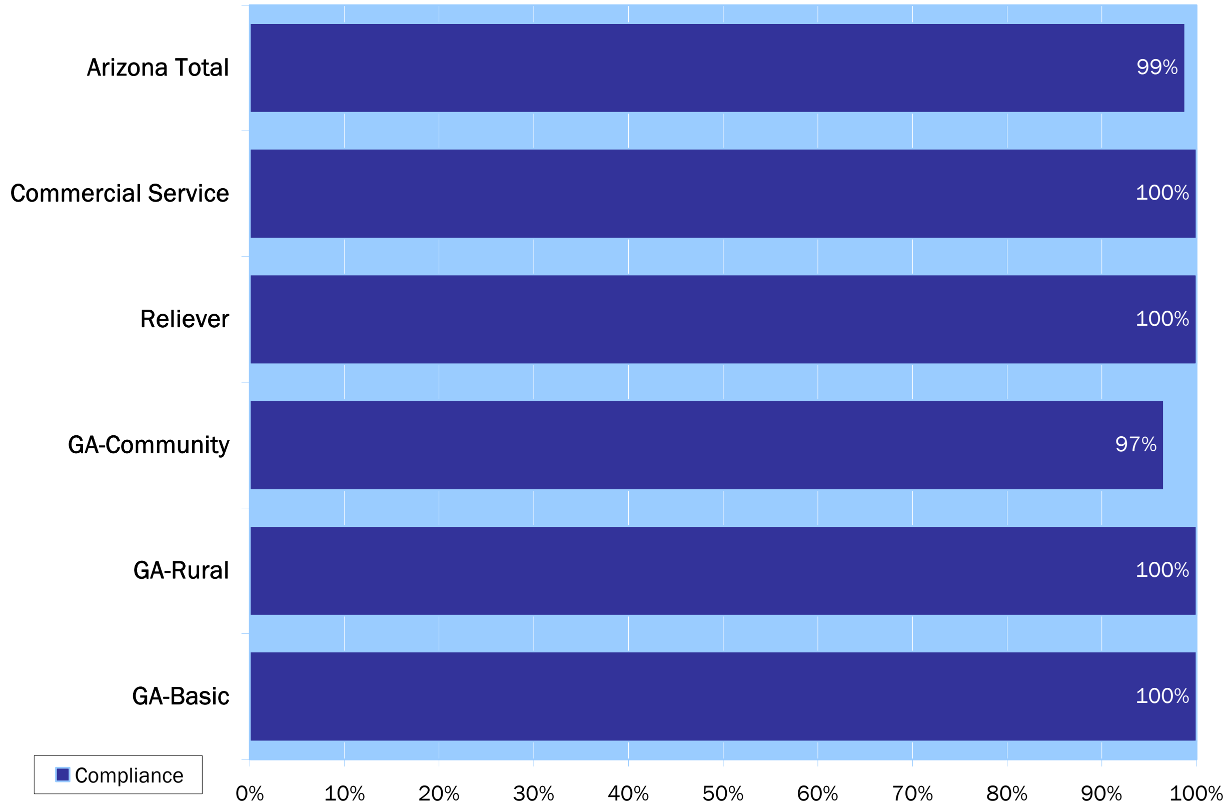
Primary Runway Surface

A runway's surface type is a major determinant of the types of aircraft that can land on it, weight capacity, and resistance to weathering. Runway surfaces range from turf and gravel to concrete and asphalt, the latter paved runways are required to land aircraft of any significant size.

Figure B-8 summarizes SASP airport roles in their compliance with primary runway surface objectives. Statewide, 99 percent of SASP airports are compliant with the runway surface objectives for their airport roles. GA-Community, at 97 percent compliance, is the only role that is not 100 percent compliant.

Figure B-9 details airport adequacy for this objective.

Figure B-8: Percentage of Airports by Role Meeting Primary Runway Surface Objectives



Source: *Airport Inventory & Data Survey* 2008

Figure B-9: Primary Runway Surface Compliance by Airport

Associated City	*Airport Name*	*Existing Runway Surface*	*Compliance*
Commercial Service: Objective - Asphalt/Paved			
Bullhead City	Laughlin/Bullhead International	Asphalt	Yes
Flagstaff	Flagstaff Pulliam	Asphalt	Yes
Grand Canyon	Grand Canyon National Park	Asphalt	Yes
Kingman	Kingman	Asphalt	Yes
Mesa	Phoenix-Mesa Gateway	Concrete	Yes
Page	Page	Asphalt	Yes
Peach Springs	Grand Canyon West	Asphalt	Yes
Phoenix	Phoenix Sky Harbor International	Concrete	Yes
Prescott	Ernest A. Love Field	Asphalt	Yes
Show Low	Show Low Regional	Asphalt	Yes
Tucson	Tucson International	Asphalt	Yes
Yuma	Yuma International Airport	Concrete	Yes
Reliever: Objective - Asphalt/Paved			
Chandler	Chandler Municipal	Asphalt	Yes
Glendale	Glendale Municipal	Asphalt	Yes
Goodyear	Phoenix Goodyear	Asphalt	Yes
Marana	Marana Regional	Asphalt	Yes
Mesa	Falcon Field	Asphalt	Yes
Phoenix	Phoenix Deer Valley	Asphalt	Yes
Scottsdale	Scottsdale	Asphalt	Yes
Tucson	Ryan Field	Asphalt	Yes
GA-Community: Objective - Asphalt/Paved			
Benson	Benson Municipal	Asphalt	Yes
Buckeye	Buckeye Municipal	Asphalt	Yes
Carefree	Sky Ranch at Carefree	Asphalt	Yes
Casa Grande	Casa Grande Municipal	Asphalt	Yes
Chandler	Memorial Airfield	Asphalt	Yes
Chandler	Stellar Airpark	Asphalt	Yes
Colorado City	Colorado City Municipal	Asphalt	Yes
Coolidge	Coolidge Municipal	Asphalt	Yes
Cottonwood	Cottonwood	Asphalt	Yes
Douglas	Douglas Municipal	Asphalt	Yes
Eloy	Eloy Municipal	Asphalt	Yes
Grand Canyon	Grand Canyon Valle	Asphalt	Yes
Holbrook	Holbrook Municipal	Asphalt	Yes
Lake Havasu City	Lake Havasu City	Asphalt	Yes
Marana	Pinal Airpark	Asphalt	Yes
Nogales	Nogales International	Asphalt	Yes
Parker	Avi Suquilla	Asphalt	Yes
Payson	Payson	Asphalt	Yes
Peoria	Pleasant Valley	Dirt	No
Safford	Safford Regional	Asphalt	Yes
Sedona	Sedona	Asphalt	Yes
Sierra Vista	Sierra Vista Municipal	Concrete	Yes

Figure B-9: Primary Runway Surface Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing Runway Surface*	*Compliance*
GA-Community: Objective - Asphalt/Paved			
Springerville	Springerville Municipal	Asphalt	Yes
St Johns	St Johns Industrial Air Park	Asphalt	Yes
Taylor	Taylor	Asphalt	Yes
Wickenburg	Wickenburg Municipal	Asphalt	Yes
Willcox	Cochise County	Asphalt	Yes
Williams	H.A. Clark Memorial Field	Asphalt	Yes
Winslow	Winslow-Lindbergh Regional	Asphalt	Yes
GA-Rural: Objective - Asphalt Desired; Unpaved			
Ajo	Eric Marcus Municipal	Asphalt	Yes
Bisbee	Bisbee Municipal	Asphalt	Yes
Bullhead City	Sun Valley	Asphalt	Yes
Chinle	Chinle Municipal	Asphalt	Yes
Clifton/Morenci	Greenlee County	Asphalt	Yes
Douglas	Cochise College	Asphalt	Yes
Douglas Bisbee	Bisbee Douglas International	Asphalt	Yes
Gila Bend	Gila Bend Municipal	Asphalt	Yes
Globe	San Carlos Apache	Asphalt	Yes
Kayenta	Kayenta	Asphalt	Yes
Kearny	Kearny	Concrete	Yes
Marble Canyon	Marble Canyon	Asphalt	Yes
Maricopa	Estrella Sailport	Asphalt	Yes
Peach Springs	Grand Canyon Caverns	Gravel	Yes
Phoenix	Phoenix Regional	Asphalt	Yes
Polacca	Polacca	Asphalt	Yes
San Luis	Rolle Airfield	Asphalt	Yes
San Manuel	San Manuel/Ray/Blair	Asphalt	Yes
Seligman	Seligman	Asphalt	Yes
Temple Bar	Temple Bar	Asphalt	Yes
Tuba City	Tuba City	Asphalt	Yes
Tucson	La Cholla Airpark	Asphalt	Yes
Whiteriver	Whiteriver	Asphalt	Yes
Window Rock	Window Rock	Asphalt	Yes
GA-Basic: Objective - Gravel/Dirt			
Aguila	Eagle Roost	Asphalt	Yes
Bagdad	Bagdad	Asphalt	Yes
Cibecue	Cibecue	Gravel	Yes
Meadview	Pearce Ferry	Dirt	Yes
Peach Springs	Hualapai	Asphalt	Yes
Rimrock	Rimrock	Asphalt	Yes
Sells	Sells	Asphalt	Yes
Superior	Superior Municipal	Dirt	Yes
Tombstone	Tombstone Municipal	Asphalt	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	Chip & Seal/Dirt	Yes

Source: *Airport Inventory & Data Survey* 2008

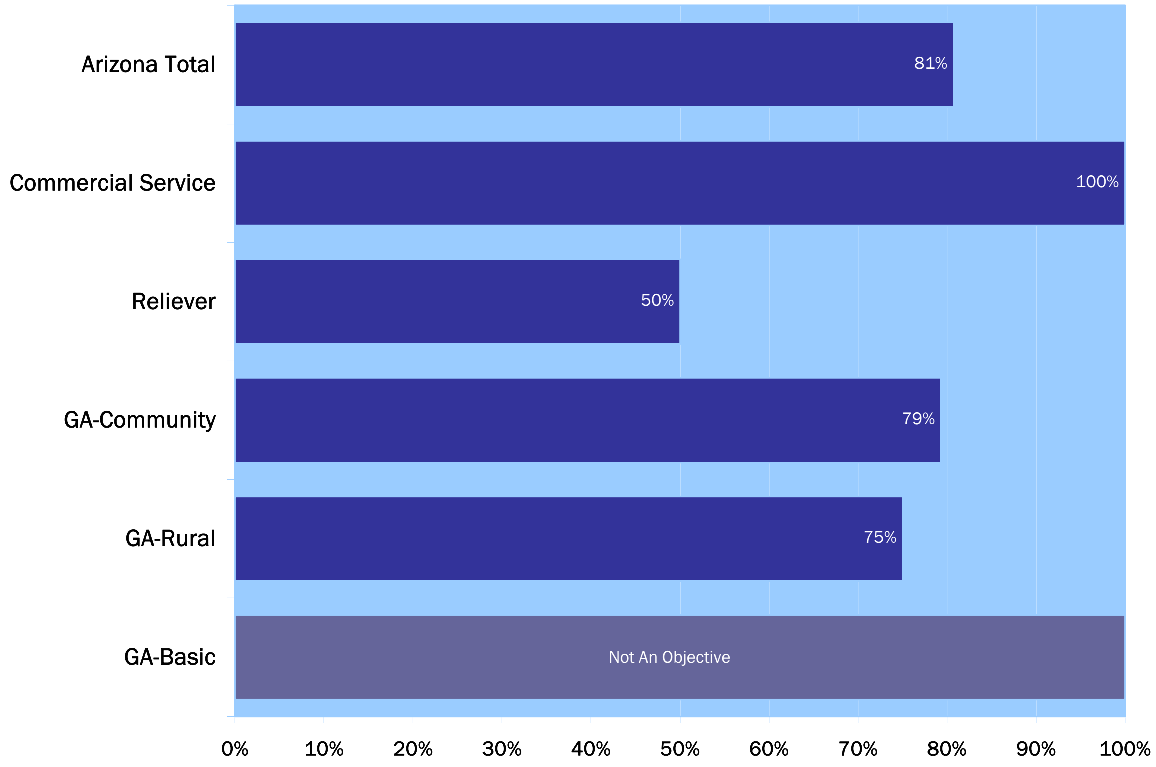
Taxiway

Taxiways are constructed to facilitate aircraft movements to and from the runway system. Strategically placed taxiway exits permit aircraft to clear the runway after landing and significantly increase the runway capacity. Some taxiways are necessary simply to provide access between the apron and runway, whereas other taxiways become needed as activity increases and safer and more efficient use of the airfield is required. Objectives were developed in the SASP for both taxiway type and width. Based on input from ADOT, the five airport roles have the following taxiway objectives:

- Commercial Service: Full parallel taxiway, with width consistent with airport master plan
- Reliever: Full parallel taxiway, with width consistent with ARC
- GA-Community: Full or partial parallel taxiway, with width consistent with ARC
- GA-Rural: Full or partial parallel taxiway, connectors, or turnarounds; width per ARC where applicable
- GA-Basic: Not an objective

Figure B-10 reveals that 100 percent of Commercial Service, 50 percent of Reliever, 79 percent of GA-Community, and 75 percent of GA-Rural airports currently meet their taxiway objectives. Eighty-one percent of all system airports now meet the system plan's taxiway objective.

Figure B-10: Percentage of Airports by Role Meeting Taxiway Objectives



Source: *Airport Inventory & Data Survey* 2008

The current and objective taxiway types and widths for each system airport are presented in **Figure B-11**. Airports must meet both their taxiway type and width objectives in order to be compliant. As shown, all Reliever airports meet their taxiway type objective, but half fall short of their width objectives, which are determined by their ARC.

Figure B-11: Taxiway Type and Width Compliance by Airport

Associated City	*Airport Name*	*Existing Taxiway Type*	*Existing Taxiway Width*	*Objective Taxiway Width*	*Full Taxiway Compliance*
Commercial Service: Objective - Consistent with Master Plan (Full Parallel)					
Bullhead City	Laughlin/Bullhead Intl	Full Parallel	75	75	Yes
Flagstaff	Flagstaff Pulliam	Full Parallel	50	50	Yes
Grand Canyon	Grand Canyon National Park	Full Parallel	75	50	Yes
Kingman	Kingman	Full Parallel	75	75	Yes
Mesa	Phoenix-Mesa Gateway	Partial Parallel	75	75	Yes*
Page	Page	Full Parallel	40	40	Yes
Peach Springs	Grand Canyon West	Full (under constr.)	40	50	Yes
Phoenix	Phoenix Sky Harbor Intl	Full Parallel	75	75	Yes
Prescott	Ernest A. Love Field	Full Parallel	50	75	Yes
Show Low	Show Low Regional	Full Parallel	50	50	Yes
Tucson	Tucson International	Full Parallel	60	75	Yes
Yuma	Yuma International	Full Parallel	75	75	Yes
Reliever: Objective - Full Parallel; width per ARC					
Chandler	Chandler Municipal	Full Parallel	40	50	No
Glendale	Glendale Municipal	Full Parallel	35	50	No
Goodyear	Phoenix Goodyear	Full Parallel	75	75	Yes
Marana	Marana Regional	Full Parallel	50	50	Yes
Mesa	Falcon Field	Full Parallel	50	50	Yes
Phoenix	Phoenix Deer Valley	Full Parallel	75	50	Yes
Scottsdale	Scottsdale	Full Parallel	40	50	No
Tucson	Ryan Field	Full Parallel	45	50	No
GA-Community: Objective - Full or Partial Parallel; width per ARC					
Benson	Benson Municipal	Full Parallel	50	35	Yes
Buckeye	Buckeye Municipal	Full Parallel	40	35	Yes
Carefree	Sky Ranch at Carefree	Full Parallel	30	35	No
Casa Grande	Casa Grande Municipal	Full Parallel	40	35	Yes
Chandler	Memorial Airfield	Full Parallel	50	35	No
Chandler	Stellar Airpark	Full Parallel	40	35	Yes
Colorado City	Colorado City Municipal	Partial Parallel	35	35	Yes
Coolidge	Coolidge Municipal	Stub	40	35	No
Cottonwood	Cottonwood	Full Parallel	40	35	Yes
Douglas	Douglas Municipal	Partial Parallel	35	35	Yes
Eloy	Eloy Municipal	Full Parallel	40	35	Yes
Grand Canyon	Grand Canyon Valle	Stub	28	35	No
Holbrook	Holbrook Municipal	Full Parallel	35	35	Yes
Lake Havasu City	Lake Havasu City	Full Parallel (TW 'A')	50	35	Yes
Marana	Pinal Airpark	Full Parallel	150	75	Yes
Nogales	Nogales International	Full Parallel	52	35	Yes
Parker	Avi Suquilla	Partial Parallel	75	35	Yes
Payson	Payson	Full Parallel	35	35	Yes
Peoria	Pleasant Valley	None	NA	35	No
Safford	Safford Regional	Full Parallel	35	35	Yes
Sedona	Sedona	Partial Parallel	35	35	Yes
Sierra Vista	Sierra Vista Municipal/LAA	Full Parallel	85	75	Yes

Figure B-11: Taxiway Type and Width Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing Taxiway Type*	*Existing Taxiway Width*	*Objective Taxiway Width*	*Full Taxiway Compliance*
GA-Community: Objective - Full or Partial Parallel; width per ARC					
Springerville	Springerville Municipal	Full Parallel	30	35	No
St Johns	St Johns Industrial Air Park	Full Parallel	40	35	Yes
Taylor	Taylor	Partial Parallel	35	35	Yes
Wickenburg	Wickenburg Municipal	Full Parallel	34.5	35	No
Willcox	Cochise County	Full Parallel (part gravel)	35	35	Yes
Williams	H.A. Clark Memorial Field	Full Parallel	50	35	Yes
Winslow	Winslow-Lindbergh Regional	Full Parallel	40	35	Yes
GA-Rural: Objective - Full or Partial Parallel, Connectors, or Turnarounds; width per ARC where applicable					
Ajo	Eric Marcus Municipal	Stub	30	25	Yes
Bisbee	Bisbee Municipal	Full Parallel	35	25	Yes
Bullhead City	Sun Valley	Full Parallel	20	25	No
Chinle	Chinle Municipal	Turnaround	NA	25	Yes
Clifton/Morenci	Greenlee County	Full Parallel (12/08)	35	35	Yes
Douglas	Cochise College	Full Parallel	25	25	Yes
Douglas Bisbee	Bisbee Douglas International	Partial Parallel	35	25	Yes
Gila Bend	Gila Bend Municipal	Full Parallel	40	35	Yes
Globe	San Carlos Apache	Full Parallel	35	35	Yes
Kayenta	Kayenta	None	NA	35	No
Kearny	Kearny	Turnarounds	0	25	Yes
Marble Canyon	Marble Canyon	Stub	20	20	Yes
Maricopa	Estrella Sailport	None	NA	NA	No
Peach Springs	Grand Canyon Caverns	Partial Parallel	20	20	Yes
Phoenix	Phoenix Regional	Full Parallel	25	25	Yes
Polacca	Polacca	None	NA	35	No
San Luis	Rolle Airfield	Turnaround	0	25	Yes
San Manuel	San Manuel/Ray/Blair	Partial Parallel	50	25	Yes
Seligman	Seligman	Full Parallel	35	25	Yes
Temple Bar	Temple Bar	Turnarounds	0	25	Yes
Tuba City	Tuba City	None	NA	25	No
Tucson	La Cholla Airpark	Full Parallel	18	18	Yes
Whiteriver	Whiteriver	Partial Parallel	35	35	Yes
Window Rock	Window Rock	None	NA	25	No
GA-Basic: Not an Objective					
Aguila	Eagle Roost	Turnaround	33	25	Yes
Bagdad	Bagdad	None	NA	25	Yes
Cibecue	Cibecue	None	NA	35	Yes
Meadview	Pearce Ferry	None	NA	25	Yes
Peach Springs	Hualapai	None	NA	NA	Yes
Rimrock	Rimrock	None	NA	25	Yes
Sells	Sells	Turnaround	35	35	Yes
Superior	Superior Municipal	None	NA	25	Yes
Tombstone	Tombstone Municipal	None	NA	25	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	None	NA	25	Yes

Source: *Airport Inventory & Data Survey* 2008
Notes: NA=Not Applicable, *Commercial Service objectives are "ultimate" goal from master plans. Not meeting this goal does not cause noncompliance.

APPROACH

Precision approach systems provide electronic horizontal and vertical information to aircraft during their approach to and landing at an airport. These systems allow aircraft to locate an airport and land on a specific runway during periods of reduced visibility and/or inclement weather. Operators of the most demanding general aviation aircraft, including business aircraft, typically prefer to operate at airports with precision approaches, in part due to their reliability during periods of inclement weather. Additionally, a precision approach minimizes the time that airports are closed because of poor visibility. This reduces delays, rerouting of aircraft, and ground travel times associated with not being able to access the most convenient airport.

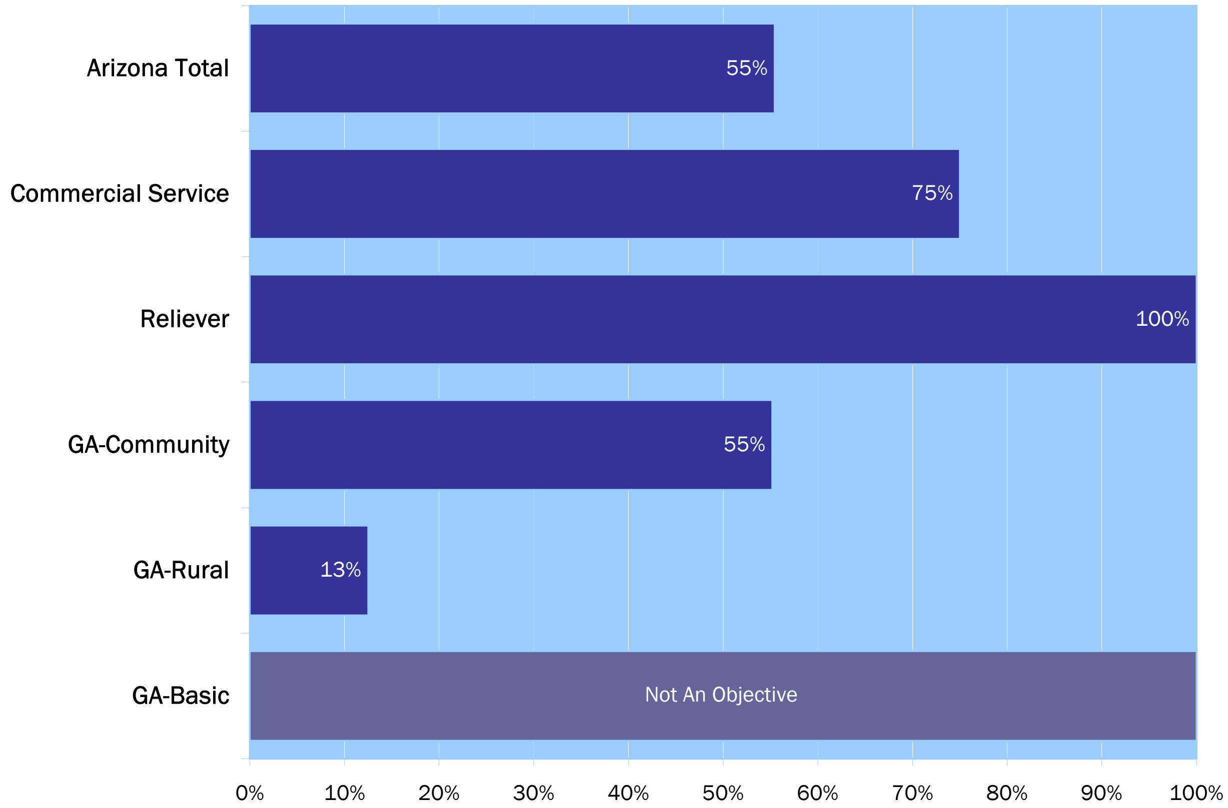
Similar to precision approaches, non-precision approaches provide electronic information to aircraft during their approach to and landing at an airport. In general, non-precision approach systems provide horizontal guidance with relation to a specific runway at an airport. Some of these systems do provide vertical guidance or glide slope information to aircraft although most do not. While not as advanced or expensive to install and maintain as precision approaches, non-precision approaches support airport operations during periods of reduced visibility and inclement weather when visual approaches are not possible. Non-precision approaches also provide additional reliability to aircraft operators.

Airports were evaluated based on the type of the most demanding approach available/published. The following categories were used:

- Precision Approach
- Near-Precision Approach
- Non-Precision Approach
- Visual Approach

As shown in Figure B-12, only 55 percent of system airports currently meet their approach type objective. By role, 75 percent of Commercial Service, 100 percent of Reliever, 55 percent of GA-Community, and 13 percent of GA-Rural airports meet their objectives. A published approach is not an objective at GA-Basic Airports.

Figure B-12: Percentage of Airports by Role Meeting Approach Type Objectives



Source: FAA Approach Plates

Figure B-13 lists the Arizona airports that currently report having an instrument approach to at least one end of their primary runway and whether or not system airports meet their objectives.

Figure B-13: Approach Type Compliance by Airport

Associated City	*Airport Name*	*Existing Approach Capability*	*Compliance*
Commercial Service: Objective - Precision Desired; Near Precision Minimum			
Bullhead City	Laughlin/Bullhead International	Near-Precision	Yes
Flagstaff	Flagstaff Pulliam	Precision	Yes
Grand Canyon	Grand Canyon National Park	Precision	Yes
Kingman	Kingman	Non-Precision	No
Mesa	Phoenix-Mesa Gateway	Precision	Yes
Page	Page	Near-Precision	Yes
Peach Springs	Grand Canyon West	Visual	No
Phoenix	Phoenix Sky Harbor International	Precision	Yes
Prescott	Ernest A. Love Field	Precision	Yes
Show Low	Show Low Regional	Non-Precision	No
Tucson	Tucson International	Precision	Yes
Yuma	Yuma International Airport	Precision	Yes
Reliever: Objective - Near-Precision Desired; Non-Precision Minimum			
Chandler	Chandler Municipal	Non-Precision	Yes
Glendale	Glendale Municipal	Near-Precision	Yes
Goodyear	Phoenix Goodyear	Non-Precision	Yes
Marana	Marana Regional	Non-Precision	Yes
Mesa	Falcon Field	Non-Precision	Yes
Phoenix	Phoenix Deer Valley	Near-Precision	Yes
Scottsdale	Scottsdale	Non-Precision	Yes
Tucson	Ryan Field	Precision	Yes
GA-Community: - Objective - Non-Precision			
Benson	Benson Municipal	Visual	No
Buckeye	Buckeye Municipal	Visual	No
Carefree	Sky Ranch at Carefree	Visual	No
Casa Grande	Casa Grande Municipal	Precision	Yes
Chandler	Memorial Airfield	Visual	No
Chandler	Stellar Airpark	Non-Precision	Yes
Colorado City	Colorado City Municipal	Non-Precision	Yes
Coolidge	Coolidge Municipal	Non-Precision	Yes
Cottonwood	Cottonwood	Visual	No
Douglas	Douglas Municipal	Visual	No
Eloy	Eloy Municipal	Visual	No
Grand Canyon	Grand Canyon Valle	Non-Precision	Yes
Holbrook	Holbrook Municipal	Visual	No
Lake Havasu City	Lake Havasu City	Non-Precision	Yes
Marana	Pinal Airpark	Visual	No
Nogales	Nogales International	Non-Precision	Yes
Parker	Avi Suquilla	Non-Precision	Yes
Payson	Payson	Non-Precision	Yes
Peoria	Pleasant Valley	Visual	No
Safford	Safford Regional	Non-Precision	Yes
Sedona	Sedona	Non-Precision	Yes
Sierra Vista	Sierra Vista Municipal	Precision	Yes
Springerville	Springerville Municipal	Non-Precision	Yes
St Johns	St Johns Industrial Air Park	Non-Precision	Yes

Figure B-13: Approach Type Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing Approach Capability*	*Compliance*
GA-Community: - Objective - Non-Precision			
Taylor	Taylor	Non-Precision	Yes
Wickenburg	Wickenburg Municipal	Visual	No
Willcox	Cochise County	Non-Precision	Yes
Williams	H.A. Clark Memorial Field	Visual	No
Winslow	Winslow-Lindbergh Regional	Non-Precision	Yes
GA-Rural: Objective - Non-Precision			
Ajo	Eric Marcus Municipal	Visual	No
Bisbee	Bisbee Municipal	Visual	No
Bullhead City	Sun Valley	Visual	No
Chinle	Chinle Municipal	Visual	No
Clifton/Morenci	Greenlee County	Visual	No
Douglas	Cochise College	Visual	No
Douglas Bisbee	Bisbee Douglas International	Non-Precision	Yes
Gila Bend	Gila Bend Municipal	Visual	No
Globe	San Carlos Apache	Non-Precision	Yes
Kayenta	Kayenta	Visual	No
Kearny	Kearny	Visual	No
Marble Canyon	Marble Canyon	Visual	No
Maricopa	Estrella Sailport	Visual	No
Peach Springs	Grand Canyon Caverns	Visual	No
Phoenix	Phoenix Regional	Visual	No
Polacca	Polacca	Visual	No
San Luis	Rolle Airfield	Visual	No
San Manuel	San Manuel/Ray/Blair	Visual	No
Seligman	Seligman	Visual	No
Temple Bar	Temple Bar	Visual	No
Tuba City	Tuba City	Visual	No
Tucson	La Cholla Airpark	Visual	No
Whiteriver	Whiteriver	Visual	No
Window Rock	Window Rock	Non-Precision	Yes
GA-Basic: Not an Objective			
Aguila	Eagle Roost	Visual	NA
Bagdad	Bagdad	Visual	NA
Cibecue	Cibecue	Visual	NA
Meadview	Pearce Ferry	Visual	NA
Peach Springs	Hualapai	Visual	NA
Rimrock	Rimrock	Visual	NA
Sells	Sells	Visual	NA
Superior	Superior Municipal	Visual	NA
Tombstone	Tombstone Municipal	Visual	NA
Whitmore	Grand Canyon Bar Ten Airstrip	Visual	NA

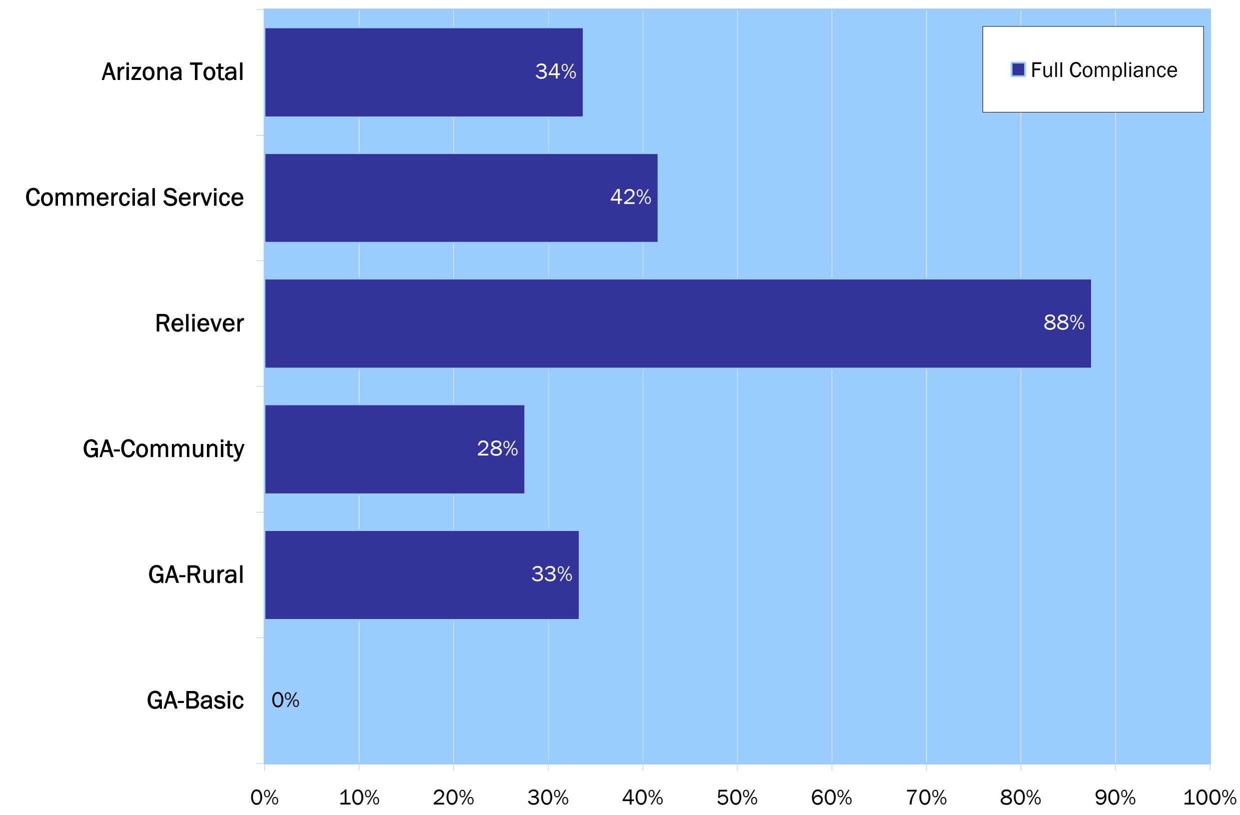
Source: FAA Approach Plates

Visual Aids

Various visual aids provide navigational assistance to aircraft arriving and departing Arizona's airports. Further, visual aids provide support to non-precision and precision approach aids. Visual aids required at Arizona airports include rotating beacons, wind indicators, segmented circles, Runway End Identifier Lights (REILs) on both runway ends, and a Visual Glide Slope Indicator such as Visual Approach Slope Indicators (VASIs), or Precision Approach Path Indicators (PAPIs), or Pulse Light Approach Slope Indicator (PLASI) on both runway ends.

As shown in **Figure B-14,** 35 percent of all system airports currently meet the visual aids objectives benchmark. By role, 42 percent of Commercial Service, 88 percent of Reliever, 28 percent of GA-Community, 33 percent of GA-Rural, and zero percent of GA-Basic airports meet all of their visual aid objectives.

Figure B-14: Percentage of Airports by Role Meeting Visual Aid Objectives



Source: *Airport Inventory & Data Survey* 2008

Figure B-15 presents which airports currently meet their objectives for visual aids. Notably, if an airport does not meet all of its visual aid objectives it is recognized as not meeting the benchmark in totality.

Figure B-15: Visual Aid Compliance by Airport

Associated City	*Airport Name*	*Existing Visual Aids*	*Compliance*
Commercial Service: Objective - Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI			
Bullhead City	Laughlin/Bullhead Intl	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Flagstaff	Flagstaff Pulliam	Rotating Beacon, Lighted Wind Cone, PAPIs	No
Grand Canyon	Grand Canyon National Park	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REIL, VASI	No
Kingman	Kingman	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Mesa	Phoenix-Mesa Gateway	Rotating Beacon, Lighted Wind Cone, Segmented Circle	No
Page	Page	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VASIs	Yes
Peach Springs	Grand Canyon West	Wind Sock, Segmented Circle	No
Phoenix	Phoenix Sky Harbor Intl	Rotating Beacon, Lighted Wind Cone, REIL, PAPIs	No
Prescott	Ernest A. Love Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Show Low	Show Low Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Tucson	Tucson International	Rotating Beacon, Lighted Wind Cone, REIL, PAPIs	No
Yuma	Yuma International	Rotating Beacon, Lighted Wind Cone, PAPIs	No
Reliever: Objective - Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI			
Chandler	Chandler Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Glendale	Glendale Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Goodyear	Phoenix Goodyear	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Marana	Marana Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Mesa	Falcon Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Phoenix	Phoenix Deer Valley	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Scottsdale	Scottsdale	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Tucson	Ryan Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REIL, VASI	No
GA-Community: Objective - Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI			
Benson	Benson Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Buckeye	Buckeye Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	No
Carefree	Sky Ranch at Carefree	Lighted Wind Cone, REILs, PLASIs	No
Casa Grande	Casa Grande Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VASIs	No
Chandler	Memorial Airfield	Wind Sock	No
Chandler	Stellar Airpark	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VASI	No
Colorado City	Colorado City Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Coolidge	Coolidge Municipal	Rotating Beacon, Wind Sock, Segmented Circle, PAPIs	No
Cottonwood	Cottonwood	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REIL, PAPI	No
Douglas	Douglas Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	No
Eloy	Eloy Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle	No
Grand Canyon	Grand Canyon Valle	Rotating Beacon, Wind Sock, Segmented Circle, REILs, VASIs	No
Holbrook	Holbrook Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Lake Havasu City	Lake Havasu City	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Marana	Pinal Airpark	Rotating Beacon, Lighted Wind Cone, Segmented Circle	No
Nogales	Nogales International	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPI	No
Parker	Avi Suquilla	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Payson	Payson	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPI	No
Peoria	Pleasant Valley	Wind Sock, Segmented Circle	No
Safford	Safford Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VASIs	No
Sedona	Sedona	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Sierra Vista	Sierra Vista Municipal	Rotating Beacon, Lighted Wind Cone, PAPIs	No
Springerville	Springerville Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	No

Figure B-15: Visual Aid Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing Visual Aids*	*Compliance*
GA-Community: Objective - Rotating Beacon, Lighted Wind Cone/Segmented Circle, REILs, VGSI			
St Johns	St Johns Industrial Air Park	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REIL, PAPIs	No
Taylor	Taylor	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Wickenburg	Wickenburg Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Willcox	Cochise County	Rotating Beacon, Lighted Wind Cone, Segmented Circle	No
Williams	H.A. Clark Memorial Field	Rotating Beacon, Wind Sock, Segmented Circle, REILs, PAPIs	No
Winslow	Winslow-Lindbergh Regional	Rotating Beacon, Wind Sock, Segmented Circle, REIL, VASI	No
GA-Rural: Objective - Rotating Beacon, Wind Cone/Segmented Circle, VGSI			
Ajo	Eric Marcus Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	Yes
Bisbee	Bisbee Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle	No
Bullhead City	Sun Valley	Wind Sock, Segmented Circle	No
Chinle	Chinle Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Clifton/Morenci	Greenlee County	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	Yes
Douglas	Cochise College	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	Yes
Douglas Bisbee	Bisbee Douglas Intl	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VASIs	Yes
Gila Bend	Gila Bend Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, PAPIs	Yes
Globe	San Carlos Apache	Rotating Beacon, Wind Sock, Segmented Circle, REILs, PAPIs	No
Kayenta	Kayenta	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VASI	No
Kearny	Kearny	Wind Sock	No
Marble Canyon	Marble Canyon	Wind Sock, Segmented Circle	No
Maricopa	Estrella Sailport	Wind Sock, Segmented Circle	No
Peach Springs	Grand Canyon Caverns	Wind Sock	No
Phoenix	Phoenix Regional	Wind Sock	No
Polacca	Polacca	Wind Sock	No
San Luis	Rolle Airfield	Wind Sock, Segmented Circle	No
San Manuel	San Manuel/Ray/Blair	Wind Sock, Segmented Circle	No
Seligman	Seligman	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Temple Bar	Temple Bar	Wind Sock, Segmented Circle	No
Tuba City	Tuba City	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, PAPIs	Yes
Tucson	La Cholla Airpark	Lighted Wind Cone, VASI	No
Whiteriver	Whiteriver	Rotating Beacon, Wind Sock, Segmented Circle, REILs, PAPI	No
Window Rock	Window Rock	Rotating Beacon, Lighted Wind Cone, REIL, PAPI	No
GA-Basic: Objective - Rotating Beacon, Wind Sock			
Aguila	Eagle Roost	Lighted Wind Cone	No
Bagdad	Bagdad	Wind Cone	No
Cibecue	Cibecue	Wind Sock	No
Meadview	Pearce Ferry	Wind Sock, Segmented Circle	No
Peach Springs	Hualapai	Wind Sock	No
Rimrock	Rimrock	Wind Sock, REIL, VASI	No
Sells	Sells	Wind Sock	No
Superior	Superior Municipal	Wind Sock	No
Tombstone	Tombstone Municipal	Wind Sock, VASI	No
Whitmore	Grand Canyon Bar Ten Airstrip	Wind Sock	No

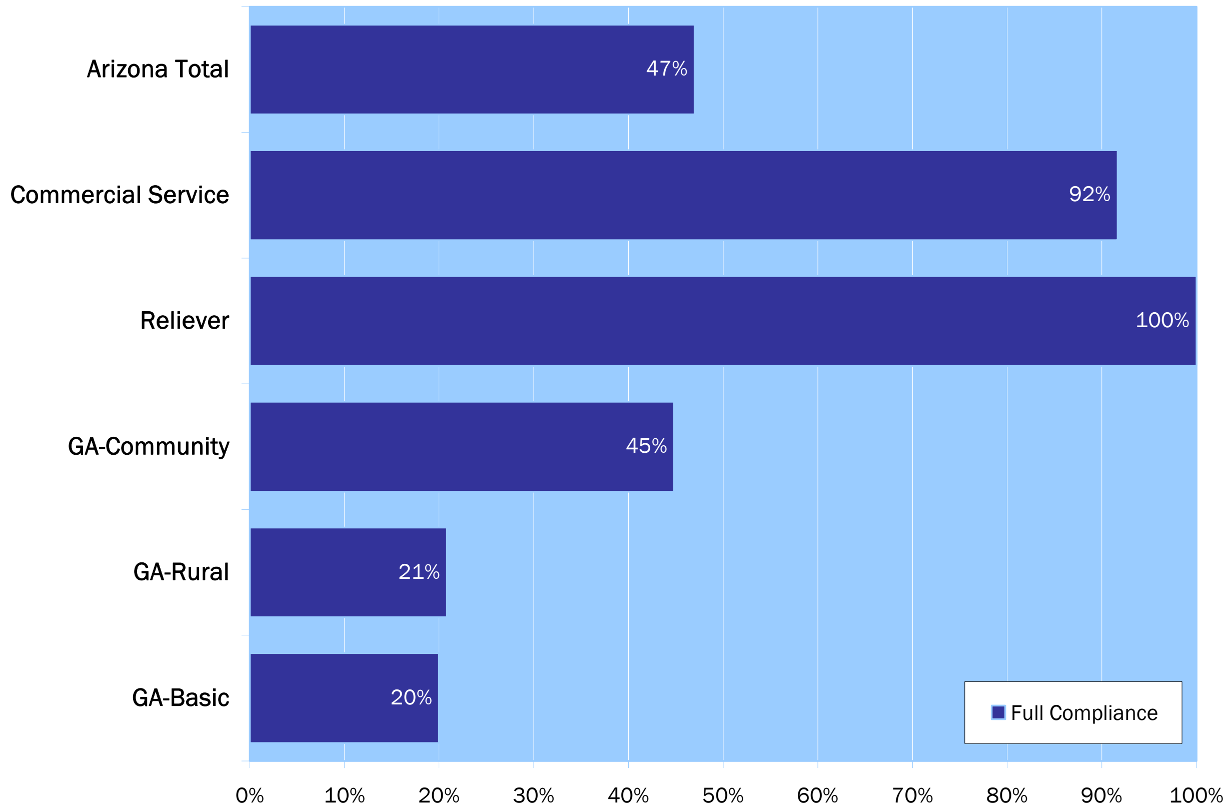
Source: *Airport Inventory & Data Survey* 2008

Lighting

Runway lights are used to outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity or brightness they are capable of producing: High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), Low Intensity Runway Lights (LIRL), and reflectors. Taxiway lights are named the same way: high (HITL), medium (MITL), and low (LITL). At smaller airports, runway reflectors are often acceptable. It should be noted that in order to meet this benchmark, airports must meet both their runway and taxiway lighting objectives.

As shown in **Figure B-16**, 47 percent of all airports included in the SASP meet their lighting objectives. This includes 92 percent of Commercial Service and 100 percent of Reliever airports. In addition, 45 percent of GA-Community, 21 percent of GA-Rural and 20 percent of GA-Basic airports meet their objectives.

Figure B-16: Percentage of Airports by Role Meeting Runway and Taxiway Lighting Objectives



Source: *Airport Inventory & Data Survey* 2008

Figure B-17 indicates which airports are currently meeting their respective lighting objectives.

Figure B-17: Runway and Taxiway Lighting Compliance by Airport

Associated City	*Airport Name*	*Existing Runway Lighting*	*Existing Taxiway Lighting*	*Full Compliance*
Commercial Service: Objective - HIRL/HITL (MIRL/MITL Minimum)				
Bullhead City	Laughlin/Bullhead International	MIRL	MITL	Yes
Flagstaff	Flagstaff Pulliam	HIRL	MITL	Yes
Grand Canyon	Grand Canyon National Park	MIRL	MITL	Yes
Kingman	Kingman	MIRL	MITL	Yes
Mesa	Phoenix-Mesa Gateway	MIRL	MITL	Yes
Page	Page	MIRL	MITL	Yes
Peach Springs	Grand Canyon West	None	None	No
Phoenix	Phoenix Sky Harbor International	HIRL	MITL	Yes
Prescott	Ernest A. Love Field	MIRL	MITL	Yes
Show Low	Show Low Regional	MIRL	MITL	Yes
Tucson	Tucson International	HIRL	MITL	Yes
Yuma	Yuma International Airport	HIRL	MITL	Yes
Reliever: Objective - MIRL/MITL				
Chandler	Chandler Municipal	MIRL	MITL	Yes
Glendale	Glendale Municipal	MIRL	MITL	Yes
Goodyear	Phoenix Goodyear	MIRL	MITL	Yes
Marana	Marana Regional	MIRL	MITL	Yes
Mesa	Falcon Field	MIRL	MITL	Yes
Phoenix	Phoenix Deer Valley	MIRL	MITL	Yes
Scottsdale	Scottsdale	MIRL	MITL	Yes
Tucson	Ryan Field	MIRL	MITL	Yes
GA-Community: Objective - MIRL/MITL				
Benson	Benson Municipal	HIRL	MITL	Yes
Buckeye	Buckeye Municipal	MIRL	MITL	Yes
Carefree	Sky Ranch at Carefree	LIRL	None	No
Casa Grande	Casa Grande Municipal	MIRL	MITL	Yes
Chandler	Memorial Airfield	None	None	No
Chandler	Stellar Airpark	MIRL	Reflectors	No
Colorado City	Colorado City Municipal	MIRL	Reflectors	No
Coolidge	Coolidge Municipal	MIRL	MITL	Yes
Cottonwood	Cottonwood	MIRL	None	No
Douglas	Douglas Municipal	MIRL	MITL	Yes
Eloy	Eloy Municipal	MIRL	None	No
Grand Canyon	Grand Canyon Valle	MIRL	None	No
Holbrook	Holbrook Municipal	MIRL	MITL	Yes
Lake Havasu City	Lake Havasu City	MIRL	MITL	Yes
Marana	Pinal Airpark	MIRL	Reflectors	No
Nogales	Nogales International	MIRL	MITL	Yes
Parker	Avi Suquilla	MIRL	MITL	Yes
Payson	Payson	MIRL	Reflectors	No
Peoria	Pleasant Valley	None	None	No
Safford	Safford Regional	MIRL	MITL	Yes
Sedona	Sedona	MIRL	MITL	Yes
Sierra Vista	Sierra Vista Municipal	HIRL	MITL	Yes

Figure B-17: Runway and Taxiway Lighting Compliance by Airport (Continued)

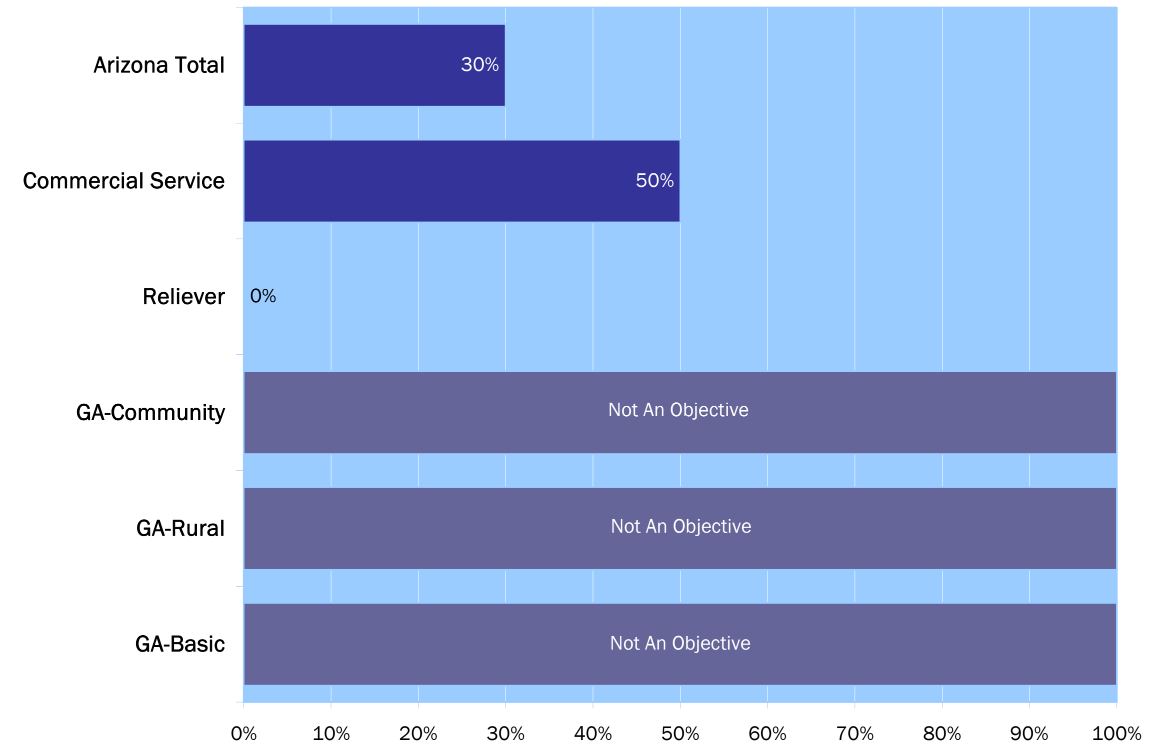
Associated City	*Airport Name*	*Existing Runway Lighting*	*Existing Taxiway Lighting*	*Full Compliance*
GA-Community: Objective - MIRL/MITL				
Springerville	Springerville Municipal	MIRL	Reflectors	No
St Johns	St Johns Industrial Air Park	MIRL	Reflectors	No
Taylor	Taylor	MIRL	Reflectors	No
Wickenburg	Wickenburg Municipal	MIRL	MITL	Yes
Willcox	Cochise County	MIRL	Reflectors	No
Williams	H.A. Clark Memorial Field	MIRL	None	No
Winslow	Winslow-Lindbergh Regional	MIRL	None	No
GA-Rural: Community - MIRL/MITL				
Ajo	Eric Marcus Municipal	LIRL	NA	No
Bisbee	Bisbee Municipal	MIRL	MITL	Yes
Bullhead City	Sun Valley	LIRL	None	No
Chinle	Chinle Municipal	MIRL	MITL	Yes
Clifton/Morenci	Greenlee County	MIRL	Reflectors	No
Douglas	Cochise College	LIRL	LITL	No
Douglas Bisbee	Bisbee Douglas International	MIRL	MITL	Yes
Gila Bend	Gila Bend Municipal	MIRL	MITL	Yes
Globe	San Carlos Apache	HIRL	None	No
Kayenta	Kayenta	MIRL	NA	No
Kearny	Kearny	None	None	No
Marble Canyon	Marble Canyon	None	None	No
Maricopa	Estrella Sailport	None	None	No
Peach Springs	Grand Canyon Caverns	None	None	No
Phoenix	Phoenix Regional	None	None	No
Polacca	Polacca	LIRL	NA	No
San Luis	Rolle Airfield	None	None	No
San Manuel	San Manuel/Ray/Blair	None	None	No
Seligman	Seligman	MIRL	MITL	Yes
Temple Bar	Temple Bar	None	None	No
Tuba City	Tuba City	MIRL	NA	No
Tucson	La Cholla Airpark	LIRL	Reflectors	No
Whiteriver	Whiteriver	MIRL	None	No
Window Rock	Window Rock	MIRL	NA	No
GA-Basic: Community - LIRL or Reflectors				
Aguila	Eagle Roost	LIRL	None	Yes
Bagdad	Bagdad	None	None	No
Cibecue	Cibecue	None	NA	No
Meadview	Pearce Ferry	None	None	No
Peach Springs	Hualapai	None	NA	No
Rimrock	Rimrock	LIRL	NA	Yes
Sells	Sells	None	None	No
Superior	Superior Municipal	None	None	No
Tombstone	Tombstone Municipal	None	None	No
Whitmore	Grand Canyon Bar Ten Airstrip	None	None	No

Source: *Airport Inventory & Data Survey* 2008
Note: NA=not applicable

Approach Lighting Systems

Much like visual aids, an approach lighting system (ALS) provides navigational assistance to aircraft arriving at and departing from Arizona's system airports. Figure B-18 summarizes the percentage of airports in each role that meet this objective. An ALS is only a requirement for Commercial Service airports and a suggestion for Reliever airports. It is not an objective for the other general aviation airports. Only 30 percent of airports for which it is a suggestion at a minimum have an ALS. Fifty percent of Commercial Service and no Reliever airports currently have an ALS.

Figure B-18: Percentage of Airports by Role Meeting ALS Objectives



Source: *Airport Inventory & Data Survey 2008*

Figure B-19 details the results of this analysis at Commercial Service and Reliever airports.

Figure B-19: Approach Lighting System Compliance by Airport

Associated City	*Airport Name*	*Existing ALS*	*Compliance*
Commercial Service: Objective - ALS			
Bullhead City	Laughlin/Bullhead International	None	No
Flagstaff	Flagstaff Pulliam	ALS	Yes
Grand Canyon	Grand Canyon National Park	ALS	Yes
Kingman	Kingman	None	No
Mesa	Phoenix-Mesa Gateway	None	No
Page	Page	None	No
Peach Springs	Grand Canyon West	None	No
Phoenix	Phoenix Sky Harbor International	ALS	Yes
Prescott	Ernest A. Love Field	ALS	Yes
Show Low	Show Low Regional	None	No
Tucson	Tucson International	ALS	Yes
Yuma	Yuma International Airport	ALS	Yes
Reliever: Objective - ALS Desired			
Chandler	Chandler Municipal	None	No
Glendale	Glendale Municipal	None	No
Goodyear	Phoenix Goodyear	None	No
Marana	Marana Regional	None	No
Mesa	Falcon Field	None	No
Phoenix	Phoenix Deer Valley	None	No
Scottsdale	Scottsdale	None	No
Tucson	Ryan Field	None	No

Source: *Airport Inventory & Data Survey* 2008

LANDSIDE FACILITIES AND SERVICES

Landside facilities and services contribute significantly to the development of an airport and its attractiveness. Hangar storage and apron parking are key elements in determining the number of aircraft that can be accommodated at the airport. A fixed base operator (FBO), which provides various services like fuel and maintenance, as wells as rental cars and auto parking play a vital role at the airport by attracting general aviation users and facilitating their passage. Landside facility and service objectives described below include the following:

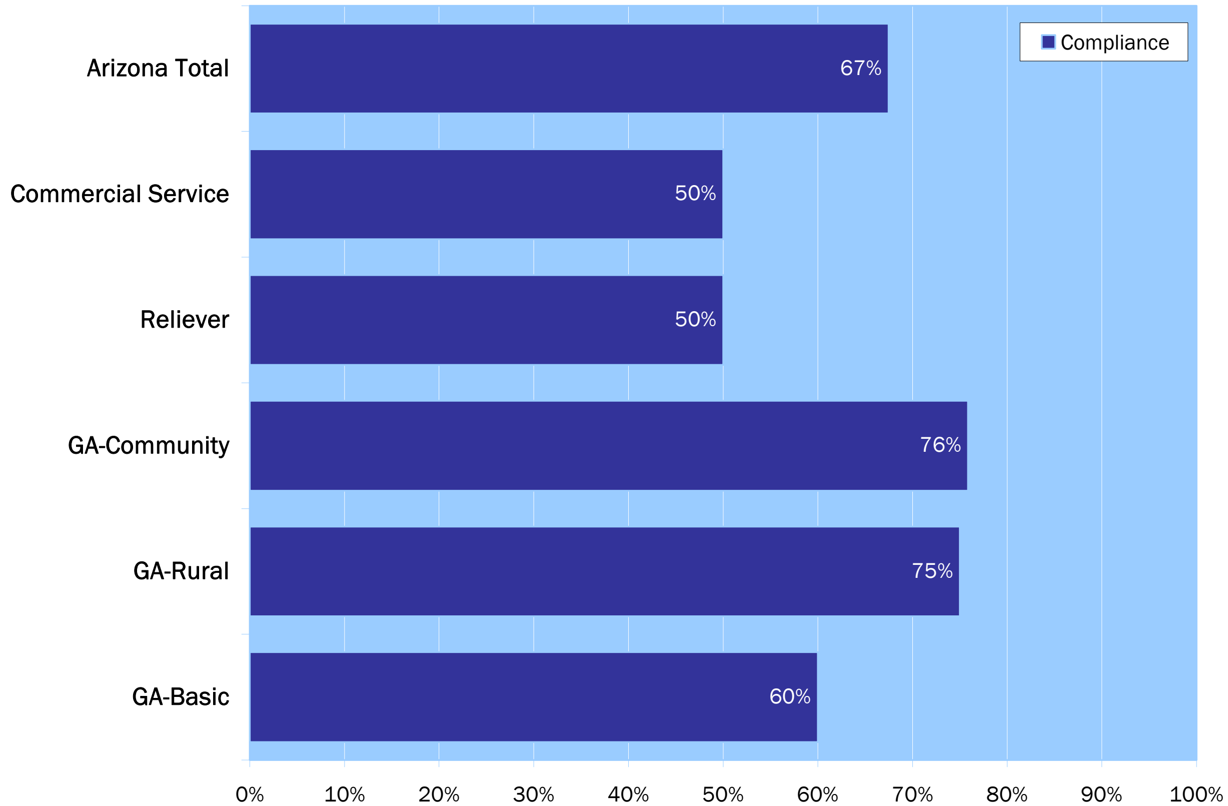
- Airport Fencing
- Services
    - Fixed base operator (FBO)
    - Maintenance
    - Ground transportation
    - Phone
    - Restroom
    - Aviation fuel
- Facilities
    - Commercial or general aviation terminals
    - Pilots lounge or related facilities
    - Hangars
    - Apron
    - Auto Parking

Airport Fencing

Fencing all or part of an airport is a crucial component in airport safety and security. Airports in Arizona typically employ one of four types of airport fencing. Four-foot tall barbwire and six- foot chain link fencing are used commonly in full perimeter fencing and sometimes to fence secure areas. Eight-foot security fencing and 10-foot wildlife fencing are also used; security fencing is more common to fence in secure areas such as the runway, apron, or control tower. For this benchmark, perimeter fencing was only considered compliant if it was complete fencing with no gaps. There is an objective for all airports to have full perimeter fencing. It is also a goal for Commercial Service and Reliever airports to have some type of controlled access to their airfields.

As shown in Figure B-20, 67 percent of airports in the SASP meet their objectives for airport fencing. By role, 50 percent of Commercial Service, 50 percent of Reliever, 76 percent of GA-Community, 75 percent of GA-Rural, and 60 percent of GA-Basic airports meet objectives set for airport fencing.

Figure B-20: Percentage of Airports by Role Meeting Airport Fencing Objectives



Source: *Airport Inventory & Data Survey*

Figure B-21 details fencing compliance by individual airport. As shown, while all Commercial Service and Reliever airports have full perimeter fencing, many noted that they had did not have controlled access to their airports, which is part of their objective. This led to the low compliance in these two categories.

Figure B-21: Airport Fencing Compliance by Airport

Associated City	*Airport Name*	*Existing Fencing*	*Compliance*
Commercial Service: Objective - Perimeter Fencing and Controlled Areas			
Bullhead City	Laughlin/Bullhead International	Perimeter Fencing	No
Flagstaff	Flagstaff Pulliam	Perimeter Fencing	No
Grand Canyon	Grand Canyon National Park	Perimeter Fencing and Controlled Areas	Yes
Kingman	Kingman	Perimeter Fencing	No
Mesa	Phoenix-Mesa Gateway	Perimeter Fencing and Controlled Areas	Yes
Page	Page	Perimeter Fencing	No
Peach Springs	Grand Canyon West	Perimeter Fencing and Controlled Areas	Yes
Phoenix	Phoenix Sky Harbor International	Perimeter Fencing and Controlled Areas	Yes
Prescott	Ernest A. Love Field	Perimeter Fencing	No
Show Low	Show Low Regional	Perimeter Fencing	No
Tucson	Tucson International	Perimeter Fencing and Controlled Areas	Yes
Yuma	Yuma International Airport	Perimeter Fencing and Controlled Areas	Yes
Reliever: Objective - Perimeter Fencing and Controlled Areas			
Chandler	Chandler Municipal	Perimeter Fencing	No
Glendale	Glendale Municipal	Perimeter Fencing	No
Goodyear	Phoenix Goodyear	Perimeter Fencing and Controlled Areas	Yes
Marana	Marana Regional	Perimeter Fencing and Controlled Areas	Yes
Mesa	Falcon Field	Perimeter Fencing	No
Phoenix	Phoenix Deer Valley	Perimeter Fencing and Controlled Areas	Yes
Scottsdale	Scottsdale	Perimeter Fencing	No
Tucson	Ryan Field	Perimeter Fencing and Controlled Areas	Yes
GA-Community: Objective - Perimeter Fencing			
Benson	Benson Municipal	Perimeter Fencing and Controlled Areas	Yes
Buckeye	Buckeye Municipal	Perimeter Fencing and Controlled Areas	Yes
Carefree	Sky Ranch at Carefree	Partial Perimeter Fencing	No
Casa Grande	Casa Grande Municipal	Perimeter Fencing and Controlled Areas	Yes
Chandler	Memorial Airfield	None	No
Chandler	Stellar Airpark	Perimeter Fencing	Yes
Colorado City	Colorado City Municipal	Perimeter Fencing and Controlled Areas	Yes
Coolidge	Coolidge Municipal	Perimeter Fencing	Yes
Cottonwood	Cottonwood	Perimeter Fencing	Yes
Douglas	Douglas Municipal	Partial Perimeter Fencing and Controlled Areas	No
Eloy	Eloy Municipal	Controlled Areas	No
Grand Canyon	Grand Canyon Valle	Perimeter Fencing	Yes
Holbrook	Holbrook Municipal	Perimeter Fencing	Yes
Lake Havasu City	Lake Havasu City	Perimeter Fencing and Controlled Areas	Yes
Marana	Pinal Airpark	Perimeter Fencing and Controlled Areas	Yes
Nogales	Nogales International	Perimeter Fencing	Yes
Parker	Avi Suquilla	Perimeter Fencing	Yes
Payson	Payson	Perimeter Fencing	Yes
Peoria	Pleasant Valley	None	No
Safford	Safford Regional	Perimeter Fencing and Controlled Areas	Yes
Sedona	Sedona	Perimeter Fencing and Controlled Areas	Yes
Sierra Vista	Sierra Vista Municipal	Perimeter Fencing	Yes
Springerville	Springerville Municipal	None	No
St Johns	St Johns Industrial Air Park	Perimeter Fencing and Controlled Areas	Yes
Taylor	Taylor	Controlled Areas	No

Figure B-21: Airport Fencing Compliance by Airport (Continued)

Associated City	*Airport Name*	*Existing Fencing*	*Compliance*
GA-Community: Objective - Perimeter Fencing			
Wickenburg	Wickenburg Municipal	Perimeter Fencing	Yes
Willcox	Cochise County	Perimeter Fencing	Yes
Williams	H.A. Clark Memorial Field	Perimeter Fencing	Yes
Winslow	Winslow-Lindbergh Regional	Perimeter Fencing and Controlled Areas	Yes
GA-Rural: Objective - Perimeter Fencing			
Ajo	Eric Marcus Municipal	Perimeter Fencing	Yes
Bisbee	Bisbee Municipal	Perimeter Fencing and Controlled Areas	Yes
Bullhead City	Sun Valley	Perimeter Fencing	Yes
Chinle	Chinle Municipal	Perimeter Fencing	Yes
Clifton/Morenci	Greenlee County	Perimeter Fencing	Yes
Douglas	Cochise College	Perimeter Fencing and Controlled Areas	Yes
Douglas Bisbee	Bisbee Douglas International	Perimeter Fencing	Yes
Gila Bend	Gila Bend Municipal	Perimeter Fencing	Yes
Globe	San Carlos Apache	Perimeter Fencing	Yes
Kayenta	Kayenta	Perimeter Fencing	Yes
Kearny	Kearny	Perimeter Fencing	Yes
Marble Canyon	Marble Canyon	Controlled Areas	No
Maricopa	Estrella Sailport	None	No
Peach Springs	Grand Canyon Caverns	Partial Perimeter Fencing	No
Phoenix	Phoenix Regional	None	No
Polacca	Polacca	Perimeter Fencing	Yes
San Luis	Rolle Airfield	Controlled Areas	No
San Manuel	San Manuel/Ray/Blair	Perimeter Fencing and Controlled Areas	Yes
Seligman	Seligman	Perimeter Fencing and Controlled Areas	Yes
Temple Bar	Temple Bar	Perimeter Fencing	Yes
Tuba City	Tuba City	Perimeter Fencing	Yes
Tucson	La Cholla Airpark	None	No
Whiteriver	Whiteriver	Perimeter Fencing	Yes
Window Rock	Window Rock	Perimeter Fencing	Yes
GA-Basic: Objective - Perimeter Fencing Desired			
Aguila	Eagle Roost	Perimeter Fencing	Yes
Bagdad	Bagdad	Perimeter Fencing	Yes
Cibecue	Cibecue	Perimeter Fencing	Yes
Meadview	Pearce Ferry	Perimeter Fencing	Yes
Peach Springs	Hualapai	None	No
Rimrock	Rimrock	None	No
Sells	Sells	None	No
Superior	Superior Municipal	Perimeter Fencing	Yes
Tombstone	Tombstone Municipal	Perimeter Fencing	Yes
Whitmore	Grand Canyon Bar Ten Airstrip	None	No

Source: *Airport Inventory & Data Survey* 2008

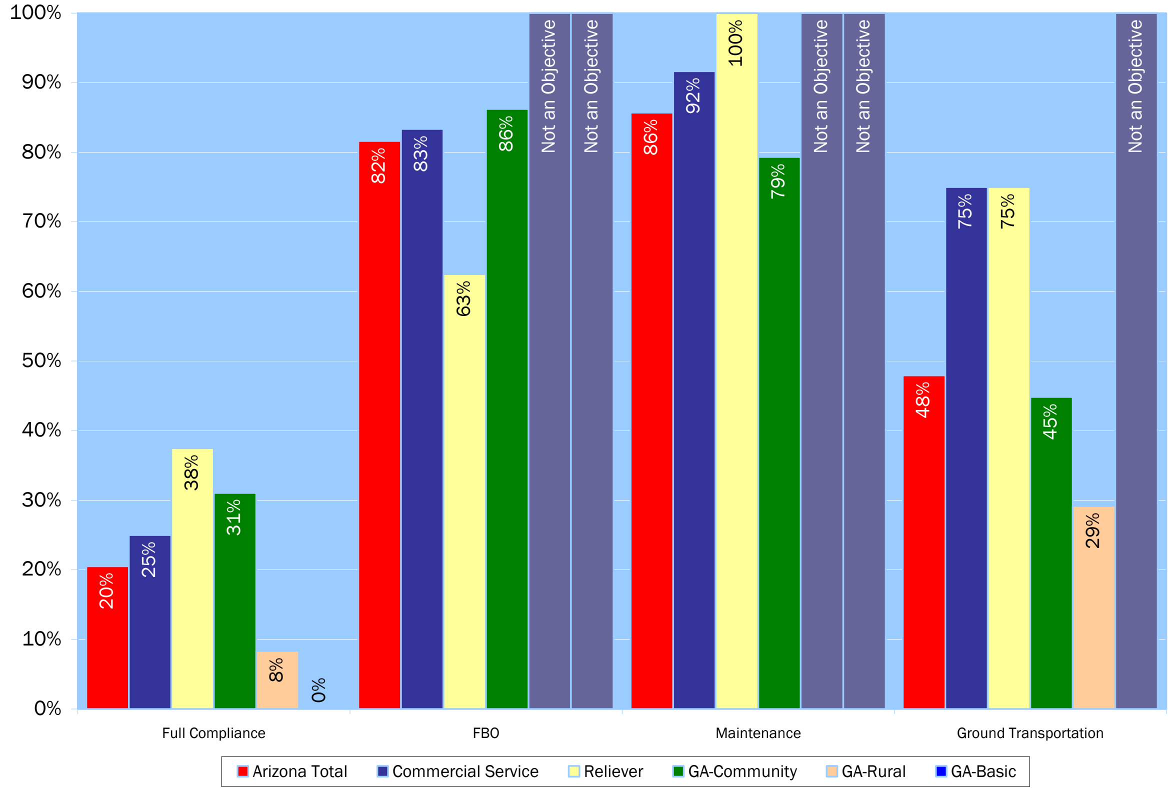
Services

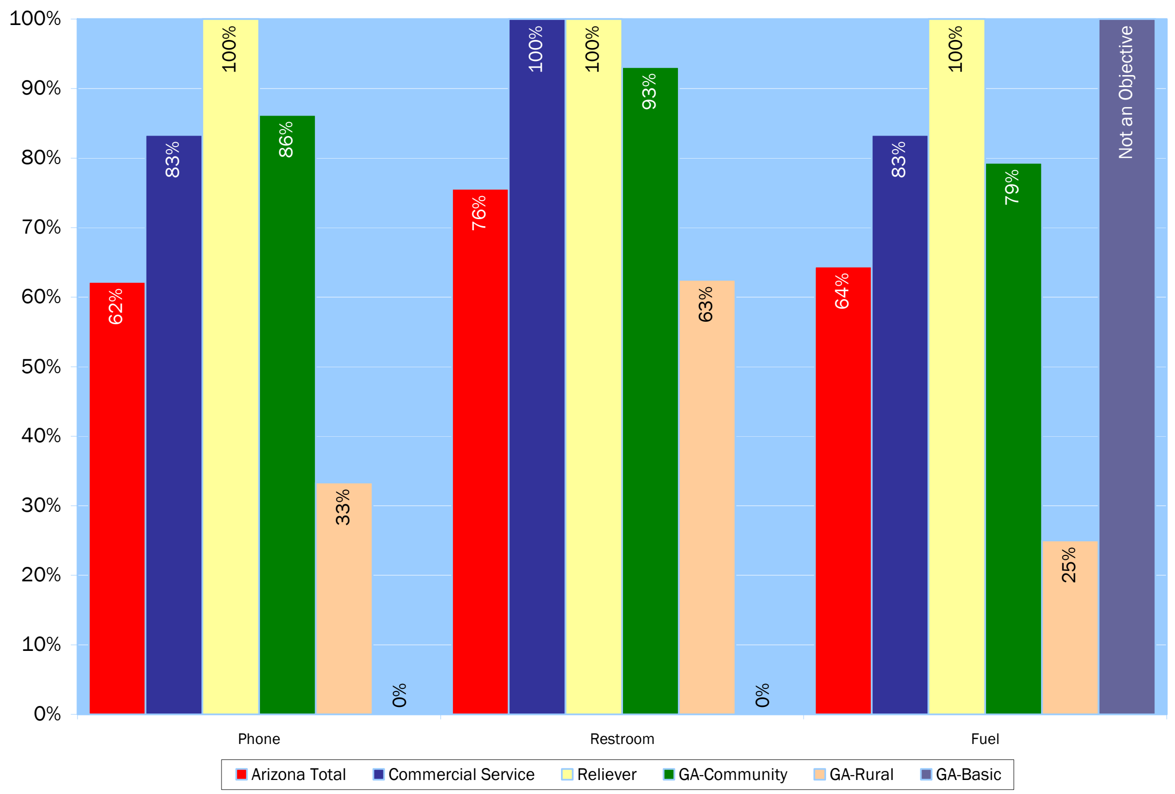
Services which are available to local pilots and tenants, as well as transient pilots, are often expected necessities while others are essential for security. Basic services that are typically welcomed at airports by pilots include local and/or emergency phone service and restrooms. The presence of an FBO which provides aviation services at an airport is a service provided to both local and transient users. An FBO was considered full-service if it provides flight instruction, maintenance, fuel, and charter service. Coupled with an FBO, a designated maintenance facility and/or hangar are important services that airports can provide that are beneficial to all vested members of the aviation community. This service is yet another mechanism that airports use to be self-sufficient while conducting business and adding jobs to the economic base of the local community, region, and state. Additionally, when aircraft owners fly into an airport either for business or discretionary purposes, it is often important for them to have access to transportation services. Users may require on-site rental car services, while at other times, off-site rental car service, or a courtesy/loaner car is acceptable to meet this demand.

Figure B-22 shows that only 20 percent of all system airports meet their respective services objectives completely. While 80 percent of airports do not meet all of the applicable objectives for their role, it is noteworthy that the airports perform much better in this benchmark by individual services. Many airports partially fulfill an individual service objective. For example, Commercial Service and Reliever airports are required to have both Jet A and AvGas available to the public 24 hours a day, seven days a week. Many airports that have public fuel do not meet this requirement as it may not be available 24/7.

Figure B-23 indicates which airports are currently meeting their respective landside service objectives. It must be taken into consideration that if an airport does not meet all of its service objectives it is recognized as not meeting the objective in totality.

Figure B-22: Percentage of Airports by Role Meeting Service Objectives





Source: Airport Inventory & Data Survey

Figure B-23: Airport Services Compliance by Airport

		Individual Service Compliance						
Associated City	*Airport Name*	*FBO*	*Maintenance*	*Ground Transportation*	*Phone*	*Restroom*	*Fuel*	*Full Compliance*
Commercial Service: Objective - Full Service FBO, Maintenance, On-site Rental Car, Phone, Restroom, 24/7 AvGas and Jet A								
Bullhead City	Laughlin/Bullhead International	Yes	Yes	Yes	No	Yes	Yes	No
Flagstaff	Flagstaff Pulliam	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grand Canyon	Grand Canyon National Park	Yes	Yes	No	Yes	Yes	No	No
Kingman	Kingman	Yes	Yes	Yes	Yes	Yes	Yes	No
Mesa	Phoenix-Mesa Gateway	Yes	Yes	Yes	Yes	Yes	Yes	No
Page	Page	No	Yes	Yes	Yes	Yes	Yes	No
Peach Springs	Grand Canyon West	No	No	No	Yes	Yes	No	No
Phoenix	Phoenix Sky Harbor International	Yes	Yes	Yes	Yes	Yes	Yes	No
Prescott	Ernest A. Love Field	Yes	Yes	Yes	No	Yes	Yes	No
Show Low	Show Low Regional	Yes	Yes	No	Yes	Yes	Yes	No
Tucson	Tucson International	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yuma	Yuma International	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reliever: Objective - Full Service FBO, Maintenance, On-site Rental Car, Phone, Restroom, 24/7 AvGas and Jet A								
Chandler	Chandler Municipal	Yes	Yes	No	Yes	Yes	Yes	No
Glendale	Glendale Municipal	Yes	Yes	Yes	Yes	Yes	Yes	No
Goodyear	Phoenix Goodyear	No	Yes	Yes	Yes	Yes	Yes	No
Marana	Marana Regional	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mesa	Falcon Field	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Phoenix	Phoenix Deer Valley	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Scottsdale	Scottsdale	No	Yes	Yes	Yes	Yes	Yes	No
Tucson	Ryan Field	No	Yes	No	Yes	Yes	Yes	No
GA-Community: Objective - Limited Service FBO, Limited Maintenance, On-site Ground Transportation, Phone, Restroom, AvGas and Jet A								
Benson	Benson Municipal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Buckeye	Buckeye Municipal	No	No	No	Yes	Yes	Yes	No
Carefree	Sky Ranch at Carefree	No	No	No	Yes	Yes	Yes	No
Casa Grande	Casa Grande Municipal	No	Yes	No	No	No	Yes	No
Chandler	Memorial Airfield	No	No	No	No	No	No	No
Chandler	Stellar Airpark	Yes	Yes	No	Yes	Yes	Yes	No
Colorado City	Colorado City Municipal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Coolidge	Coolidge Municipal	Yes	Yes	No	Yes	Yes	Yes	No

Figure B-23: Airport Services Compliance by Airport (Continued)

		Individual Service Compliance						
Associated City	*Airport Name*	*FBO*	*Maintenance*	*Ground Transportation*	*Phone*	*Restroom*	*Fuel*	*Full Compliance*
GA-Community: Objective - Limited Service FBO, Limited Maintenance, On-site Ground Transportation, Phone, Restroom, AvGas and Jet A								
Cottonwood	Cottonwood	Yes	Yes	No	No	Yes	No	No
Douglas	Douglas Municipal	Yes	Yes	No	Yes	Yes	Yes	No
Eloy	Eloy Municipal	Yes	Yes	No	Yes	Yes	Yes	No
Grand Canyon	Grand Canyon Valle	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Holbrook	Holbrook Municipal	Yes	No	Yes	Yes	Yes	No	No
Lake Havasu City	Lake Havasu City	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marana	Pinal Airpark	Yes	Yes	No	No	Yes	Yes	No
Nogales	Nogales International	Yes	Yes	No	Yes	Yes	Yes	No
Parker	Avi Suquilla	Yes	Yes	No	Yes	Yes	Yes	No
Payson	Payson	Yes	Yes	No	Yes	Yes	Yes	No
Peoria	Pleasant Valley	Yes	Yes	No	Yes	Yes	No	No
Safford	Safford Regional	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sedona	Sedona	Yes	No	Yes	Yes	Yes	Yes	No
Sierra Vista	Sierra Vista Municipal	Yes	Yes	No	Yes	Yes	Yes	No
Springerville	Town of Springerville Municipal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
St Johns	St Johns Industrial Air Park	Yes	No	Yes	Yes	Yes	Yes	No
Taylor	Taylor	Yes	Yes	Yes	Yes	Yes	No	No
Wickenburg	Wickenburg Municipal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Willcox	Cochise County	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Williams	H.A. Clark Memorial Field	Yes	Yes	No	Yes	Yes	No	No
Winslow	Winslow-Lindbergh Regional	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GA-Rural: Objective - Ground Transportation, Phone, Restroom, AvGas								
Ajo	Eric Marcus Municipal	NA	NA	No	No	No	No	No
Bisbee	Bisbee Municipal	NA	NA	Yes	Yes	Yes	Yes	Yes
Bullhead City	Sun Valley	NA	NA	No	Yes	Yes	Yes	No
Chinle	Chinle Municipal	NA	NA	No	No	No	No	No
Clifton/Morenci	Greenlee County	NA	NA	No	No	Yes	No	No
Douglas	Cochise College	NA	NA	No	Yes	Yes	Yes	No
Douglas Bisbee	Bisbee Douglas International	NA	NA	No	Yes	Yes	Yes	No
Gila Bend	Gila Bend Municipal	NA	NA	No	No	Yes	No	No
Globe	San Carlos Apache	NA	NA	Yes	No	Yes	No	No
Kayenta	Kayenta	NA	NA	No	No	No	No	No

Figure B-23: Airport Services Compliance by Airport (Continued)

		Individual Service Compliance						
Associated City	*Airport Name*	*FBO*	*Maintenance*	*Ground Transportation*	*Phone*	*Restroom*	*Fuel*	*Full Compliance*
GA-Rural: Objective - Ground Transportation, Phone, Restroom, AvGas								
Kearny	Kearny	NA	NA	No	No	Yes	No	No
Marble Canyon	Marble Canyon	NA	NA	No	Yes	Yes	No	No
Maricopa	Estrella Sailport	NA	NA	No	No	Yes	No	No
Peach Springs	Grand Canyon Caverns	NA	NA	Yes	Yes	Yes	No	No
Phoenix	Phoenix Regional	NA	NA	No	No	Yes	No	No
Polacca	Polacca	NA	NA	No	No	No	No	No
San Luis	Rolle Airfield	NA	NA	No	No	No	No	No
San Manuel	San Manuel/Ray/Blair	NA	NA	Yes	Yes	Yes	Yes	Yes
Seligman	Seligman	NA	NA	No	No	Yes	No	No
Temple Bar	Temple Bar	NA	NA	No	No	No	No	No
Tuba City	Tuba City	NA	NA	No	No	No	No	No
Tucson	La Cholla Airpark	NA	NA	Yes	No	No	Yes	No
Whiteriver	Whiteriver	NA	NA	Yes	No	No	No	No
Window Rock	Window Rock	NA	NA	Yes	Yes	Yes	No	No
GA-Basic: Objective - Phone and Restroom Desired								
Aguila	Eagle Roost	NA	NA	NA	No	No	NA	No
Bagdad	Bagdad	NA	NA	NA	No	No	NA	No
Cibecue	Cibecue	NA	NA	NA	No	No	NA	No
Meadview	Pearce Ferry	NA	NA	NA	No	No	NA	No
Peach Springs	Hualapai	NA	NA	NA	No	No	NA	No
Rimrock	Rimrock	NA	NA	NA	No	No	NA	No
Sells	Sells	NA	NA	NA	No	No	NA	No
Superior	Superior Municipal	NA	NA	NA	No	No	NA	No
Tombstone	Tombstone Municipal	NA	NA	NA	No	No	NA	No
Whitmore	Grand Canyon Bar Ten Airstrip	NA	NA	NA	No	No	NA	No

Source: *Airport Inventory & Data Survey* 2008
Note: NA=Not Applicable

Facilities

Landside facilities are important infrastructure elements of an airport and vital economic catalysts for both airport and its community. A terminal building is typically seen as both an airport's and community's "welcome center" when pilots and users arrive by aircraft. General aviation terminals serve different roles depending on the complexity of the airport. At many airports, the terminal may house the FBO, a pilots' lounge, a weather information area, and an observation area.

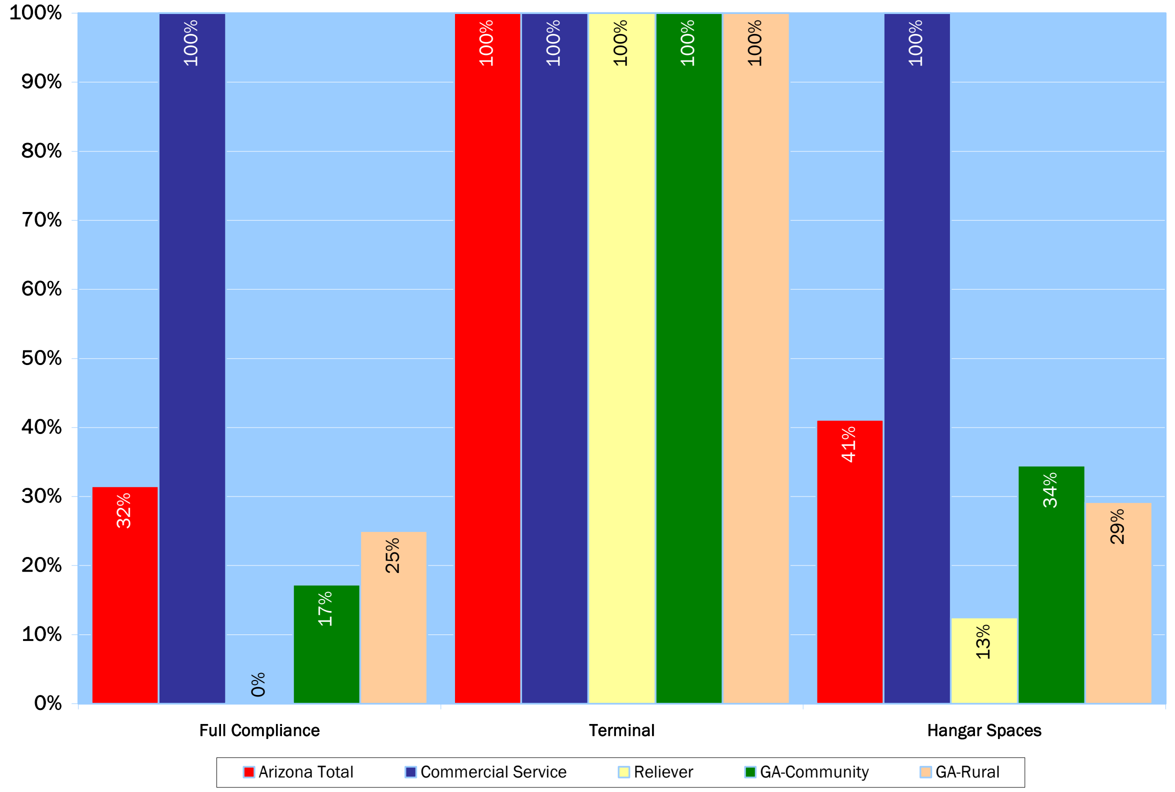
Similarly, the need to provide covered storage for based aircraft varies by airport, climate, aircraft cost, security, and other considerations. Nationally, there continues to be trend for owners of general aviation aircraft to seek covered storage. Until recently, hangar development did not qualify for federal grants and the need for hangar development often lagged behind the airport's ability to provide such facilities. In addition to providing covered storage for based aircraft there is the need to ensure adequate apron space for storing local and transient aircraft that cannot be housed in hangars.

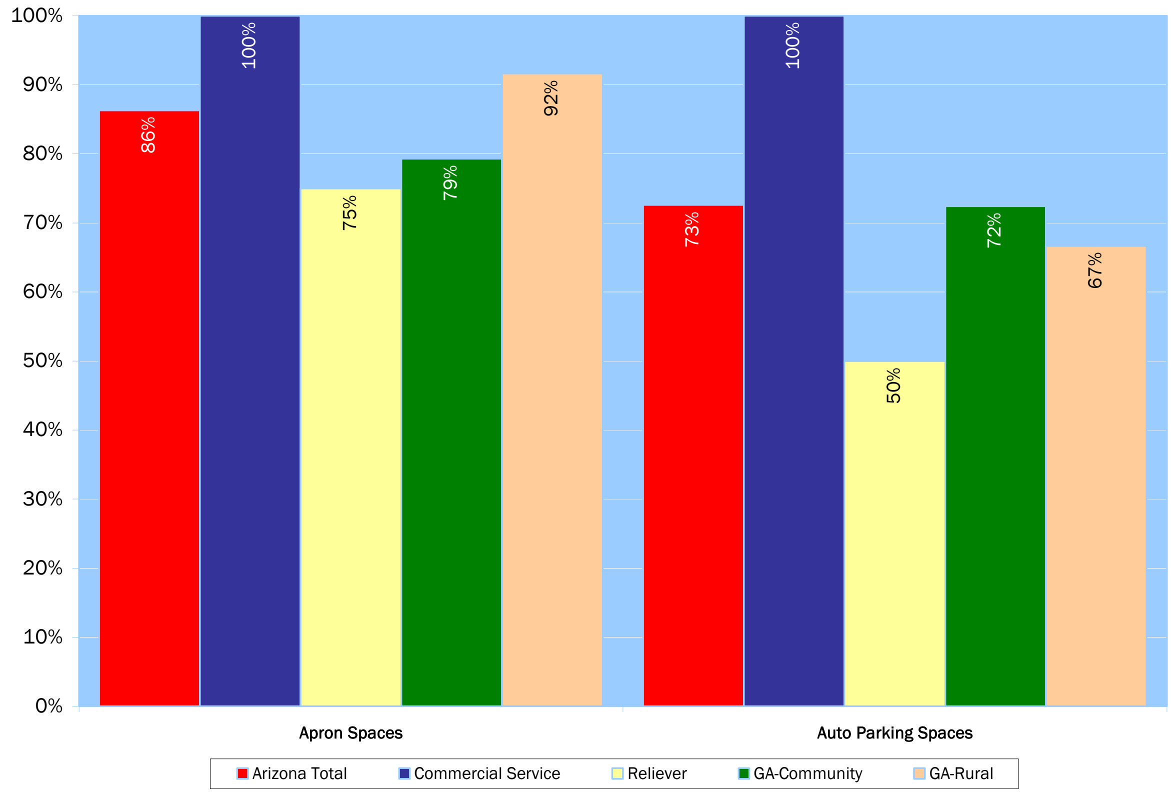
Regardless of how an individual reaches an airport, there is an inherent need for auto parking whether it is for employees of aviation businesses to park their personal vehicles, aircraft owners that wish to park their car before taking their aircraft for a flight, or visitors and business users arriving via aircraft that will rent a car or utilize a courtesy car to go into town. As a result of the events on September 11, 2001, new security guidelines for commercial and general aviation airports may result in restricted auto parking in aircraft movement areas. Airports should therefore plan to provide auto parking in designated areas away from hangars and other areas of aircraft movement.

Figure B-24 shows that only 32 percent of airports for which facility objectives were set meet these objectives. Similar to the landside service objectives, most airports roles perform better in the individual facility objectives. The only facility objective where poor performance is noted is in the number of hangar spaces. Only 41 percent of total airports met this objective. Again, one should consider that if an airport does not meet all of its applicable landside facility objectives it is recognized as not meeting the objective in totality. Facility objectives were not set for GA-Basic airports.

Figure B-25 indicates which airports are currently meeting their respective landside service objectives.

Figure B-24: Percentage of Airports by Role Meeting Landside Facility Objectives





Source: *Airport Inventory & Data Survey*

Figure B-25: Airport Facilities Compliance by Airport

Associated City	Airport Name	Hangar Objective	Apron Objective	Auto Parking Objective	Individual Facility Compliance: Terminal	Hangars	Apron	Auto Parking	Other Facilities	Full Compliance
Commercial Service: Objective - Consistent with Master Plan										
Bullhead City	Laughlin/Bullhead International	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Flagstaff	Flagstaff Pulliam	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Grand Canyon	Grand Canyon National Park	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Kingman	Kingman	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Mesa	Phoenix-Mesa Gateway	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Page	Page	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Peach Springs	Grand Canyon West	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Phoenix	Phoenix Sky Harbor International	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Prescott	Ernest A. Love Field	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Show Low	Show Low Regional	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Tucson	Tucson International	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Yuma	Yuma International Airport	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
Reliever: Objective - Terminal with Pilots' Lounge, Hangars (75% of based fleet and 25% overnight), Apron (25% of based fleet and 75% transient), Auto Parking (75% of based fleet)										
Chandler	Chandler Municipal	382	217	375	Yes	No	Yes	No	Yes	No
Glendale	Glendale Municipal	314	148	310	Yes	No	Yes	Yes	Yes	No
Goodyear	Phoenix Goodyear	215	159	230	Yes	Yes	No	No	Yes	No
Mesa	Falcon Field	723	382	711	Yes	No	Yes	Yes	Yes	No
Phoenix	Phoenix Deer Valley	968	464	956	Yes	No	No	Yes	Yes	No
Scottsdale	Scottsdale	347	249	336	Yes	No	Yes	No	Yes	No
Tucson	Marana Regional	233	112	207	Yes	No	No	No	Yes	No
Tucson	Ryan Field	235	153	228	Yes	No	Yes	Yes	Yes	No
GA-Community: Objective - Terminal with Appropriate Facilities, Hangars (60% of based fleet and 25% overnight), Apron (40% of based fleet and 50% transient), Auto Parking (33% of based fleet)										
Benson	Benson Municipal	26	21	14	Yes	No	Yes	Yes	Yes	No
Buckeye	Buckeye Municipal	39	31	21	Yes	Yes	Yes	No	Yes	No
Carefree	Sky Ranch at Carefree	70	46	38	Yes	Yes	No	No	Yes	No
Casa Grande	Casa Grande Municipal	56	44	31	Yes	No	Yes	Yes	Yes	No
Chandler	Memorial Airfield	1	3	0	Yes	Yes	No	Yes	Yes	No
Chandler	Stellar Airpark	93	68	51	Yes	Yes	No	No	Yes	No
Colorado City	Colorado City Municipal	4	4	2	Yes	Yes	Yes	No	Yes	No

Figure B-25: Airport Facilities Compliance by Airport (Continued)

Associated City	*Airport Name*	*Hangar Objective*	*Apron Objective*	*Auto Parking Objective*	*Individual Facility Compliance: Terminal*	*Hangars*	*Apron*	*Auto Parking*	*Other Facilities*	*Full Compliance*
GA-Community: Objective - Terminal with Appropriate Facilities, Hangars (60% of based fleet and 25% overnight), Apron (40% of based fleet and 50% transient), Auto Parking (33% of based fleet)										
Coolidge	Coolidge Municipal	21	18	12	Yes	No	No	No	Yes	No
Cottonwood	Cottonwood	31	27	17	Yes	No	Yes	Yes	Yes	No
Douglas	Douglas Municipal	17	17	9	Yes	No	Yes	Yes	Yes	No
Eloy	Eloy Municipal	26	22	14	Yes	No	Yes	Yes	Yes	No
Grand Canyon	Grand Canyon Valle	4	2	2	Yes	Yes	Yes	Yes	Yes	Yes
Holbrook	Holbrook Municipal	13	11	7	Yes	No	Yes	Yes	Yes	No
Lake Havasu City	Lake Havasu City	140	109	76	Yes	No	Yes	Yes	Yes	No
Marana	Pinal Airpark	1	0	0	Yes	Yes	Yes	Yes	Yes	Yes
Nogales	Nogales International	23	24	12	Yes	No	Yes	Yes	Yes	No
Parker	Avi Suquilla	27	25	14	Yes	No	Yes	Yes	Yes	No
Payson	Payson	54	46	29	Yes	No	Yes	No	Yes	No
Peoria	Pleasant Valley	21	14	12	Yes	No	Yes	No	Yes	No
Safford	Safford Regional	26	26	14	Yes	No	Yes	Yes	Yes	No
Sedona	Sedona	66	66	35	Yes	Yes	Yes	Yes	Yes	Yes
Sierra Vista	Sierra Vista Municipal	50	38	28	Yes	Yes	No	Yes	Yes	No
Springerville	Town of Springerville Municipal	12	14	7	Yes	No	Yes	Yes	Yes	No
St Johns	St Johns Industrial Air Park	10	14	5	Yes	No	Yes	Yes	Yes	Yes
Taylor	Taylor	9	7	5	Yes	Yes	Yes	Yes	Yes	Yes
Wickenburg	Wickenburg Municipal	29	24	16	Yes	Yes	No	Yes	Yes	No
Willcox	Cochise County	17	15	9	Yes	No	Yes	No	Yes	No
Williams	H.A. Clark Memorial Field	12	9	6	Yes	No	Yes	Yes	Yes	No
Coolidge	Coolidge Municipal	21	18	12	Yes	No	No	No	Yes	No
GA-Rural: Objective - Hangars (50% of based fleet and 25% overnight), Apron (50% of based fleet and 25% transient), Auto Parking (equal to based fleet)										
Ajo	Eric Marcus Municipal	5	9	8	Yes	Yes	Yes	No	Yes	No
Bisbee	Bisbee Municipal	18	32	34	Yes	No	Yes	No	Yes	No
Bullhead City	Sun Valley	17	23	33	Yes	No	No	No	Yes	No
Chinle	Chinle Municipal	3	4	4	Yes	No	Yes	Yes	Yes	No
Clifton/Morenci	Greenlee County	2	2	2	Yes	Yes	Yes	Yes	Yes	Yes
Douglas	Cochise College	12	12	15	Yes	No	Yes	Yes	Yes	No
Douglas Bisbee	Bisbee Douglas International	10	18	18	Yes	No	Yes	Yes	Yes	No

Figure B-25: Airport Facilities Compliance by Airport (Continued)

Associated City	*Airport Name*	*Hangar Objective*	*Apron Objective*	*Auto Parking Objective*	*Individual Facility Compliance*					*Full Compliance*
					Terminal	*Hangars*	*Apron*	*Auto Parking*	*Other Facilities*	
GA-Rural: Objective - Hangars (50% of based fleet and 25% overnight), Apron (50% of based fleet and 25% transient), Auto Parking (equal to based fleet)										
Gila Bend	Gila Bend Municipal	2	3	3	Yes	Yes	Yes	Yes	Yes	Yes
Globe	San Carlos Apache	24	38	47	Yes	No	Yes	No	Yes	No
Kayenta	Kayenta	1	2	0	Yes	No	Yes	Yes	Yes	No
Kearny	Kearny	3	5	5	Yes	Yes	Yes	Yes	Yes	Yes
Marble Canyon	Marble Canyon	1	1	1	Yes	No	Yes	No	Yes	No
Maricopa	Estrella Sailport	15	20	28	Yes	No	Yes	No	Yes	No
Peach Springs	Grand Canyon Caverns	1	2	0	Yes	Yes	Yes	Yes	Yes	Yes
Phoenix	Phoenix Regional	6	8	11	Yes	No	Yes	No	Yes	No
Polacca	Polacca	1	2	0	Yes	No	Yes	Yes	Yes	No
San Luis	Rolle Airfield	0	2	0	Yes	Yes	Yes	Yes	Yes	Yes
San Manuel	San Manuel/Ray/Blair	30	53	57	Yes	No	Yes	Yes	Yes	No
Seligman	Seligman	1	3	0	Yes	No	Yes	Yes	Yes	No
Temple Bar	Temple Bar	1	2	0	Yes	No	Yes	Yes	Yes	No
Tuba City	Tuba City	1	2	0	Yes	No	Yes	Yes	Yes	No
Tucson	La Cholla Airpark	49	67	97	Yes	No	No	No	Yes	No
Whiteriver	Whiteriver	1	2	0	Yes	No	Yes	Yes	Yes	No
Window Rock	Window Rock	3	4	4	Yes	Yes	Yes	Yes	Yes	Yes

Source: *Airport Inventory & Data Survey* 2008

APPENDIX C: NPIAS CANDIDATE AIRPORT ANALYSIS

This appendix details the analysis to determine eligibility of Arizona system airports for NPIAS inclusion. If the airport system grows as projected in the SASP, there may be a future need for improved facilities that may benefit from inclusion in the NPIAS. Three airports are analyzed for their ability to meet NPIAS candidacy: Rolle Airfield in San Luis, and proposed airports at Superior and Maricopa. It is important to note that the state should continue to monitor activity at non-NPIAS system airports to see if other airports should be considered in the future as well.

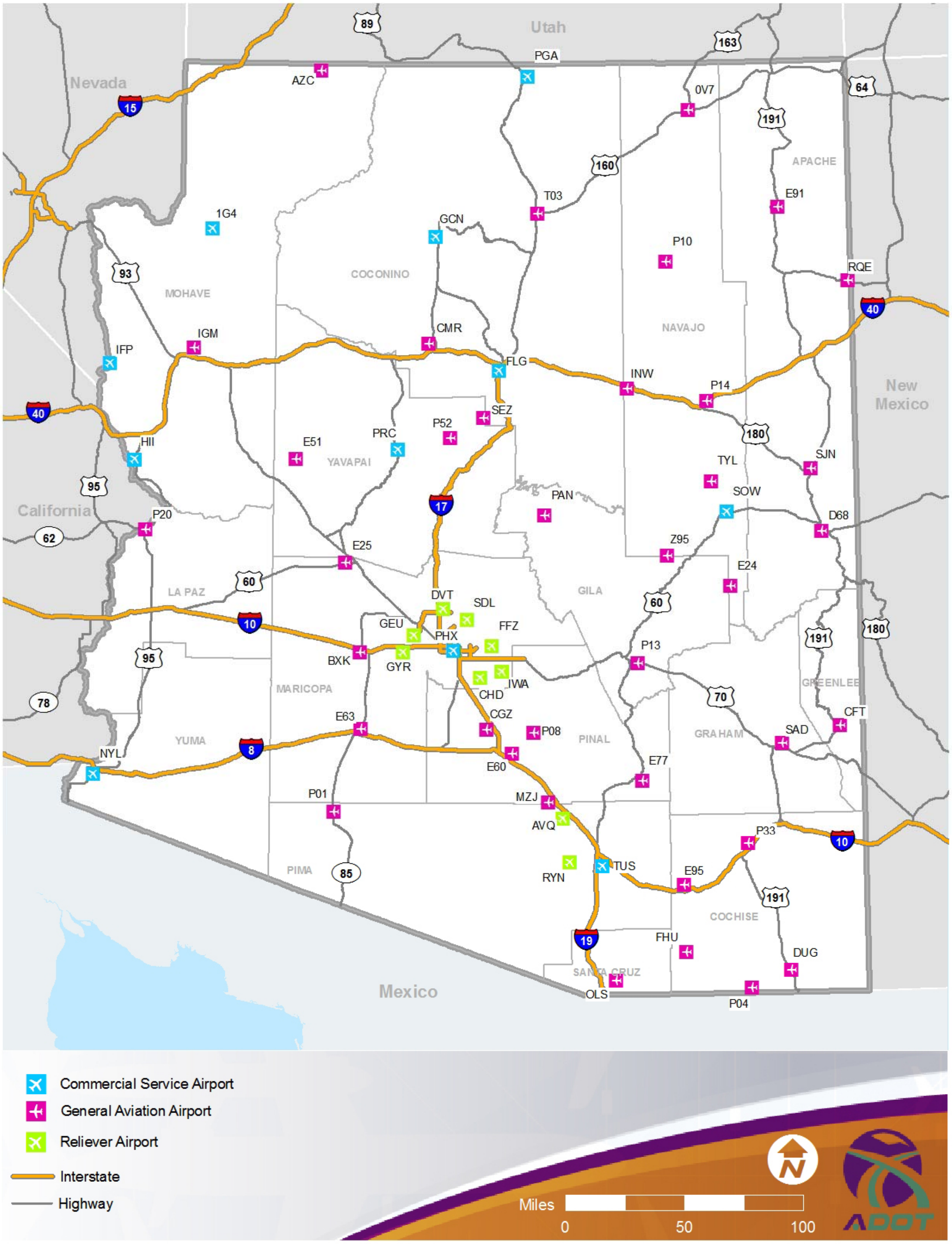
NPIAS AIRPORTS IN ARIZONA

The National Plan of Integrated Airport Systems (NPIAS) is the Federal Aviation Administration's (FAA's) national airport plan. The NPIAS includes nearly 3,500 existing and proposed airports in the United States which are of significance to the national air transportation system. Fifty-nine of Arizona's 83 public-use airports are included in the National Plan of Integrated Airport Systems for Fiscal Years (FYs) 2009-2013. Airports included in the NPIAS are eligible to compete for federal funding from the FAA's Airport Improvement Program (AIP). As noted in Chapter Two of the SASP, the FAA classifies airports in the NPIAS into categories such as primary commercial service, non-primary commercial service, or general aviation. Figure C-1 depicts the location of Arizona's NPIAS airports in the 2009-2013 publication. Currently, there are 11 commercial service airports and 48 general aviation airports in Arizona that are included in the 2009-2013 NPIAS.[1]

As noted, inclusion of an airport in the NPIAS makes it eligible to compete for project funding from the AIP. Funds for AIP come from the Aviation Trust Fund which is 100 percent user funded. For airports to be eligible for funding from the FAA, they must be included in the NPIAS. FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* dated December 4, 2000 provides guidelines for qualifying airports for entrance into the NPIAS.

[1]It should be noted that while the most recent FAA NPIAS (2009-2013) still shows Phoenix-Mesa Gateway as a reliever, that the airport should be classified as a Primary Commercial Service Airport. This airport has maintained commercial airline service and has surpassed the 10,000 annual enplanement mark.

Figure C-1: Arizona FAA Airport Classification



Sources: FAA National Plan of Integrated Airport Systems (NPIAS) 2009-2011 and AZ SASP Records. Prepared: January 2009.

NPIAS ELIGIBILITY CRITERIA

Based on the FAA's order, there are airports which could be considered for inclusion in the NPIAS since the previous State Aviation Needs Study was completed in 2000. Airport economics and significant changes in Arizona with regards to energy, tourism, and agriculture have lead to the need for an evaluation of potential NPIAS eligibility. The FAA's criteria for an airport's inclusion in the NPIAS are based on a variety of factors such as airport demand, geographic location, airport sponsorship, as well as other criteria. The following sections discuss FAA's criteria considered for inclusion in the NPIAS:

- Airports formerly in the NPIAS – Airports that have been included at one time in the NPIAS but have been eliminated from the program are eligible for inclusion. These airports must meet other NPIAS criteria, however, such as a minimum level of based aircraft. An exception to this criterion includes airports not included in a SASP or airports where there is clearly no longer a continuing national interest in the airport.
- Airport's location in relation to the nearest NPIAS airport – An airport that is included in a SASP may be included in the NPIAS if it has 10 or more based aircraft and serves a community located at least 20 miles or a 30-minute drive from the nearest existing or proposed NPIAS airport.
- Reliever Airport – An existing or proposed airport may be included in the NPIAS if it relieves airport congestion in a metropolitan area by providing general aviation users with an alternative landing location. The purpose of the reliever airport is to provide substantial capacity or instrument training relief. Currently, there are nine airports in the Arizona system that have been given reliever status.
- Airports receiving U.S. Mail Service – Any public airport where a scheduled air carrier transports mail to an airport or where an independent carrier, freight forwarder, FBO, etc. is under contract with the U.S. Postal Service (USPS) to carry mail may be included in the NPIAS. The airport must be adequate to satisfy the needs of the USPS.
- Airports with a National Defense Role – Any public-use airport where a unit of the Air National Guard or of a reserve component of the Armed Forces of the United States is permanently based or is adjacent to and who operates permanently assigned aircraft directly related to its mission is included in the NPIAS.

An existing or proposed airport not meeting the criteria above may be included in the NPIAS if it meets all of the following:

- It is included in the SASP
- It serves a community more than 30 minutes from the nearest NPIAS airport
- It is forecast to have 10 or more based aircraft within the short-term planning period (5 years)
- There is an eligible public sponsor willing to undertake the ownership and development of the airport

Airports that do not meet any of the previously discussed entry criteria may be considered for inclusion in the NPIAS on the basis of a special justification. This justification must show that there is a significant national interest in the airport. Such special justifications include:

- A determination that the benefits of the airport will exceed its development costs
- Written documentation describing isolation
- Airports serving the needs of Native American communities

- Airports needed to support recreation areas
- Airports needed to develop or protect important national resources

Benefit/Cost Analysis

If an airport is included in a SASP, but the community it serves is within 20 miles or a 30-minute drive of an existing or proposed NPIAS airport, or if it is forecasted to have less than 10 based aircraft in the short-term planning period, a benefit analysis may be conducted to determine if the benefits of the airport exceed its cost.

The FAA defines the benefits accruing to airport users as the time saved by using an airport and the net costs of such use relative to travel to the next best alternative airport. The rationale is that time saved can be devoted to other endeavors, resulting in a net increase in the production of goods and services in the national economy. In the FAA's 1992 report *Estimating the Regional Economic Significance of Airports,* the FAA established a methodology that estimates the measure of importance of airports on their surrounding communities. In such an analysis, the FAA considers both the transportation benefits and the economic benefits of candidate airports. The guidelines estimate that when the distance saved by general aviation users is 20 miles, the annual benefit per based aircraft is $12,330. When the 1992 estimated annual benefit per based aircraft is adjusted for inflation over the last 17 years, the annual benefit becomes $18,740 per based aircraft.

However, it is believed that the true economic benefit of Arizona airports is much greater than that calculated by the FAA report. ADOT Aeronautics sponsored a much more recent economic impact study that determined the economic output derived from airports in Arizona. According to the study, completed in 2004, each based aircraft at a general aviation airport equates to approximately $275,000 in annual economic benefit. For the purpose of this analysis, this figure, which is more recent and Arizona-specific compared to the FAA benefit calculation, will be used to determine if the benefits of an airport joining the NPIAS outweigh the cost of upgrading the airport to FAA standards.

To determine the cost of an airport, it was assumed that the average cost for upgrading a non-standard general aviation airport's runway to FAA standards is approximately $1.5 to $2.0 million. This figure is based on actual historical experience in Arizona within the last five years.

Within the context of establishing whether or not an airport is eligible for NPIAS inclusion, FAA methodology generally considers based aircraft because the number is more verifiable than operations or passengers. The FAA methodology then relates based aircraft to annual passenger trips by using an average number of itinerant operations per based aircraft. The resulting number of based aircraft required for an airport being considered for NPIAS inclusion is dependant on upon the time required to drive to the nearest alternate NPIAS airport and the NPIAS cost of the candidate airport. The lower the development and operating costs for the candidate airport, the fewer the number of based aircraft required to justify the airport's inclusion in the NPIAS.

It is important to note that the FAA's entry equation for NPIAS inclusion is most sensitive to three factors. These factors are:

- Based aircraft
- Access time and distance to other NPIAS airports
- Airport costs

ARIZONA NPIAS-CANDIDATE AIRPORTS

This section discusses three possible candidate airports to be considered for NPIAS inclusion: Rolle, Maricopa, and Superior. The potential airports at Maricopa and Superior are presently in the planning stages. They are included to assess the potential for becoming a NPIAS airport if they are constructed.

Rolle Airfield

The existing Rolle Airfield is located in southwest Arizona, approximately 15 miles south of Yuma. The airfield has one paved runway, Runway 17/35. The airport's existing runway is 2,800 feet long and 60 feet wide. The airport has visual approaches to both runway ends. The 2008 Arizona SASP effort shows that the airport had no based aircraft in 2007 and experienced approximately 2,900 total operations in 2007. The airport's based aircraft are forecast as part of the SASP to increase to 1 by 2013 with operations increasing to 3,285.

Figure C-2 identifies the criteria used to determine whether the airport is eligible for inclusion in the NPIAS. When following FAA's guidelines and methodologies, Rolle Airfield fulfills the requirements concerning geographic location, but not for airport demand. It is at least 15 miles or 30 minutes from the nearest NPIAS airport, however it does not currently have nor is it projected to have more than 10 based aircraft. Local general aviation traffic and military operations are currently the primary aviation activities at Rolle Airfield.

The distance to the nearest existing NPIAS airport, Yuma International, is 37 minutes driving time. Despite the fact that this does meet the FAA requirement, the lack of current and projected based aircraft results in very little benefit to offset cost of upgrading the airport's non-standard general aviation runway to FAA standards. Rolle Airfield does not meet minimum requirements for inclusion in the NPIAS at this time, but activity should continue to be monitored through the SASP forecast period.

Figure C-2: NPIAS Candidate Airport Data and Entry Criteria – Rolle Airfield

Facility Data				
Primary Runway Length:	2,800 feet	*Runway Surface:*	Asphalt	
Runway Width:	60 feet	*Approach Type:*	Visual	
Activity Data				
	2007	2008 Estimate	2013 Projection	
Based Aircraft:	0	1	1	
Operations:	2,900	2,961	3,285	
NPIAS Entry Criteria				
If any of the following questions are answered positively, then the airport is eligible.				
			Yes	No
Was the airport formerly included in the NPIAS?				X
Is the airport more than 30 minutes from the nearest NPIAS airport?			X	
-What is the closest NPIAS airport?			Yuma International	
-What is the driving distance in miles?			15 miles	
-What is the driving distance in minutes?			37 minutes	
Is the airport a reliever airport?				X
Does the airport receive U.S. mail?				X
Does the airport have a national defense role?				X
If all of the following questions are answered positively, then the airport is eligible.				
			Yes	No
Is the airport included in the SASP?			X	
Does the airport serve a community more than 30 minutes from the nearest NPIAS airport?			X	
Is the airport forecast to have 10 or more based aircraft?				X
Does the airport have a willing sponsor?			X	
If any of the following questions are answered positively, then the airport is eligible.				
			Yes	No
Do the airport's benefits outweigh its costs?				X
Does the airport serve the needs of the following:				
-Remote/isolated communities?				X
-Native American communities?				X
-Support recreational areas?				X
-Promote development or protect important national resources				X

Source: Arizona State Parks, Arizona Game and Fish Department, and Wilbur Smith Associates
Prepared: January 2009

Proposed Maricopa Airport

A new airport is proposed for the City of Maricopa, to be located in south central Arizona, approximately 35 miles south of Phoenix and 20 miles northwest of Casa Grande. Projections for the City of Maricopa are sizeable; the population growth rate is over 50 percent per year for at least the next five years, and employment is projected to grow at an even faster rate. If growth rates are sustained, Maricopa could be on pace to become a metropolitan center between Phoenix and Tucson.

In 2006, the City of Maricopa and the Arizona Department of Transportation commissioned an airport feasibility study[2] to assess the potential for a general aviation airport in the city. Estimates of based aircraft at the new Maricopa airport were made based on proximity to the Maricopa planning area and from registered aircraft per capita growth rates in Pinal County. In zip codes located within the primary service area, two of three registered aircraft were assigned to the new airport; while in zip codes on the fringe of the primary service area, 10 percent of the registered aircraft were assigned to the new airport. The result was a potential for an initial basing of 54 aircraft if the airport were to open in 2006, and an increase to 80 aircraft by 2010. The feasibility study was completed prior to the recent economic downturn and estimates of based aircraft and operations may now be lower than suggested in the study. It is important to note that this study may need to be revisited in order for the proposed airport to be considered for NPIAS candidacy. However, this NPIAS candidate analysis is a cursory examination and does not provide new estimates.

Determining potential operations at Maricopa Airport was estimated based on ratios of operations per based aircraft at existing area towered airports. The study estimated 32,400 annual operations in 2006, and 48,000 by 2010; 40 percent of which would be itinerant operations. As noted above, these estimates are based on good economic conditions that would be sustained through the completion of a new Maricopa airport.

When following FAA's guidelines and methodologies, the proposed Maricopa Airport, based on 2006 activity and based aircraft projections, appears to meet the criteria concerning airport demand and geographic location. The driving time to the nearest NPIAS airport, Casa Grande, is 40 minutes. This distance meets FAA criteria. In addition, the City of Maricopa is a willing sponsor of the airport. The airport would also help to promote and enhance the state's recreational and national resources being very close in proximity to the Gila River Indian Reservation and Sonoran Desert National Monument.

Using the benefit/cost analysis guidelines and data from the 2006 study, Maricopa Airport could qualify for the NPIAS soon after its development as the benefit would outweigh the cost of constructing the airport in 30 years. Using ADOT estimates of annual per aircraft benefit of $275,000, and study projections to have between 50 and 80 based aircraft when the airport is developed, the cost of constructing the new $44,000,000 airport could be paid for in less than five years. As business and corporate activity increases, the length of time for paying off the costs of construction would decrease.

If the airport were constructed, it appears that demand for the facility and the current proposed location would make the airport eligible for NPIAS consideration. Activity related to the airport's development should be monitored for future NPIAS consideration.

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[2] Coffman Associates: *City of Maricopa Airport Feasibility Study*. <www.coffmanassociates.com/public/Maricopa/. Prepared 2006>.

Superior Airport

The existing Superior Municipal Airport is located in southern Arizona, approximately 65 miles east of Phoenix. The airport has one gravel runway, 04/22, that is 3,250 feet long and 75 feet wide with visual approaches to both runway ends. In addition, there are no based aircraft, making the current Superior Municipal ineligible for NPIAS candidacy.

The Town of Superior purchased the airport property from Pinal County in 1999. The town is seeking to acquire another 181 acres of contiguous land. This acquisition would provide an opportunity for future expansion of the airport and economic diversification. The need for a new airport is also being driven by one local business, Resolution Copper, a mining company that has invested recently in the town and who would like to use the Superior Airport for its business needs. Resolution Copper cannot safely fly its aircraft into the current airport. A feasibility study for the relocation and expansion of the airport is planned but currently on hold. The timeframe on the development of a new airport is unknown, but may occur within the SASP forecast period. The activity at the airport should be monitored and candidacy for NPIAS inclusion should be evaluated as plans for the new airport are developed.

APPENDIX D: RELIEVER CANDIDATE AIRPORT ANALYSIS

The FAA classifies NPIAS airports as primary commercial service, non-primary commercial service, or general aviation. In addition to these classifications, a fourth class of airport deemed "Reliever" is also eligible to compete for federal funding from the FAA's Airport Improvement Program (AIP). Reliever airports are designated by the FAA to relieve congestion at commercial service airports and to provide improved general aviation access to the overall community. They may be publicly or privately owned. Currently, there are eight general aviation airports in Arizona that have reliever status, six of which are located in Greater Phoenix. These airports are listed here:

- Phoenix Metro Area
  - Chandler Municipal
  - Glendale Municipal
  - Phoenix Deer Valley
  - Phoenix Goodyear
  - Phoenix-Mesa Gateway
  - Mesa Falcon Field
  - Scottsdale
- Tucson Metro Area
  - Marana Regional
  - Ryan Field

It should be noted that while the most recent FAA NPIAS (2009-2013) still shows Phoenix-Mesa Gateway as a reliever, that the airport should be classified as a Primary Commercial Service Airport. This airport has maintained commercial airline service and has surpassed the 10,000 annual enplanement mark.

NPIAS RELIEVER CRITERIA

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems*, identifies criteria to determine the eligibility of airports to be included in the NPIAS. In Arizona's State Airports System, there are existing or proposed airports which could be considered for inclusion in the NPIAS as relievers. Significant changes in airport economics and Arizona since the previous State Aviation Needs Study have lead to this evaluation, based upon data from the 2008 Arizona State Airports System Plan.

An individual review should be conducted for each candidate reliever to determine whether there is a current or future significant requirement for additional general aviation capacity to relieve congestion at the nearby commercial service airport or to enhance general aviation access to the overall community. An airport should be designated as a reliever airport only if the review documents a significant requirement. The following sections discuss reliever airport criteria.

- High Activity Level – The reliever airport must have current activity levels of at least 100 based aircraft or 25,000 annual itinerant operations (a heliport may qualify as a reliever if it has one half of this activity level). In the case of a new airport or an existing airport it must have a forecasted activity level of at least 100 based aircraft or 25,000 annual itinerant operations for the time period in which it is being designated as a reliever.
- Reliever to Commercial Airport – The relieved airport must be a commercial service airport that serves a metropolitan area with a population of at least 250,000 persons or at least 250,000 annual enplaned passengers. The relieved airport also must

operate at 60 percent of its capacity, or would be operated at such a level before being relieved by one or more reliever airports, or is subject to restrictions that limit activity that would otherwise reach 60 percent of capacity.

- Grandfathered Reliever Status – Privately owned airports currently designated as reliever airports that do not meet the new reliever criteria but have received AIP funds and are subject to grant obligations will retain the reliever airport designation and therefore remain eligible for AIP funds. These grandfathered airports will retain their reliever designation until the grant obligations have been met (10 years for privately owned airports). Those airports that do not meet the new reliever criteria and have not received AIP funds should be re-designated as general aviation airports or removed from the NPIAS.

Once it is established that one or more reliever airports are determined to be necessary to serve a community, issues of complexity, general location, and total number of reliever airports must be considered.

- Complexity – One reliever should be recommended as an all-weather instrumented facility primarily to serve itinerant general aviation activity. This reliever should be located with respect to the city center or business or industrial district served by the relieved airport, so that it will provide essentially the same user conveniences as those provided by the relieved airport.
- General Location – Any additional relievers, if required, may be less complex if they primarily will accommodate locally based small aircraft. Location in relationship to aircraft owners to be served or to an area well suited for instrument training should not be a consideration; access to the city center is the primary concern.
- Total Number of Relievers – Depending upon optimum siting conditions, there are situations where a single reliever can adequately serve both transient itinerant activity and based aircraft requirements. There are also situations where more than one reliever is needed to provide the required degree of relief. Most of the latter instances occur in large, densely populated metropolitan areas where reliever airports must be planned on a system basis and where optimum airport locations are not available (not unlike Phoenix).

It should be noted that prior to recommending the inclusion of a reliever airport in the NPIAS, the airport to be relieved must be examined for alternative means of expanding its capacity and relieving congestion. In every instance, recommendation of a short runway (not necessarily parallel) should be considered to serve general aviation in lieu of or in conjunction with a reliever airport.

EXISTING RELIEVERS FOR PHX

In 2007, Phoenix Sky Harbor International Airport (PHX) enplaned 15.4 million passengers and had over 539,000 annual operations. According to the 2008 SASP, PHX operated at 79 percent of capacity in 2007. Operations at PHX are expected to exceed capacity during the forecast period, with the demand/capacity ratio reaching 132 percent by 2030.
There are currently seven reliever airports (including Phoenix-Mesa Gateway) in the Greater Phoenix area, all helping to relieve congestion at Phoenix Sky Harbor International Airport (PHX) while providing valuable general aviation access to their respective communities. Figure D-1 shows the locations of each existing reliever in relation to PHX.

Figure D-1: Location of Existing Reliever Airports in Phoenix Metro Area

Source: Wilbur Smith Associates

Figure D-2 below displays the activity levels and driving times/distances for the existing reliever airports, which are criteria for determining reliever status. All existing reliever airports meet or exceed minimum requirements.

Figure D-2: Based Aircraft and Activity at Phoenix Metro Area Reliever Airports and Driving Time/Distance to Phoenix Sky Harbor

FAA ID	*Airport*	*Based Aircraft (2007))*	*Itinerant Operations (2007)*	*Driving Miles to Phoenix*	*Driving Time to Phoenix*
CHD	Chandler Municipal	499	89,379	27	35
DVT	Phoenix Deer Valley	1274	141,224	20	32
FFZ	Falcon Field	947	141,665	25	31
GEU	Glendale Municipal	413	43,753	20	27
GYR	Phoenix Goodyear	276	87,416	20	28
IWA	Phoenix-Mesa Gateway	103	88,327	31	44
SDL	Scottsdale	447	133,374	20	33

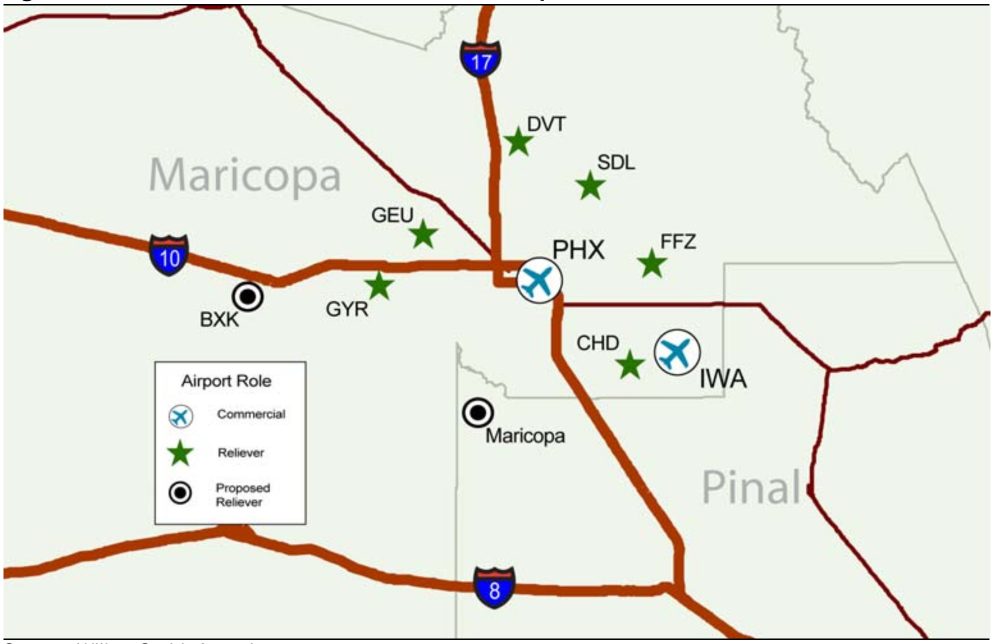
Sources: Airport Inventory and Data Survey, Google Maps

POSSIBLE NEW RELIEVERS

The airport relieved, PHX, far exceeds its criteria of having 250,000 annual enplanements or serving a community of at least 250,000 people, which fulfills one of the desired criteria for a reliever. Despite the current presence of seven reliever airports in Greater Phoenix, projections of future aviation demand due to the staggering growth of the Phoenix Metropolitan Statistical Area (second fastest growth rate in the U.S.) will require greater reliever capacity. This section discusses the suitability of two regional general aviation airports to become Reliever airports for Phoenix Sky Harbor International (PHX). The airports are Buckeye Municipal and Maricopa Airport, the latter of which is a proposed airport. Figure

D-3 depicts the location of both Buckeye Municipal and the proposed Maricopa Airport in relation to PHX and existing reliever airports.

Figure D-3 Current and Potential Candidate Reliever Airports in Phoenix Metro Area



Source: Wilbur Smith Associates

Buckeye Municipal Airport

Buckeye Municipal Airport is located in the City of Buckeye approximately 38 miles west of downtown Phoenix. Buckeye was ranked as the second fastest growing suburb in the U.S. after the population grew 192 percent between 2000 and 2006. In 2007, Buckeye Municipal had 62 based aircraft and a total of 9,425 itinerant operations; which does not currently meet the desired criteria of 100 based aircraft or 25,000 itinerant operations.

Although the population of Buckeye is rapidly growing, there is not enough current activity from itinerant flights to warrant reliever status at Buckeye Municipal. Not only are the activity levels not sufficient, but its location in relation to existing relievers also works against its cause. Buckeye lies directly west of Phoenix where two existing relievers, Phoenix Goodyear and Glendale Municipal, lie halfway between Buckeye and downtown Phoenix. Situated in the path of major population and economic growth west of Phoenix, these two airports are heavily used and absorb much of the general aviation demand in the area. Current planning for Phoenix Goodyear includes development of a parallel runway to provide capacity relief and to better separate single engine aircraft from the larger aircraft, while plans for Glendale Municipal include a runway extension and taxiway development to accommodate larger business jets and increase overall capacity. There are also potential issues related to the expansion of Buckeye Municipal due to the location of the Yuma Proving Ground to the southwest.

It appears that by expanding capacity at Phoenix Goodyear and Glendale Municipal would be sufficient, at least in the near term, to provide the region with an effective reliever airport system. However, activity levels at Phoenix Sky Harbor, as well as Phoenix Goodyear and Glendale Municipal should be monitored to determine the need for additional activity relief.

Proposed Maricopa Airport

Maricopa Airport is a proposed airport for the City of Maricopa, to be located in south central Arizona, approximately 42 miles south of Phoenix. Future growth projections for the City of Maricopa are sizeable. With population and business growth comes growth in aviation demand, so a future Maricopa Airport could be a key asset to the growing economy of Greater Phoenix. A 2006 feasibility study estimates Maricopa Airport to have 80 based aircraft in 2010 and 140 by 2015, assuming the aircraft was constructed before that time. Annual operation estimates from the 2006 study are 48,000 in 2010 and 84,000 by 2015. These estimates do not account for the recent economic downturn which would likely drastically decrease the activity estimates. As of early 2009, the community was requesting airport inclusion in the FAA NPIAS and no construction had been initiated.

It is estimated that initial activity levels at Maricopa Airport would most likely not be sufficient for reliever status. However, with the growth that had occurred in the City of Maricopa prior to the economic downturn, it was estimated that activity levels would grow rapidly at the newly built airport. The study's projections, which were prepared based on registered aircraft per capita growth rates in Pinal County, estimate 31,000 itinerant operations and 140 based aircraft by 2015, more than sufficient for reliever status if these levels were achieved and additional capacity relief was still important in the Phoenix metropolitan area.

Location is the other major factor considered in the NPIAS Reliever analysis. The distance from Maricopa to downtown Phoenix is on par with the other reliever airports, and its proposed location would make it the only NPIAS airport southwest of Phoenix. This, in conjunction with general aviation demand projections, makes it a potential candidate to achieve reliever status should the airport be constructed and demand in the region continue at its recent pace.