A R I Z O N A

STATE AVIATION SYSTEM PLAN UPDATE

2018 TECHNICAL REPORT | ADOT

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State Aviation System Plan Update

Prepared for

Arizona Department of Transportation
Aeronautics Group
1801 W. Jefferson St.
MD 426M
Phoenix, AZ 85007

Final Report
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PLANNING ADVISORY COMMITTEE MEMBERS

The Arizona Department of Transportation (ADOT) requested participation from stakeholders throughout the state to serve on a Planning Advisory Committee (PAC) for the State Aviation System Plan (SASP) Update. The PAC members represented aviation, industry, and governmental agencies and served as a sounding board to ADOT. The PAC's input and guidance was an important element of the overall process. ADOT Aeronautics and the Consultant Team would like to thank the PAC members that participated in the project:

Amanda Shankland | Former Sedona Airport Authority

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INTRODUCTION

This chapter establishes the framework for the Arizona State Aviation System Plan (SASP) Update. After providing an overview of the study intent, chapter one provides the following baseline information:

1. Reviews the purpose of aviation system planning
2. Summarizes the study process
3. Reviews existing relevant studies
4. Establishes the study vision, goals, and performance measures

This information serves as the foundation for all subsequent tasks of the SASP Update. For reference, a glossary of terms can be found in **Appendix A**.

STUDY OVERVIEW

The SASP Update serves as a roadmap to guide long-term aviation planning in the state. This plan provides important insight into how Arizona's airports can remain highly advanced, safe, and responsive to the public's needs in today's global economy.

The Arizona Department of Transportation (ADOT) conducted the first SASP in 1978; this document was subsequently updated in 2000 and 2008. Since that time, aviation in general and specifically in Arizona has confronted significant changes affecting the management, funding, and operations of airports. ADOT has experienced substantial changes since 2008. From staff and funding reductions to the implementation of new Federal Aviation Administration (FAA) regulations and procedures that affect ADOT's policies and procedures; ever-advancing technological trends, such as new based aircraft reporting systems (i.e., basedaircraft.com), unmanned aerial systems (UAS), and the continued expansion of NextGen; and overall changes in commercial airline service and general aviation (GA) demand, these changes have a great impact on the future Arizona aviation system needs.

In addition to these broader trends and issues, the ADOT Aeronautics Group (or ADOT Aeronautics) completed the most recent *Economic Impact of Aviation in Arizona*. This document quantifies the impact of aviation in the state and provides insight into most valuable areas for investment and development. This study and other trends, issues, and requirements are important considerations in airport system planning and are considered in the development of planning recommendations.

Given these and other changes, ADOT Aeronautics determined that an update to the SASP was needed. The FAA also supported the SASP Update based on the agency's three broad conditions that indicate a system plan update is warranted: changes in airport roles; the implementation of development projects; or in response to issues that affect the operation and development of system airports (Advisory Circular [AC] 150/5070-7, Change 1, §601).[1] These triggers have played a role in catalyzing the need for the 2018 SASP Update.

[1] Aviation system planning is guided by the FAA's AC 150/5070, Change 1, *The Airport System Planning Process*.

The ADOT Aeronautics Group designed the 2018 SASP Update to analyze a number of specific issues currently affecting the aviation system, such as funding, existing and future levels of service, available facilities, and non-aviation influences on airports (e.g., land use around airports, highway development, and UAS). Yet more broadly, understanding each of these issues helps to answer several questions posed by ADOT Aeronautics in the 2018 SASP Update:

1. Is the airport system performing at its optimal level?
2. What enhancements will improve overall system performance while ensuring a continual process for system optimization over the planning horizon?

These questions serve as the guiding principles of this study and inform all subsequent analyses leading to the system recommendations developed as the final step of the SASP Update.

PURPOSE OF AIRPORT SYSTEM PLANNING

At the state level, airport or aviation system planning helps aviation agencies determine the “type, extent, location, timing, and cost of airport development needed…to establish a viable system of airports” (AC 150/5070-7, Change 1, §201a). At the Federal level, the FAA’s *National Plan of Integrated Airport Systems* (NPIAS) represents a comprehensive planning document that supports the agency’s strategic goals for safety, system efficiency, and environmental compatibility. The NPIAS summarizes the needs deemed significant to the National Airspace System (NAS). At the airport-specific level, master plans provide detailed, long-term development plans and financial implementation schedules.

State system planning exists between the NPIAS and airport-specific master plans by feeding “information *up* to be consolidated into the NPIAS and *down* to provide goals and development recommendations for individual airports” (AC 150/5070-7, Change 1, §201d). States and the FAA can then use the system planning results to guide decision-making and responsibly apply resources to develop a network of airports consistent with existing and future needs. This process is primarily achieved by coordinating the NPIAS with the Airports Capital Improvement Program (ACIP), which applies a systematic process for identifying, prioritizing, and assigning funds to those projects most critical for the NAS. The national ACIP provides the basis for the distribution of Airport Improvement Program (AIP) grant funds to specific airport improvement projects. Airports must be included in the NPIAS to receive a Federal AIP grant.

It is also important to recognize that there are airports not included in the NPIAS that are still included in state airport systems. These airports may serve important roles in the state system but do not meet the NPIAS criteria. According to AC 150/5070-7, Change 1, §210b, airports not included in the NPIAS should be included in system planning projects “only to the extent they play an essential role in the state or metropolitan airport system or affect airspace considerations related to NPIAS airports.” Due to the importance of all public-use airports to Arizona’s communities, particularly in consideration of the state’s extensive rural expanses, all public-use airports have been included in the 2018 SASP Update.

STUDY PROCESS

Figure 1 depicts the relationships between the nine tasks identified by ADOT that comprise the study process. As depicted, there are many interrelationships between tasks that help to inform and assist in the development of the final report.

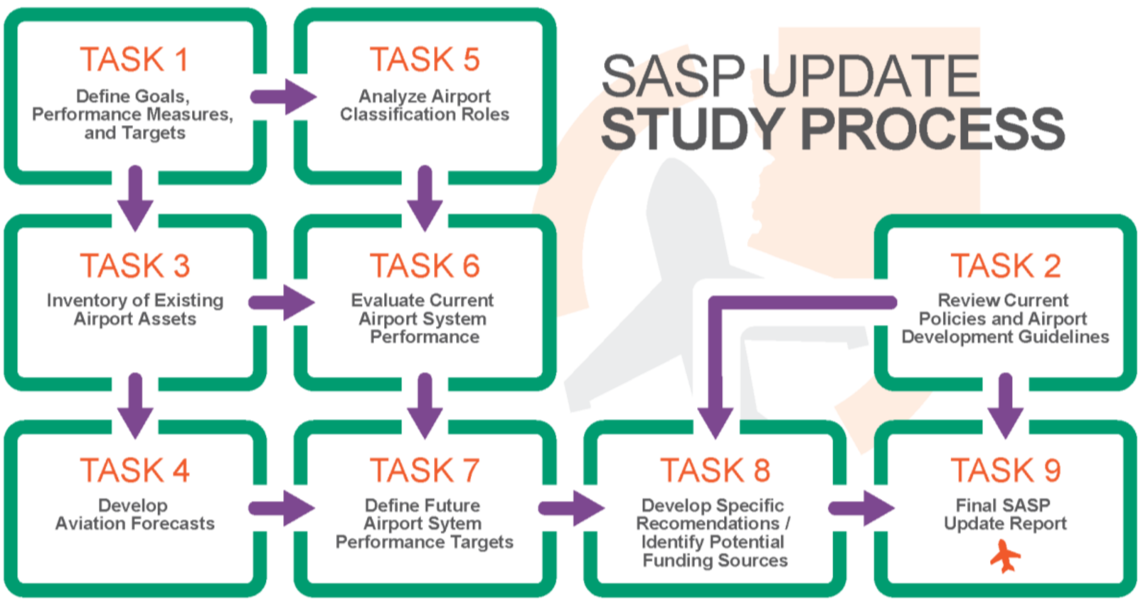

Figure 1. SASP Update Study Process

An overview of the primary objectives of each task is provided below.

1. **Tasks 1 and 2** are primarily aimed at setting the stage for the study by defining the vision and goals of the state airport system; reviewing the policies, issues, and guidelines affecting airports; and identifying the airports included in the analyses. These tasks also define the goals, performance measures, and indicators used to evaluate the status and performance of Arizona's airport system and inform the data that is required in the measurement process.
2. **Task 3** includes an extensive inventory of all airport assets using existing data and an airport survey with follow-up site visits. A business survey is implemented to capture additional data about aviation use in the state. This task informs the analysis of system deficiencies, as well as areas where airports are performing well.
3. **Task 4** results in aviation forecasts to provide a general understanding of future aviation needs and where growth is most likely anticipated. These insights help ADOT and airport sponsors pinpoint areas where improvements may be most valuable and guide the decision-making processes.
4. **Task 5** analyzes the role that each airport plays in the Arizona airport system based on the extensive data gathered during tasks one through four. These roles are valuable in determining the level of development needed at each airport. Each facility plays a unique role in the system and must be treated in a way that best reflects the needs of the airport, its users, and other facilities in the surrounding region.

5. **Task 6** produces a report card that identifies where the existing airport system is adequate or deficient based on the goals and performance measures established at the start of the project. Airport classifications determined in task five are critical to this task. Solutions, and the party responsible for implementing each solution, are provided for each deficiency identified during the study process. This report card is a key outcome of the SASP Update and is used to develop recommendations for the airport system.
6. **Task 7** defines targets for future system performance and identifies the areas where improved system performance would be most valuable.
7. **Task 8** includes the development of specific recommendations to achieve the performance improvements identified in task seven. Costs for improving the system are also determined, and recommendations are made regarding funding sources.
8. **Task 9** provides the final recommended SASP Update. This recommended plan utilizes all data gathered in earlier tasks and other additional data sources to provide a list of prioritized strategies for enhancing aviation in the state. The task also considers if there is a need for additional airports to meet capacity deficiencies in certain areas.

The final SASP Update provides guidance on specific, prioritized actions that can be implemented to ensure Arizona's aviation system continues to meet the public's evolving aviation needs.

Project Advisory Committee

The SASP Update is guided by a Project Advisory Committee (PAC) assembled by the ADOT Aeronautics Group at the beginning of the study. This committee is engaged at every stage of the study process to provide important guidance and regional-specific insight into the future of aviation in Arizona. The PAC comprises stakeholders from across the state with a broad range of knowledge and experience in airports, aviation, and other statewide issues impacting the airport system. The PAC represents the following types of organizations:

1. Federal, state, and Tribal agencies
2. Airports, including rural, urban, GA, and commercial service facilities
3. Stakeholder organizations representing various types of aviation users
4. U.S. military

ADOT benefits from the unique perspectives offered by the PAC members to develop a system representative of the state's diverse communities. The PAC participates in meetings, reviews documentation, and provides input to ADOT on the study's findings and recommendations.

REVIEW OF PREVIOUS STUDIES

Framing the SASP Update within its historic context is an important aspect of the study process. The ADOT Aeronautics Group, regional partners, airport sponsors, municipalities, and other state agencies have completed various planning studies that guide transportation development in Arizona. State system planning impacts Federal (via the NPIAS) and airport-specific (via the master planning) planning processes. In turn, state efforts can be influenced by the content, tone, and direction of other transportation efforts. Aligning system planning with Federal initiatives can help prioritize projects to advance a coordinated set of strategic goals across the NAS. At all levels, previous studies can provide critical information on recent, ongoing, and future efforts that may be leveraged to maximize limited resources as multiple entities work towards a similar end.

2017 – 2021 NPIAS Report

The FAA's 2017 – 2021 NPIAS Report identifies airports that are considered significant to national air transportation and support civil aviation, national defense, and the U.S. Postal service. According to this recent NPIAS Report, approximately 5,136 public airports are located in the U.S. Sixty-five percent of these airports (3,332 existing and eight proposed), which encompass all commercial service and selected GA airports, are included in the NPIAS. General eligibility requirements are as follows:[2]

1. Included in an accepted SASP and/or metropolitan airport system plan (MASP), if available
2. Serves a community more than 30 minutes from an existing or proposed NPIAS airport
3. Forecasted to have 10 based aircraft during the short-range planning period (i.e., within five years)
4. Supported by an eligible sponsor willing to undertake the ownership and development of the airport

In addition to identifying those airports of national importance, airports must be included in the NPIAS to receive AIP funds from the FAA. Airports must also fulfill one of the following criteria to receive an AIP grant:

1. Publicly owned
2. Privately owned but designated as a reliver by the FAA
3. Privately owned but providing schedule air service and at least 2,500 annual enplanements

The 2017-2021 NPIAS Report estimates $32.5 billion in airport improvement needs across the country.[3] Arizona's 59 NPIAS airports are estimated to have $402 million of airport development needs within the next five years (FAA 2016). These cost estimates were primarily obtained from airport master and state system plans developed in accordance with FAA forecasts of aviation activity, follow agency guidelines, and have been accepted by FAA planners familiar with local conditions (Ibid., vi). Because identified needs exceed available funding, state planning efforts also help prioritize projects for implementation. Recommendations in this SASP Update consider the needs identified in the NPIAS and individual airport master plans.

The Economic Impact of Aviation in Arizona — 2012

Arizona's aviation system serves as a significant cornerstone of the state's economy. The system offers excellent commercial air service, a vibrant aerospace manufacturing base, and a strong GA community. The state's superior flying conditions have led to a strong military presence and one of the nation's largest and most elite flight training markets that draws foreign and domestic student pilots from around the globe.

ADOT Aeronautics Group commissioned *The Economic Impact of Aviation in Arizona – 2012* to quantify how these assets impact the state's economy. The study analyzed the seven primary components of the aviation industry encompassing commercial, general, and off-airport aviation activities; aerospace manufacturing; military aviation; aviation education; and tourism. The state's 12 commercial service airports provide one of the largest economic impacts in the industry and serve as a gateway for more than 9.9 million out-of-state visitors traveling to Arizona each year. In total, the study found that total economic activity is estimated at nearly $58 billion across Arizona and is responsible for 408,625 jobs and $21 billion in payroll.

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[2] The NPIAS entry criteria is contained in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS)*, available at www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/12754.
[3] The 2017-2021 NPIAS Report is based on airport master and state system planning efforts conducted through 2015 (pp. vi).

Despite these significant figures, the study reported that aviation has posted slower-than-anticipated growth in the five years prior to the report primarily due the recession between 2007 and 2009 and associated real estate crash, as well as rising gasoline prices. Aviation-related employment has been particularly hard-hit by the economic slowdown. While payroll and total economic activity have risen above inflation rates, employment declined approximately 13 percent since the study was last completed in 2002. This decline is specifically attributed to factors including airline consolidations, fewer commercial flights, and less GA activity and operations due to the high cost of flying and aircraft ownership.

Enplanements were 13 percent higher than 2001; however, rates remained below the peaks of 2005 through 2007. The study forecasted that enplanements will grow at an annual rate of 2.8 percent over the next two decades (Elliot D. Pollack & Company 2012).

Arizona Airport Pavement Management System

Grant assurances for projects funded under the FAA 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) in 2003.

The program provides pavement evaluation, design services, construction administration, and construction management at more than 60 airports statewide. The system prioritizes preventative maintenance projects with the greatest benefit for pavement dollar expended. The system also identifies pavement sections with a pavement condition index (PCI) below the level where they can be maintained and instead require rehabilitation.

Between 2013 and 2016, 39 airports in Arizona received pavement maintenance projects through the APMS program. The total APMS construction costs during this time period are presented in **Table 1**.

Table 1. APMS Construction Costs (2013 – 2016)

Year	Annual Cost ($)
2013	$5,252,543
2014	$4,801,721
2015	$6,304,774
2016	$4,675,111

Source: Arizona Airport Pavement Management System 2017

As of May 2017, the ADOT Aeronautics Group suspended APMS rehabilitations through 2019 due to funding shortfalls. PCI evaluations will continue to monitor the status of airport pavement in Arizona.

ESTABLISHMENT OF SYSTEM VISION, GOALS, AND PERFORMANCE MEASURES

Planning processes typically begin with the end goal. Accordingly, articulating a vision statement that expresses the essential need for Arizona’s aviation system to be forward-thinking, innovative, and responsive was a key first step of the SASP Update. A vision statement is a strategic goal that clearly and concisely conveys an organization’s aspiration for its future. This message can serve as a compass by helping organizations determine the actions that will—or will not—advance its goals. Vision statements communicate purpose and intent and serve as an invaluable strategic decision-making tool.

This vision can then lead to the development of goals and associated goal categories that provide the framework for evaluating the overall efficacy of the system and identifying opportunities for improvement and specific areas of achievement. Based on these goals, key performance measures and indicators were developed to serve as the tools by which the aviation system could be evaluated.

The relationship between the system vision, plan goals, performance measures, and policy recommendations is depicted in Figure 2.

Figure 2. System Plan Update Process

System Plan Vision

Arizona's constituencies range from urbanites in the Phoenix and Tucson metropolitan areas to rural Tribal communities without access to a robust multimodal transportation network. Arizona's aviation system must mirror this diversity to adequately serve residents, visitors, and businesses and provide reasonable levels of access to aviation serves. To reflect the diverse demands placed upon the system and based on feedback received from the PAC and ADOT Aeronautics Group, the vision of the SASP Update is:

> ***To provide the framework that will allow Arizona's aviation system to meet the needs of citizens, visitors, and businesses by supporting economic competitiveness, connectivity, and accessibility with a commitment to safety, sound resource management, and partnerships.***

This vision also reflects ADOT's responsibility to serve as trusted stewards of public funds, the reality of limited funding resources, and growing investment needs across the state. Achieving such a system demands the continued engagement of ADOT; cities, counties, and other public agencies; airports and airport sponsors; the business community and industry; and the millions of citizens and visitors who rely on Arizona's airports each year.

System Plan Goals and Goal Categories

Goals provide overarching direction for the state system and the framework for defining the performance measures and indicators used to determine the health and adequacy of the system. As part of the first PAC meeting, all participants responded to the question, "The Arizona airport system is _______?" Members were then asked to rank the importance of each of the responses to better understand members' perspectives on the system. PAC members indicated that the key attributes of the system are "business-oriented," "partnerships," and "safety." These key characteristics have been incorporated into the following SASP goal categories, each of which includes a brief statement that describes its purpose in creating ADOT's vision for the future:

1. **Safety and security.** Arizona should maintain a safe and secure airport system as measured by compliance with applicable safety and security standards while supporting health and safety-related services and activities.
2. **Fiscal responsibility.** Arizona should implement cost-effective investment strategies to meet current and projected demand while remaining adequately accessible to Arizona's citizens, visitors, and businesses.
3. **Economic support.** Arizona should advance a system of airports that promote Arizona's economic growth and development.

System Plan Performance Measures and System Indicators

During the 2008 SASP, 52 performance measures were measured to evaluate Arizona's airport assets. During the course of this update process, ADOT personnel and the PAC recognized the need to reduce the number of measures to focus data that is measurable, meaningful, and can effectively be used to monitor progress over time. ADOT and the consultant team reviewed the existing measures and determined that 29 measures gathered data that were valuable to know from an informational perspective, but not necessarily an appropriate measure by which to evaluate the performance of Arizona's airports. As a result, these informational measures were termed performance indicators. Performance measures are the actionable data that will serve as the mechanism to define baseline existing conditions and provide a consistent framework for monitoring progress over time.

After delineating data as performance measures and system indicators, PAC members were asked to provide input on the most essential performance measures. Based on this feedback, ADOT and the consultant team identified the 11 key performance measures and 11 key system indicators used to evaluate the health and adequacy of Arizona's aviation system. These data are presented by goal category in **Table 2**. The table also provides a brief statement outlining the relevancy of each measure in determining the health and adequacy of the Arizona system.

Table 2. Performance Measures and System Indicators by Goal Category

Goal Category	Performance Measure	Relevancy
Safety and security	Percent of airports capable of supporting medical operations	Supports community access to specialized and emergency care (particularly important for rural communities)
	Percent of airports with surrounding municipalities that have adopted controls/zoning, including "disclosure areas," to make land use in the airport environs compatible with airport operations and development	Supports safety of pilots, passengers, and individuals on the ground in the vicinity of an airport
	Percent of airports controlling all primary runway end runway protection zones (RPZs)	
	Percent of airports that have runway safety areas (RSAs) on their primary runway that meet the standards for their current airport reference code (ARC)	
	Percent of airports with clear approaches to both ends of the primary runway	
	Percent of airports with adopted wildlife plans in accordance with appropriate FAA regulations	
Fiscal responsibility	Percent of population within 30 minutes of an all-weather runway (paved, instrument approach, weather reporting)	Provides full accessibility to aviation services at all times, including inclement weather
	Number of airports with a current (past five years) master plan	Demonstrates responsible airport investment by ensuring resources are devoted to current needs, including local community support for the airport
	Percent of airports with a PCI of 70 or greater	Demonstrates responsible use of funds by devoting resources to runway maintenance projects instead of costly runway reconstructions
Economic support	Percent of airports with 24/7 fuel	Demonstrates the airport's support for aviation demand
	Percent of airports that are recognized in local/regional growth plans	Protects the airport from future development and demonstrates recognition of the airport's role in the community
	Percent of airports with the facilities to support jet aircraft	Supports the type of activity most often used by business/corporate aviation users

Goal Category	System Indicator	Relevancy
Safety and security	Percent of airports that have a written emergency response plan	Supports the safety of pilots, passengers, and individuals on the ground in the vicinity of an airport
	Percent of airports that have active programs to clear obstructions from their approaches	
	Percent of airports that support aerial firefighting operations	Provides critical safety services to protect local and regional communities
Fiscal responsibility	Percent of population within 30 minutes of a system airport meeting business user needs	Provides support for business/corporate aviation users
	Percent of communities in the state with a population greater than 5,000 with a 60-minute drive time of a commercial service airport	Provides community access to scheduled commercial service
	Percent of communities in the state with a population greater than 1,000 with a 30-minute drive time of a GA airport	Provides community access to the aviation activities supported by GA airports
	Number of airports with utilities (i.e., electricity, telephone, water, sewer, and gas)	Facilitates aviation- and non-aviation-related activities at an airport

	Percent of population within 30 minutes of a NPIAS airport	Supports community access to airports deemed significant to NAS
Economic support	Percent of system airports supporting flight training	Supports one of the most significant types of aviation-related revenue streams
	Dollars of direct and indirect economic impact in the state from aviation	Demonstrates the significant economic impacts provided by airports

Source: Kimley-Horn 2018

The vision, goals, and performance measures and indicators established in this chapter serve as the basis for the report card developed as part of Task 6. This report card identifies where the existing system is adequate, deficient, or duplicative in terms of infrastructure and services.

SUMMARY

The information presented in this chapter guides the remaining tasks of the SASP Update. The information presented in this chapter is used to:

1. Assess the existing condition and performance of the aviation system
2. Guide the on-site inventory process by identifying data needs
3. Help determine the feasibility and prioritization of future recommendations
4. Pinpoint specific areas for improving the system's abilities to meet the state's needs, including modifications to ADOT Aeronautics Group policies and funding procedures
5. Identify the need to conduct future studies on Arizona's aviation system

CHAPTER TWO: REVIEW OF CURRENT POLICY

INTRODUCTION

In recent years, the aviation industry has faced a number of major shifts impacting the technology, regulations, and economics of flight. While some trends affect airports across the globe, others will be realized differently in Arizona. Policies—including those governing aviation—arise out of specific historical contexts and are driven by complex variables such as economic, geopolitical, and demographic conditions. Over time, all policies should be re-evaluated to ensure their continued efficacy and appropriateness to govern existing and projected future conditions.

This chapter provides an overview of Arizona's current aviation-related policies to serve as the framework for a subsequent evaluation of these policies' continued ability to meet the needs of Arizona's residents, visitors, and businesses. It also provides important background information for the policy recommendations that will be developed as one of the final outcomes of the 2018 SASP Update. A comparison of the duties assigned to the Arizona Department of Transportation (ADOT) Aeronautics Group with other states is also provided to help inform future policy recommendations.

REVIEW OF CURRENT STATE POLICIES

In the U.S., governance occurs through the passage of laws by the legislative branch and the subsequent implementation of those laws by state agencies within the executive branch. Arizona's laws as established by the Arizona Legislature are codified in the Arizona Revised Statutes (A.R.S.). At the agency level, the State Transportation Board (STB) and ADOT are responsible implementing all transportation-related laws through a series of rules and guidelines developed in accordance with the A.R.S.

Based on this structure, a comprehensive review of the policies governing the state aviation system necessitates an evaluation of the following three components of transportation policy:

1. A.R.S. Title 28 — Transportation
2. STB Aviation Policies
3. ADOT Five-Year Development Program[1]

It is important to remember that these three policy components are interrelated, with the A.R.S. establishing the baseline laws governing the system and STB Policies and Five-Year Development Guidelines providing for their administration and execution in the state. **Figure 1** provides a general overview of the roles and relationship between A.R.S. Title 28, the STB, and the ADOT Aeronautics Group. Additional details about each of the topics presented in the figure are presented throughout the chapter.

[1] The administrative policies and guidelines associated with ADOT's Five-Year Development Program are outlined in the Airport Development Guidelines (2016). As described in further detail in this chapter, the Five-Year Development Program specifically refers to the five programs developed for the allocation of the State Aviation Fund. The Airport Development Guidelines is ADOT's broader administrative guidebook for airports. Thus, while the Five-Year Development Program and Airport Development Guidelines are inextricably related, they are not interchangeable.

A.R.S. Title 28

- Provides the governing legislation of the Arizona transportation system
- Defines the powers and duties of the STB and ADOT
- Establishes the laws governing the aviation system
- Creates the State Aviation Fund and identifies the revenue sources available to it

STB

- Provides the rules administering the effective implementation of A.R.S. Title 28, including those relating to priority programs for airport development and issuing airport grants
- Allocates the State Aviation Fund in an equitable, efficient, and effective manner
- Approves the distribution of the State Aviation Fund for airport improvement projects

ADOT Aeronautics Group

- Administers and implements the policies of the STB
- Prepares the Five-Year Airport Development Program to support the allocation of the State Aviation Fund
- Cooperates with all state, local, and federal organizations to encourage and advance the safe and orderly development of aviation in the state
- Administers the Five-Year Airport Capital Improvement Program (ACIP), which becomes part of the ADOT Five-Year Transportation Facilities Construction Program

Source: Kimley-Horn 2017

Figure 1. Key Purposes and Overview of A.R.S. Title 28 — Transportation, the STB, and the ADOT Aeronautics Group

Arizona Revised Statutes Title 28 — Transportation

The A.R.S. are codified into a series of 49 titles, each of which addresses a specific area of governance.[2] Title 28 — Transportation governs Arizona's transportation systems and codifies all laws relating to motor vehicles, roadways, rail, public transit, aeronautics, and other transportation modes. The statutes under Title 28 establish both the STB and ADOT and provide the set of mandates, powers, and duties for each entity to govern transportation in Arizona.

Aircrafts and airports are specifically addressed in A.R.S. Title 28, Chapter 25, Aviation. As presented in **Table 1**, Chapter 25 addresses issues ranging from the organization and powers of the ADOT Aeronautics Group to aircraft operation, registration and taxation, and dealers; airports; airport zoning and regulation; and joint powers airport authorities.[3]

[2] Two titles have since been repealed, so the A.R.S. addresses 47 topics.

[3] The A.R.S. refers to the ADOT Aeronautics Division. However, the division has since been re-organized under the ADOT Multimodal Planning Division to become the ADOT Aeronautics Group.

Table 1. Articles of A.R.S. Title 28, Chapter 25

Article	Title
	Article 1. General Provisions
28-8201	Definitions
28-8202	State aviation fund
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
28-8210	Civil air patrol; federal monies
	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; classification
28-8280	Careless or reckless aircraft operation; violation; classification; definitions
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

Article	Title
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
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
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28-8344	Aviation fuel tax; rate; definition
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Article 7. Airport Zoning and Regulation	
28-8461	Definitions
28-8462	Airport hazard; public nuisance; prevention and elimination

Article	Title
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28-8466	Zoning regulations; relationships
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28-8482	Incorporation of sound attenuation standards in building codes
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28-8485	Airport influence areas; notice
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Article 8. Joint Powers Airport Authority	
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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 Revised Statutes 2017

Specific Policy Implications

As shown in **Table 1**, many of the articles of A.R.S. Title 28, Chapter 25 do not impact the operations or activity of the ADOT Aeronautics Group or airports specifically, but instead focus on general provisions, aircraft operations, and aircraft dealers. The SASP Update primarily addresses the requirements of Article 1. General Provisions and Article 2. Aeronautics Division, although the analyses and recommendations developed during this process may have implications for other provisions, as well. Several key statutes with the greatest ability to impact Arizona's aviation system are highlighted here.

State Aviation Fund

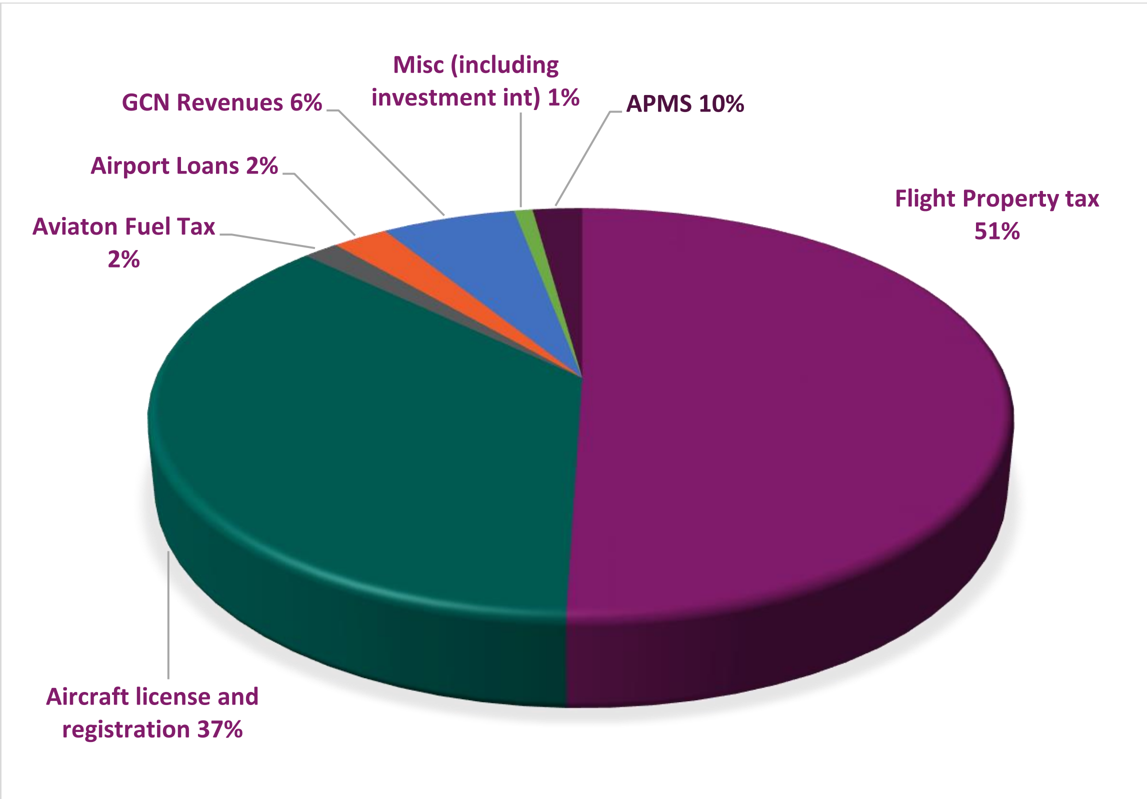
A.R.S. 28-8202 establishes the State Aviation Fund for the planning, design, development, acquisition of land, construction, and improvement of publicly owned and operated airport facilities in Arizona. These funds are derived from:

1. **Flight property tax.** Tax on the full cash value of flight property operated by airline companies in Arizona (A.R.S. 42-14255).
2. **Aircraft license tax and registration fees.** Tax levied on all aircraft customarily maintained and registered in the State of Arizona except regularly scheduled aircraft operated by an airline company for hire or other types of aircraft specifically excluded. The tax is levied at a rate of 0.5 percent of the average fair market value of the particular make, model, and year of aircraft. The minimum tax is $20 dollars per year (A.R.S. 28-8335).
3. **Airport loan payments.** Airport loan payments associated with the Airport Loan Program (additional details provided in the Five-Year Development Program Guidelines section below).
4. **Investment interest.** Monies earned through the investment of the State Aviation Fund as provided for in A.R.S. 35-313.
5. **Grand Canyon National Park Airport (GCN) revenues.** GCN is owned by ADOT and revenues are deposited in the State Aviation Fund (A.R.S. 8204). Revenues from GCN may include but are not limited to:

   - Landing and takeoff fees for commercial aircraft
   - Aircraft tiedown fees
   - Terminal and land space rental fees
   - Fuel flowage fees
   - Commercial-use ramp fees
   - Security and commercial ground transportation fees

6. **Aviation fuel tax.** Tax is levied on both Jet A fuel used by jet aircraft and AvGas (100LL) used in piston engines. The jet fuel excise and jet fuel use taxes are levied at a rate of $0.0350 per gallon on the first 10 million gallons of fuel (A.R.S. 42-5352). All jet fuel purchased in excess of 10 million is exempt from further taxation.[4] AvGas is subject to a state excise tax of $0.05 per gallon (A.R.S. 28-8344).
7. **Sale of seized or abandoned aircraft.** Pursuant to A.R.S. 28-8331.

Figure 2 presents the average annual percent contribution of each of these revenue sources as presented in ADOT's *Airport Development Guidelines* (2016), ADOT's manual outlining the policies that govern the administration of the Five-Year Development Program.[5] Please note that these percentages are only illustrative, as revenue sources can significantly vary by year depending on external conditions outside of the state's control.



Source: ADOT 2017

Figure 2. State Aviation Fund Revenue Sources

[4] According to A.R.S. 42-6014 (effective August 9, 2017), jet fuel tax is a matter of state concern. Thus, all Arizona cities and counties are prohibited from imposing local taxes on any fuel sale or purchase in excess of 10 million gallons. A.R.S. 42-6014 further requires that all revenues generated by a public-use airport be segregated into separate accounts for the exclusive expenditure for the capital or operating costs of the airport, the airport system, or other local airport facilities owned or operated by the municipality and directly or substantially related to the air transportation of people or properties. These revenue sources may include fuel flowage, aircraft tie-downs, hangar space, and terminal and land use rental fees, among others.

[5] The Airport Development Guidelines (2016) do not provide a percent contribution for the sale of seized or abandoned aircraft. It is likely that these monies provide a relatively insignificant portion of revenue to the State Aviation Fund.

Figure 3 depicts revenue into the State Aviation Fund from 2006 to 2015. During this time period, revenue reached its peak in 2007 before declining in the wake of the economic downturn. Revenue began to recover by 2012, but growth was not steady through the study period. In fiscal year 2015, the State Aviation Fund received slightly over $20 million in revenue from various sources. In all years except 2013, flight property taxes provided the largest contribution to the fund ($11.5 million average annual contribution), followed by aircraft registration taxes ($7.4 average annual contribution). In 2013, aircraft registration taxes contributed approximately $125,000 more than aircraft registration taxes to the State Aviation Fund.

Source: ADOT 2018

Figure 3. Total Revenue into the State Aviation Fund (Fiscal Years 2006 – 2015)

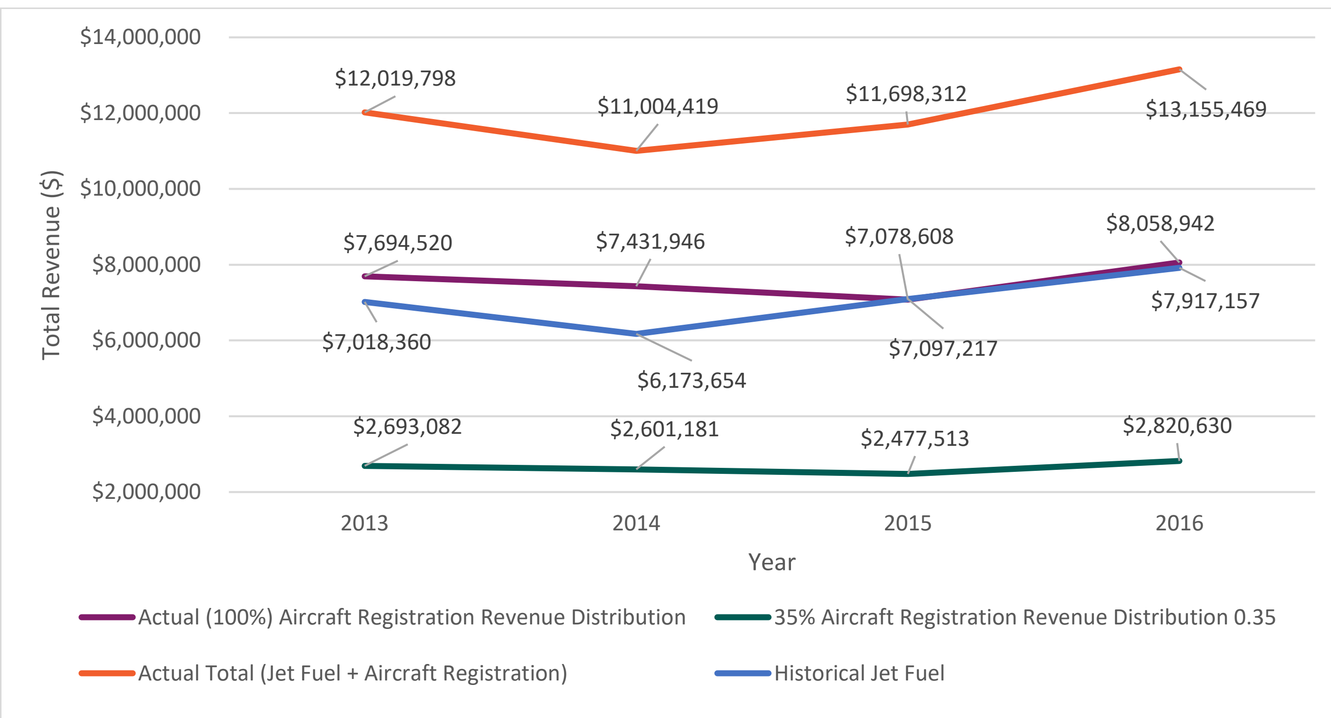
While **Figure 2** presents the historic composition of the State Aviation Fund revenue sources, recent changes in state statute will likely significantly alter the percent contributions in future years. Senate Bill 1531 (S.B. 1531) effective May 12, 2017, changed the percent of aviation fuel tax and aircraft license tax revenues distributed between the State General Fund and the State Aviation Fund. S.B. 1531 (Section 2, Subsection A) establishes the distribution of the aircraft license tax revenues as follows:

1. 50 percent in the State General Fund
2. 35 percent in the State Aviation Fund for use in the construction, development, and improvement of airports
3. 9.5 percent to counties in the proportion that the population of each county bears to the total population of Arizona

4. 5.5 percent to incorporated cities and towns in the proportion that the population of each county bears to the total population of the state (monies distributed to incorporated cities and towns may be used for any purpose permitted by law)

S.B. 1531 also amended the A.R.S. to distribute one hundred percent of the jet fuel excise and use taxes into the State Aviation Fund (S.B. 1531 Section 5). The Final Revised Fact Sheet for S.B. 1531 prepared by Senate Research staff reported that the distribution changes affecting jet fuel and aircraft license tax revenues will be revenue neutral to the State Aviation Fund (2017), as any decreases in aircraft license tax revenues will be off-set by a concurrent increase in jet fuel tax revenues.

However, ADOT's internal analysis projects that the changes will reduce future revenues into the State Aviation Fund. To understand how these changes may impact revenue in the future, ADOT analyzed how S.B. 1531 would have affected their 2013 to 2016 revenue streams. The results of this analysis are presented in **Figure 4**. The analysis assessed the distribution of aircraft registration and jet fuel taxes into the State Aviation Fund under two scenarios. The first scenario reviewed the actual distribution of aircraft registration tax revenue into the fund. The second scenario assessed the 35 percent distribution of aircraft registration tax revenue into the State Aviation Fund as modified by S.B. 1531. The combined totals of aviation jet fuel and aircraft registration tax revenues for both scenarios were also assessed. According to ADOT's internal analysis, S.B. 1531 would have resulted in an average annual net loss of $514,000 into the State Aviation Fund during the 2013 to 2016 study period.



Source: ADOT 2017

Figure 4. Impacts of S.B. 1531 on Aircraft Registration and Jet Fuel Tax Revenues into the State Aviation Fund

The latest change to S.B. 1531 will compound ongoing budget shortfalls experienced by the ADOT Aeronautics Group in recent years. The State Aviation Fund was established in 1979 to specifically meet the state's aviation funding needs. However, the State Legislature has transferred money from the fund for non-aviation-related purposes since 1997. These transfers have cumulatively totaled over $114 million as of January 2017 (Arizona Airports Association 2017).

Governing Agencies

Arizona statute establishes both ADOT and the STB, which have distinct but related powers and duties regarding the state transportation system. In general, the STB is responsible for establishing the policies that govern transportation and approving administrative and funding decisions. ADOT is responsible for implementing or administering those policies.[6]

Table 2 provides several examples comparing the roles of the STB and ADOT in accordance with state statute. Please note that this table does not provide a comprehensive list of the powers and duties vested to either entity. Instead, the information is intended to provide a representative illustration of the relationship between the STB and ADOT on similar policy topics.

Table 2. Comparison of Powers and Duties Granted by A.R.S. Title 28 — Transportation to the STB and ADOT

Policy Topic	STB Powers and Duties		ADOT Powers and Duties	
Purpose	28-304 (A)	The board shall develop and adopt a statewide transportation policy statement.	28-331 (A)	The department shall provide for an integrated and balanced state transportation system.
Transportation Planning	28-304 (A)	The board shall adopt a long-range statewide transportation plan.	28-332 (B)	The department shall conduct multimodal state transportation planning, cooperate and coordinate transportation planning with local governments, and establish an annually updated priority program of capital improvements for all transportation modes.
		The board shall adopt uniform transportation planning practices and performance based planning processes for use by the department.		
		The board shall adopt transportation system performance measures and factors and data collection standards to be used by the department.		
	28-304 (D)	The board shall determine priority program planning with respect to transportation facilities using the performance based methods developed pursuant to article 7 of this chapter.		
Facility Construction	28-304 (C)	The board shall establish policies to guide the development or modification of the five-year transportation facilities construction program that are consistent with the principles of performance based planning developed pursuant to article 7 of this chapter.	28-332 (B)	The department shall design and construct transportation facilities in accordance with a priority plan and maintain and operate state highways, state owned airports and state public transportation systems.

[6] Note that A.R.S. Title 28 establishes the STB "in the department of transportation" (A.R.S. 28-302). Thus, the STB is not a separate regulatory entity; however, its role in state transportation policy is distinct from the agency as a whole. As a result, it is treated as quasi-independent entity for the purpose of clarity.

Policy Topic	STB Powers and Duties		ADOT Powers and Duties	
		The board shall award all construction contracts for transportation facilities.		
		The board shall monitor the status of these construction projects.		
State Aviation Fund	28-8202 (D)	The board shall distribute monies appropriated to the department from the state aviation fund for planning, design, development, acquisition of interests in land, construction and improvement of publicly owned and operated airport facilities.	28-8202 (C)	The department shall administer monies that are appropriated by the legislature from the state aviation fund.
Construction of New Airports	28-8205 (A)	A new airport shall not be constructed within the boundaries of an urbanized area or within twenty-four statute miles of the exterior boundary of an urbanized area without approval of the board.	28-8242 (D)	The director shall, in conjunction with local authorities, plan, build and develop airports, airport terminals and other related navigational facilities.

Source: Arizona Revised Statutes 2017

Construction of New Airports

A.R.S. 28-8205 mandates "a new airport shall not be constructed within the boundaries of an urbanized area or within 24 statute miles of the exterior boundary of an urbanized area without approval of the STB." While this statute impacts the location of future airport development, it does not provide the STB with the authority to regulate the construction of an airport in more rural areas of the state. Furthermore, there are no policy mechanisms to identify the construction of new airports within the 24-mile threshold.

If a new grant-eligible airport (i.e., publicly owned and operated) is constructed outside of the 24-mile threshold, the ADOT Aeronautics Group would be obligated to consider the airport for grant funding—placing new pressures on already limited resources. The construction of any new airport regardless of ownership or usage rights may also impact air traffic, posing safety or congestion concerns for nearby facilities.

Acceptance of Federal Aid

A.R.S. 28-8413 allows the state or a county, city or town to accept or receive public or private money for the acquisition, construction, enlargement, improvement, maintenance, equipment, or operation of airports, other air navigation facilities, and sites for airports and other navigational facilities. The ADOT Aeronautics Group can also be designated as the entity's agent in such a transaction. This statute allows ADOT to consider participating in the Federal Aviation Administration's (FAA) State Block Grant Program, which would give the agency the authority to administer Airport Improvement Program (AIP) grants at non-primary commercial service, reliever, and general aviation (GA) airports. ADOT can also consider becoming an channeling state. Under a channeling agreement, the ADOT Aeronautics Group would serves as the liaison between airport sponsors and the FAA for AIP funding requests, receipt, and distribution. The state may also provide technical oversight and review. Channeling agreements are based on state enabling legislation (in this case, A.R.S. 28-8413) and do not require approval from the FAA Airport Development Office (FAA 2014, 2-16).

Airport Disclosure Notices

According to A.R.S. 28-8485, the state or a governing body of a political subdivision that has established or operates an airport may designate all property within the vicinity of an airport as an airport influence area after a notice and hearing. The area must be exposed to aircraft noise and overflight with a day-night average sound level of 65 decibels or higher or be within such a geographic distance from an existing runway that it is exposed to aircraft noise and overflights. Once the area has been identified, the political entity must file a record of the airport influence area with the office of the county recorder. The record must be sufficient to notify existing or potential property owners that the area is subject to aircraft noise and overflights.

As a separate provision, A.R.S. 28-8486 mandates that all public airports owned by a political subdivision of the state prepare an airport disclosure notice sufficient to determine if a property is located in the vicinity of the airport. This territory is defined as an area that is within the traffic pattern airspace as defined by the FAA and property that experiences a day-night average sound level as follows:

1. 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.
2. 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.

Airport disclosure maps shall be submitted to the office of the country recorder and transmitted to the Arizona Department of Real Estate (ADRE). However, a relatively small percentage of publicly owned, public-use airports have maps on file with the ADRE as required by state statute. A.R.S. 28-8484 provides a similar notification process for properties within the vicinity of a military airports. However, while military airport disclosure notices are noncompulsory, they are widely implemented.

A.R.S. 28-8485 and 28-8486 are designed to support airport zoning and regulation, provide an additional level of safety for people and property on the ground, and a means to educate existing and potential property owners about possible noise and overflight issues associated with airports. As the state population increases, new development is continuously encroaching on airports, increasing safety concerns and noise complaints within surrounding communities. Encroachment on airports may also limits future expansion potential.

Tribal Airports

A.R.S. 28-8202 establishes the eligibility criteria for airports to receive state funding. Prior to 2013, state statute limited funding eligibility to publicly owned and operated airport facilities in counties and incorporated cities and towns. The statute further defined publicly owned and operated facilities as follows:

> *An airport and appurtenant facilities in which one or more agencies, departments, or instrumentalities of this state, or a city, town, or county of this state, holds an interest in the land on which the airport is located that is clear of any encumbrance that might preclude or interfere with possession, use, or control of the land for public airport purposes for a minimum period of twenty years. (A.R.S. 25-8202)*

Based on this definition, Tribal airports were excluded from receiving state funding. However, this law was revised by S.B. 1317 effective June 14, 2013 to include Tribal airports. As a result, 14 Tribal airports became eligible for state funding and have thus been included in the 2018 SASP Update.

State Transportation Board Policies

The STB is a regulatory authority composed of one or two representatives from each of the six transportation districts in Arizona (A.R.S. 28-301). Members of the board are appointed by the governor and all members must have been a resident and taxpayer of the state and county from which the member is chosen for at least five years immediately before the person's appointment (A.R.S. 28-302). The powers and duties of the STB are outlined in A.R.S. Title 28, Chapter 2, Article 1; with respect to aeronautics, the board's duties are further outlined in A.R.S. Title 28, Chapter 25, Aeronautics.

The STB has broad authority to plan and develop Arizona's transportation systems with jurisdiction over Arizona's highways, airports, bicycle and pedestrian facilities, and other modal infrastructure. The STB's *State Transportation Board Policies* were most recently approved in December 2015 with no changes since the last revision date in November 2013 (STB 2015, i). In regard to aeronautics, it is the STB's policy to "provide a safe and secure airport system that accommodates demand, supports economic and transportation needs, and maximizes funding resources." The STB developed a set of four specific goals to achieve that end (STB 2015, 25):

1. Provide for a safe airport system, as measured by compliance with applicable safety standards, which supports health, welfare, and safety related services and activities.
2. 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.
3. 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.
4. Promote a system of airports that is sensitive to and considerate of the environment. The system should support aviation outreach opportunities.

The STB has adopted seven policies applicable to the state aviation system as summarized in the following sections.[7] These policies are updated regularly to reflect aviation needs, statutory requirements, and other conditions. As a result, the STB Aviation Policies should be reviewed and updated as deemed appropriate based on the findings and recommendations of the 2018 SASP Update.

[7] More information about each provision is provided in ADOT's Airport Development Guidelines and the STB's State Transportation Board Policies documents. The Arizona State Transportation Board Policies (revised December 2015) are available at aztransportationboard.gov/downloads/Board-Policy-Map.pdf. The Airport Development Guidelines (revised September 2016) are available at azdot.gov/planning/airportdevelopment/development-and-planning/Aeronautics-Documents. Both documents were accessed September 2017 for this writing.

SASP Policy

In accordance with A.R.S. 28-304 (Section A), it is the policy of the STB to "develop, adopt, and periodically update a long-range transportation plan in the form of a State Airports System Plan" (Ibid. 25). In addition to providing the framework for evaluating the system's performance and supporting long-term transportation planning efforts, the SASP defines the airport roles used in the allocation of state aviation funds. In 2009, the STB adopted the 2008 SASP airport roles as official state policy:

1. **Commercial Aviation.** Publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled passenger air service.
2. **Reliever.** FAA-designated airports that relieve congestion at a commercial service airport.
3. **GA-Community.** Airports that serve regional economies, connecting to state and national economies and serve all types of GA aircraft.
4. **GA-Rural.** Airports that serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying.
5. **GA-Basic.** Airports that serve a limited role in the local economy, primarily serving recreational and personal flying.

Chapter 5: Airport Clasification Analysis provides further details about the 2008 SASP roles and the revised airport classifications developed as part of the 2018 SASP Update.

Airport Development Program Policy

The STB is responsible for distributing state aviation funds for planning, design, development, acquisition of interests in land, construction, and improvement of publicly owned and operated airport facilities in counties, incorporated cities and towns, and Indian reservations (A.R.S. 28-8202).[8] Funds must be distributed according to airport need as determined by the STB, with no more than 10 percent of the average annual revenue that the fund received for the past three years awarded to any one airport in any fiscal year (A.R.S. 28-8202 [D]). The STB has established five programs that together compose the Airport Development Program for the transparent and equitable distribution of funds listed in order of funding priority:

1. Federal/State Matching (FSL) Airport Development Grants Program
2. State/Local (SL) Matching Airport Development Grants Program
3. Airport Pavement Management System (APMS) Program
4. State System Planning Program
5. Airport Development Loan Program

The ADOT Aeronautics Group is responsible for administering the Airport Development Program in a manner that maximizes funding for all five programs and parallels the design and planning criteria established by the FAA for the development of airport facilities (ADOT 2016, 50). Additional information about ADOT's funding guidelines and procedures is provided in the Five-Year Development Program Guidelines section starting on page 2-15.

[8] S.B. 1317 effective June 14, 2013 amended A.R.S. 28-8282 to authorize ADOT to fund Tribal airports.

Resource Allocation Policy

The STB allocates the State Aviation Fund in an "equitable, efficient, and effective manner" by first distributing funds to those airports with the highest level of aviation activity while providing grant access to all eligible airports in Arizona. This policy is achieved through the use of the 2008 SASP airport roles in the funding allocation criteria developed by the ADOT Aeronautics Group.

Project Selection and Prioritization Criteria Policy

A.R.S. 28-304 (A) directs the STB to adopt performance-based planning processes including performance measures, factors, and data-collection standards. Founded in this legislative mandate, the STB requires the use of established, published, and consistently applied project eligibility criteria and priority rating systems in the development of ADOT's Five-Year Transportation Facilities Construction Program.

Adequate Funding Policy

It is the policy of the STB to ensure adequate aviation funding by:

1. Taking full advantage of federal funding by ensuring the availability of sufficient state and matching funds
2. Pursing new and existing funding sources
3. Working with the Arizona congressional delegation to increase the funding for Arizona in the federal aviation programs
4. Advocating federal and state legislation for aviation funding in the state

Regional and National Cooperative Planning and Best Practices Policy

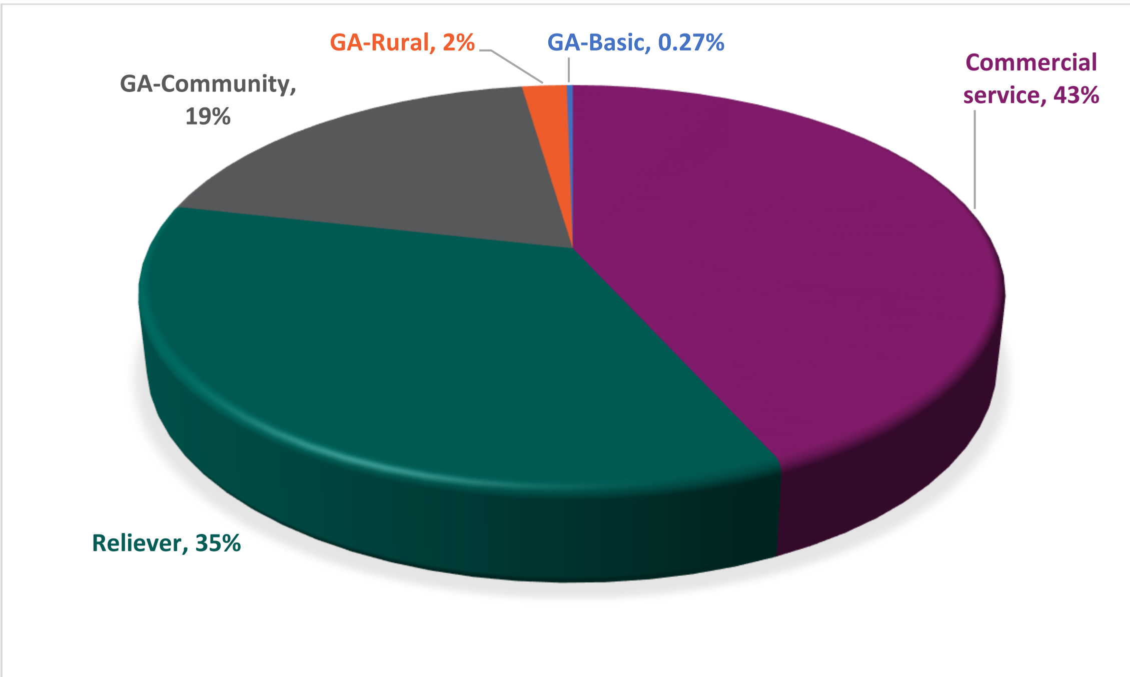
It is the policy of the STB to support and work collaboratively with state and federal aviation system meets current standards and future levels of demand. The STB also recognizes the importance of developing and implementing best practices within the industry to enhance Arizona's aviation transportation system by improving its safety, efficiency, and effectiveness.

Five-Year Development Program

The ADOT Aeronautics Group is responsible for encouraging and advancing the safe and orderly development of aviation in Arizona in accordance with state statute and STB policies (A.R.S. 82-8242). The ADOT Aeronautics Group achieves this primary end through the administration of the State Aviation Fund (A.R.S. 82-8202) allocated through the Five-Year Airport Development Program. Please note that the *Airport Development Guidelines* (2016) provide the ADOT policies for the administration of the Five-Year Development Program.

Funding Allocations

In accordance with the STB's resource allocation policy of providing the greatest percentage of funds to the airports with the highest levels of activity, ADOT established the administrative guidelines for the allocation of funds based on the 2008 SASP airport roles as presented in **Figure 5** (ADOT Aeronautics Group 2016, 6). ADOT has the authority to adjust these allocations based on program initiatives, system needs, or the balance of the fund. Additionally, the STB may annually review and amend these distributions as necessary.



Source: ADOT 2016

Figure 5. State Funding Allocations by Airport Role (Existing)

Program Overviews

The Five-Year Airport Development Program comprises five programs guided by STB policy. Funds for each of the programs are distributed according a specific set of guidelines established by ADOT with the approval of the STB. **Table 3** provides of a summary of each program; additional details about each program follow.

Table 3. Summary of the Five-Year Airport Development Program

Program Component	Summary	Eligibility	Status
Federal/State/Local Airport Development Grants	Provides a one-half share of an airport sponsor's match of an FAA Airport Improvement Program (AIP) grant.	Recipient of an FAA AIP grant.	Funding allocations made during the Fiscal Year (FY) 2016/17 will be honored.
State/Local Airport Development Grants	Provides a 90 to 95 percent match for eligible projects. Projects are prioritized based on	– Compliant with criteria provided in the Airport Development Guidelines	New grants on-hold through 2020. Funding allocations made during the FY 2016/17 will be honored.

Program Component	Summary	Eligibility	Status
	project category, type of project, and measure of aviation activity.	– Publicly owned, public-use airports (including those airports owned by a Tribal entity)	
Airport Pavement Management System	Provides maintenance improvements to extend the useful life of airfield pavement.	– Project identified by ADOT based on a prioritized need – Airport required to conduct a certified annual maintenance program post-construction	New projects on-hold until FY 2019. Pavement inspection services will continue.
State System Planning and Services	Supports state and regional planning efforts to ensure safe and orderly airport development in Arizona.	Projects requested by ADOT Aeronautics Group and approved by the STB based on current and projected conditions in the state.	Awarded on an as-needed basis.
Airport Loan	Provide interest-bearing loans for airport development projects designed to generate direct revenue to the airport.	– Airport identified in the ADOT SASP dated November 2009 – Owned by the public agency making the loan application – Open to the public	Suspended indefinitely.

Source: ADOT 2016

FSL Airport Development Grants

To maximize and leverage the availability of federal assistance to Arizona's airports, ADOT strives to match one-half of all airport sponsors' local shares of FAA AIP grants. Airports must be included in the NPIAS to receive an AIP grant. All FSL Airport Development Grant projects are included in ADOT's Five-Year ACIP.

SL Airport Development Grants

The SL Airport Grants Development Program is designed to achieve the goals of the state aviation system by providing funds for projects of local, regional, or state significance, including those that may not be funded by the FAA due to eligibility or selection criteria. The program provides 90 percent of eligible project costs at Commercial Service, Reliever, GA-Community, GA-Rural Airports and 95 percent of eligible costs at GA-Basic airports.

Projects are selected for inclusion in the SL Airport Development Grants Program based on a priority rating system. This system provides the ADOT Aeronautics Group with an objective measure of various factors, including the importance of the proposed project to the airport, airport system, and considerations specified in A.R.S. 28-6951. This numerical rating system is designed to allocate funds to the highest-priority projects within the statewide aviation system by providing systematic information to guide the decision-making process.

The priority rating system utilizes six prioritized grant categories, including safety, security, capacity, planning, environmental, and sustainability, that serve as the framework for project evaluation. Each grant category includes 58 specific project types (known as project components) with an assigned score (known as a priority value). **Table 4** summarizes the grant categories listed in order of priority and provides sample project components and priority values within each category.

Table 4. Summary of Grant Categories and Example Project Components

Grant Category	Summary Description	Example Project Component (Priority Value)
Safety	Projects directly associated with the safe operations of aircraft at an airport. Typical projects are designed to meet the FAA's design standards for an airport's demand aircraft, deemed necessary by the FAA's Runway Safety Action Team, or identified by Airport Certification Inspections.	– Obstructions, light/mark/remove (255) – Land for protection (safety areas), acquire (245) – Runway, extend (238)
Security	Projects designed to advance the Transportation Security Administration's (TSA) security requirements for commercial service airports or guidelines for GA airports.	– Perimeter fencing – barbed wire, new install (235) – Wildlife deterrent fencing, new install (212) – Chain link security fencing, new install (170)
Capacity	Project that support an airport's ability to accommodate growth not specifically associated with safety.	– Acquire land for development (55) – Terminal, construct/expand (44)
Environmental	Documentation that support environmental compliance in accordance with the FAA's requirements for environmental services.	– Environmental studies (variable)
Planning	Planning projects specific to demonstrating airport need and defining near-future airport development improvements.	– Master plans (100) – Airport drainage plan (95)
Sustainability	Projects that indirectly support aviation-based activities but are not typically used to generate airport revenue.	– Main airport access/public circulation road, rehabilitate (60) – Land for development, acquire (55) – Terminal, construct/expand (44)

Sources: ADOT 2016, ADOT 2011

In addition to the project component score, airports receive an airport measure rating based on three common measures of aviation activity:

1. Registered based aircraft
2. Scheduled air carrier enplaned passengers
3. Sponsor-reported aircraft operations compared to the airport service volume

The overall priority of a project is the sum of the project component points plus airport measure points. Projects are selected for inclusion in the ACIP based on their priority ranking scores.

Airport Pavement Management System

The APMS Program provides assistance to airports conducting ongoing airfield pavement maintenance to meet federal grant assurance obligations and preserve past investments in airfield pavement. These projects are supported on the basis that preventative maintenance activities can cost-effectively extend pavement life and reduce long-term needs associated with major rehabilitations, strengthening, reconstruction, and new construction. The APMS Program identifies the pavement areas at Arizona's grant-eligible airports most in-need of maintenance repairs and provides turnkey design, construction, and close-out services for the implementation of those repairs. Airport sponsors receiving a pavement maintenance project through the APMS are responsible for 10 percent of construction costs.

The program is designed to comply with Public Law 103-305; FAA AC 150/5380-6, *Airport Pavement Maintenance*; and FAA AC 150/5380-7, *Airport Pavement Management*. As part of federal grant assurances, any pavement that has been constructed, reconstructed, or repaired with federal assistance is required to establish a pavement management program. The ADOT Aeronautics Group has established this same grant assurance for state money. Any airport that does not perform regular maintenance and inspection or maintain related documentation jeopardizes its eligibility to receive grant funding from both the FAA and ADOT (ADOT Aeronautics Group 2016). To assist airports in this process, ADOT maintains an APMS, which fulfills these federal and state grant obligations when coupled with monthly pavement evaluations and regular maintenance activities by airport sponsors.

The APMS uses the Army Corps of Engineers Micropaver program as the basis of generating the Five-Year Airport Pavement Preservation Program (APPP). The APMS is based on visual pavement inspections conducted on a three-year cycle which assign Pavement Condition Index (PCI) numbers to all pavement areas at Arizona's grant-eligible airports. The PCI is a calculated value based on distress type, severity, and quantity. A unique PCI is assigned to each pavement area, which is then averaged to determine the overall PCI for each pavement branch.

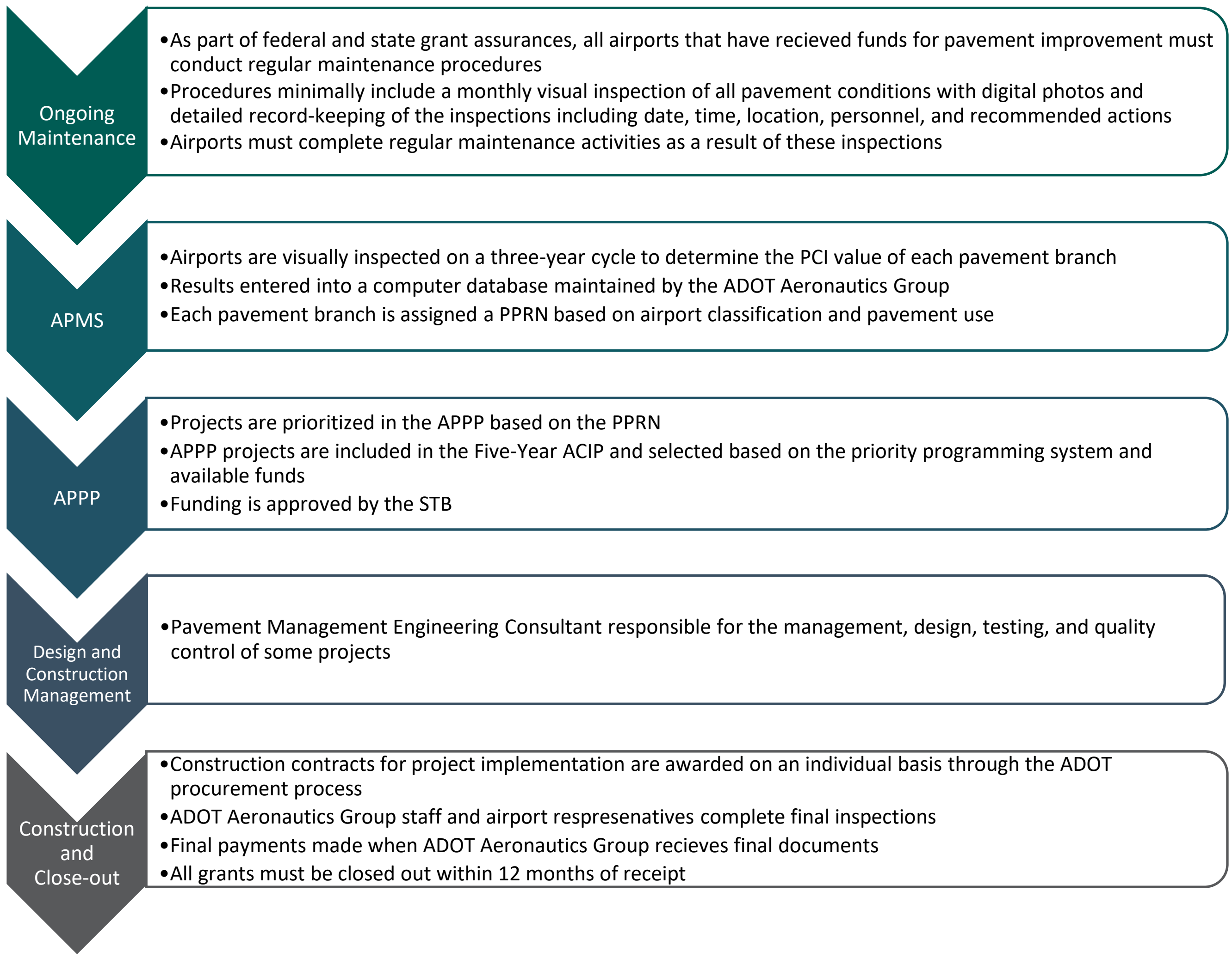
Based on this PCI, pavement use (i.e., main runway, taxiway, secondary runway, apron/helipad, T-hangar), and airport classification, pavement areas are assigned a Pavement Priority Rating Number (PPRN). Pavement sections are prioritized for improvement through the APPP based on their PPRNs. Five treatment options are considered in the APPP as follows:

1. Crack seal and slurry seal
2. Crack seal and rubberized asphalt emulsion seal coat
3. Thin rubberized asphalt overlay
4. Mill and replace porous friction course
5. Portland Concrete Cement join resealing and spall repairs.

Paint remarking is also considered for all pavement sections with unsatisfactory markings. Asphalt surface pavements with a PCI value below 55 and Portland Concrete Cement (PCC) pavement below 65 require major rehabilitations and are thus ineligible for the APPP. APPP projects are included in the Five-Year ACIP and submitted to the STB for funding approval.

Once a project has been selected for funding, ADOT provides the prescribed pavement treatment through the statewide Pavement Management Engineering Consultant. The consultant is responsible for the management, design, testing, and quality control of every project throughout the state. Some construction contracts are awarded for each individual airport through a public procurement process administered by ADOT. Grants issued through the APMS Program are limited to 12 months, and only one pavement maintenance projects per airport is issued each year.

Figure 6 outlines the APMS Program process.



Source: ADOT 2016

Figure 6. APMS Program Process

State System Planning and Services

State Aviation Funds may be used to inventory, monitor, and assess the state aviation system, as well as establish goals and priorities of the state system. These funds are typically used by the ADOT Aeronautics Group to conduct statewide aviation planning, research studies, or aviation support services.

Airport Loan

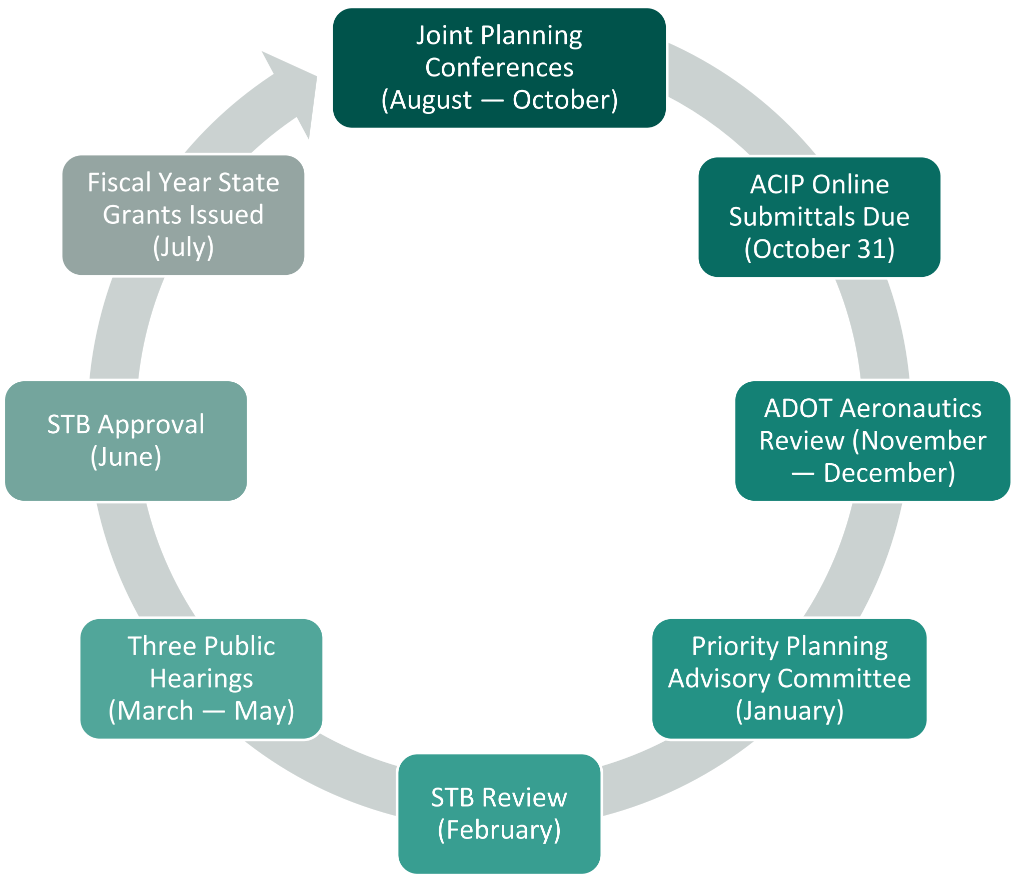
The Airport Loan Program is designed to maximize the use and efficiency of the State Aviation Fund and support the self-sufficiency of airports. The program provides financial assistance in the form of interest-bearing loans to public agencies that own and operate airports to expand and enhance aviation business opportunities on airport property. These types of projects are designed to generate direct revenue to airports and are typically not

eligible to receive funding through the other Five-Year Development Programs. The Airport Loan Program is currently suspended with no plans of resurrection in the foreseeable future.

Five-Year Airport Capital Improvement Program

Each year, the number of potential aviation projects in Arizona far exceed the monies available in the State Aviation Fund. Airport development projects requesting FSL and SL program grants are selected for funding through the ACIP, which is then incorporated into the ADOT Tentative Five-Year Transportation Facilities Construction Program. The ACIP ensures the effective use of state dollars for airport development and maximizes FAA funds for Arizona airports. The ACIP also fulfills a state requirement for the development of a Five-Year Transportation Facilities Construction Program (A.R.S. 28-3951).

ADOT prepares the ACIP on an annual basis following the general process outlined in **Figure 7**. It is important to note that the STB is responsible for reviewing and approving projects for funding in conjunction with STB Policies.



Source: ADOT 2008

Figure 7. ACIP Timeline

The ACIP is developed each year based upon the projects submitted by airport sponsors via the Aeronautics Group's ACIP website. Projects can be accepted into the ACIP database once the ADOT Aeronautics Group has conducted an initial review for eligibility and general conformity with ADOT criteria. Airport development projects requesting SL funding are ranked based on the priority rating system. Funding levels are applied to the prioritized SL projects to determine which projects can be included in the tentative ACIP. All FSL grant requests are included in this tentative document. The ADOT Aeronautics Group's and Highway Program's tentative ACIPs are then combined to form the Tentative Five-Year Transportation Facilities Construction Program.

COMPARISON WITH OTHER STATES

The powers and duties of the ADOT Aeronautics Group as assigned by A.R.S. Title 28 are designed to provide a safe and secure airport system that accommodates demand, supports economic and transportation needs, and maximizes funding resources in accordance with STB policy. To identify potential areas for improvement or alternative means to accomplish similar goals, it is helpful to review the roles of other state aviation agencies. These agencies can provide inspiration for developing more effective ways to serve Arizona's residents, visitors, and businesses or validation that the existing model is best meeting the needs of the state.

The National Association of State Aviation Officials (NASAO) represents the aeronautics staff at state transportation agencies in the 50 states, Guam, and Puerto Rico. This national organization periodically generates the *NASAO State Aviation Funding and Organizational Data Report* to highlight the various duties of state aeronautics agencies across the country. The most recent report was updated in 2015. **Table 5** compares the duties of the ADOT Aeronautics Group to those performed by other state aeronautics agencies in the U.S.

Table 5. Comparison of ADOT Aeronautics Group Division Duties and Programs with Other Western States

State Duty/Responsibility	AZ	CA	CO	KY	NC	NV	NM	UT	WA	WY
Aeronautical chart	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Air service assistance program							✓			
Aircraft registration	✓						✓	✓	✓	
Airfield maintenance project funding	✓	✓	✓	✓	✓		✓	✓	✓	✓
Airfield pavement management program	✓	✓	✓		✓	✓	✓	✓	✓	✓
Airport directory			✓	✓	✓	✓	✓	✓	✓	✓
Airport preservation program		✓	✓		✓			✓	✓	
Aviation education		✓	✓		✓		✓			
FAA channeling state				✓				✓		✓
FAA Block Grant Program state					✓					
Hangar construction funding	✓	✓	✓	✓			✓			✓
License airports		✓		✓				✓		
Navigational aid (NAVAID) project funding		✓	✓	✓	✓		✓	✓	✓	✓
Operate state-owned airports	✓			✓					✓	
Own and operate state aircraft	✓	✓		✓	✓	✓		✓	✓	✓
Pilot registration										
Search and rescue program								✓	✓	
State funding (FAA matching only)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
State funding (state-only grants)	✓	✓	✓	✓	✓		✓	✓	✓	✓
State-only loans	✓	✓	✓		✓					

Source: NASAO 2015

Overall, the ADOT Aeronautics Group's duties are similar to other state aviation divisions across the U.S. However, additional duties that the ADOT Aeronautics Group may want to consider depending on staffing and resources available include producing an airport directory to promote the statewide aviation system; implementing an airport preservation program; participating in an aviation education outreach program to positively impact workforce development and support the airport economic engine of the statewide system of airports; and supporting a statewide NAVAID program to enhance safety and economic opportunities across the statewide system of airports.

SUMMARY

This chapter identified the primary policy mechanisms affecting Arizona's airport system. In recent years, the aviation industry has experienced significant changes that have catalyzed the need to re-evaluate these policies to ensure Arizona's aviation system continues to effectively accommodate existing and future demands. To provide a broader context for this discussion, a comparison of the duties and powers of the ADOT Aeronautics Group with other state aeronautics departments was also provided. This information provides the framework for policy and development recommendations that will be developed as the final outcome of the SASP Update.

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CHAPTER THREE: IDENTIFICATION OF AIRPORT ASSETS

INTRODUCTION

A critical function of the State Aviation System Plan (SASP) is establishing baseline data for each planning variable (for example, airport runway length) that will be analyzed and used to evaluate the overall airport system. The Identification of Airport Assets Chapter presents the results of an extensive data collection process utilizing existing Federal Aviation Administration (FAA) and Arizona Department of Transportation (ADOT) resources as well as new data that was developed through individual airport surveys and follow-up airport staff interviews.

This chapter details the inventory data collection process and results, and is presented as follows:

1. Inventory Process
2. SASP Airports
3. Existing Airside Facilities
4. Existing Landside Facilities
5. Existing Services
6. Airport Activity
7. Airspace
8. Navigational Aids (NAVAIDs) and Approach Types
9. Airport Planning Documentation
10. Airport Development Constraints

INVENTORY PROCESS

The inventory process started with identification of the airports considered for participation in the plan's analysis. Eighty-six airports were initially contacted for participation, including 16 privately-owned, public-use airports. The 86 airports considered in the 2018 SASP Update are made up of publicly owned and privately owned airports, including many Tribal airports**.**

To initiate the data collection efforts, an Airport Inventory and Data Survey Form was prepared identifying all the essential data points required to evaluate the system. These data points included those necessary to measure the system's performance as documented in a previous chapter. The inventory forms were pre-populated with data available in ADOT Aeronautics' Airport System Manager (ASM) to aid in the completion of the forms. The ASM is a database maintained by ADOT Aeronautics that details airport facilities within the state. Letters were distributed to airport representatives to both identify the purpose of the study and provide a hard copy of the pre-populated form. Follow-up phone calls and emails were conducted to further explain the purpose of the study and to schedule site visits with each airport's representative (in most cases, the airport manager served as its representative). During April and May 2017, airport site visits were conducted throughout Arizona. During the on-site visit, the inventory forms were thoroughly reviewed with the airport representatives for accuracy and additional input.

As supplements to the inventory form and on-site visits, the following sources were gathered directly from the airport or FAA and examined for a more in-depth analysis of the airports and the system:

1. FAA Terminal Area Forecasts (TAFs)
2. FAA 5010 forms for individual airports
3. Airport master plans (MPs)
4. Airport layout plans (ALPs)
5. FAA's Air Traffic Activity Data System (ATADS)

The following data were collected (as applicable) from the airport via the Inventory and Data Survey Form, on-site visits, additional correspondence with airport representatives, and other available sources:

1. General airport information (e.g., sponsor name, contact information, airport website, three-letter identifier code)
2. Airside facilities (e.g., runways, taxiways)
3. Aviation services (e.g., fuel, transient hangars, maintenance)
4. Landing aids (e.g., instrument approach procedures [IAP], approach light systems [ALS])
5. Weather/communication facilities
6. Approach minima and protection standards
7. Scheduled airline activity
8. Landside facilities (e.g., terminal building, aircraft storage, utilities, parking)
9. Airport activity (e.g., airport operations, operational mix, passenger enplanements, based aircraft, fleet mix, critical aircraft)
10. Type of operations (e.g., recreational, corporate/business, air cargo, law enforcement/U.S. Border Patrol [USBP], military, flight training, forest firefighting, air shows, air ambulance)
11. Unique users dependent on the airport
12. Existing airport plans and studies (e.g., airport MPs, ALPs, noise contours, emergency plans, economic impacts)
13. Future needs and development plans, including proposed capital improvements
14. Development constraints
15. Security measures (e.g., fencing, lighting, self-inspections)
16. Land use/zoning surrounding or affecting the airport
17. Airport-specific ordinances
18. Community/municipality relations

All collected data is used in the subsequent evaluation of the Arizona airport system. Key data elements are summarized in this chapter.

SASP AIRPORTS

As previously identified, 86 airports were considered for participation in the SASP Update and comprising the system of airports or SASP airports. While contact was made at 86 airports, airport site visits were only conducted at 80 facilities including publicly owned, public-use and privately owned, public-use. These include all 12 public-use Tribal airports. These included all airports included in the FAA's latest National Plan of Integrated Airport Systems (NPIAS) and others that have historically been considered part of ADOT's system of airports.[1] The 80 airports which received site visits are categorized in **Table 1**.

Table 1. Airports Surveyed

Airport Classifications	Number of Airports Surveyed
Commercial Service	11
NPIAS – General Aviation (GA)	48
Non-NPIAS – GA	21
Total	80

Sources: 2017-2021 NPIAS

While FAA terminology is used for the most part throughout the SASP Update, the use of "commercial service" in the context of the SASP Update refers to those airports that had scheduled commercial airline service as of 2017. The FAA's latest NPIAS identifies 10 commercial service airports. Of these 10, nine are primary commercial service and Ernest A. Love Field (Prescott) is identified as a non-primary commercial service airport. Show Low Regional is identified by the NPIAS as a non-primary GA airport, but has scheduled commercial airline service and is therefore identified as commercial service in the SASP Update. For all subsequent tables, 11 airports are included in the commercial service category, with the remaining airports categorized as GA with no delineation between those that are included in the NPIAS and those that are not.

Private airports are currently ineligible to receive state funding and many of these airports expressed that they were not interested in being part of the state airport system. Through discussion with ADOT and the Project Advisory Committee (PAC), it was determined that only airports eligible for state funding should be included in the state airport system and referred to as SASP airports. Eligible airports were defined as all public-use airports owned by a political subdivision of the state or Tribal government. It should be noted that there are two airports owned by the National Park Service (NPS) which is not a political subdivision. Using this definition, the system would comprise 68 airports. Double Circle Ranch Airport (Z66) was the only publicly owned airport that declined participation due to low usage.[2] Therefore, the final number of airports included in the 2018 SASP Update was determined to be 67.

The 12 privately owned airports and two NPS airports removed from further analysis are presented in **Table 2**. While these airports were removed from the study, they will continue to serve a role in the system by accommodating various aviation users. A reference table containing the airport codes, airport name, and associated city name can be found in **Appendix B**.

[1] FAA, Report to Congress, *National Plan of Integrated Airport Systems 2017-2021*.

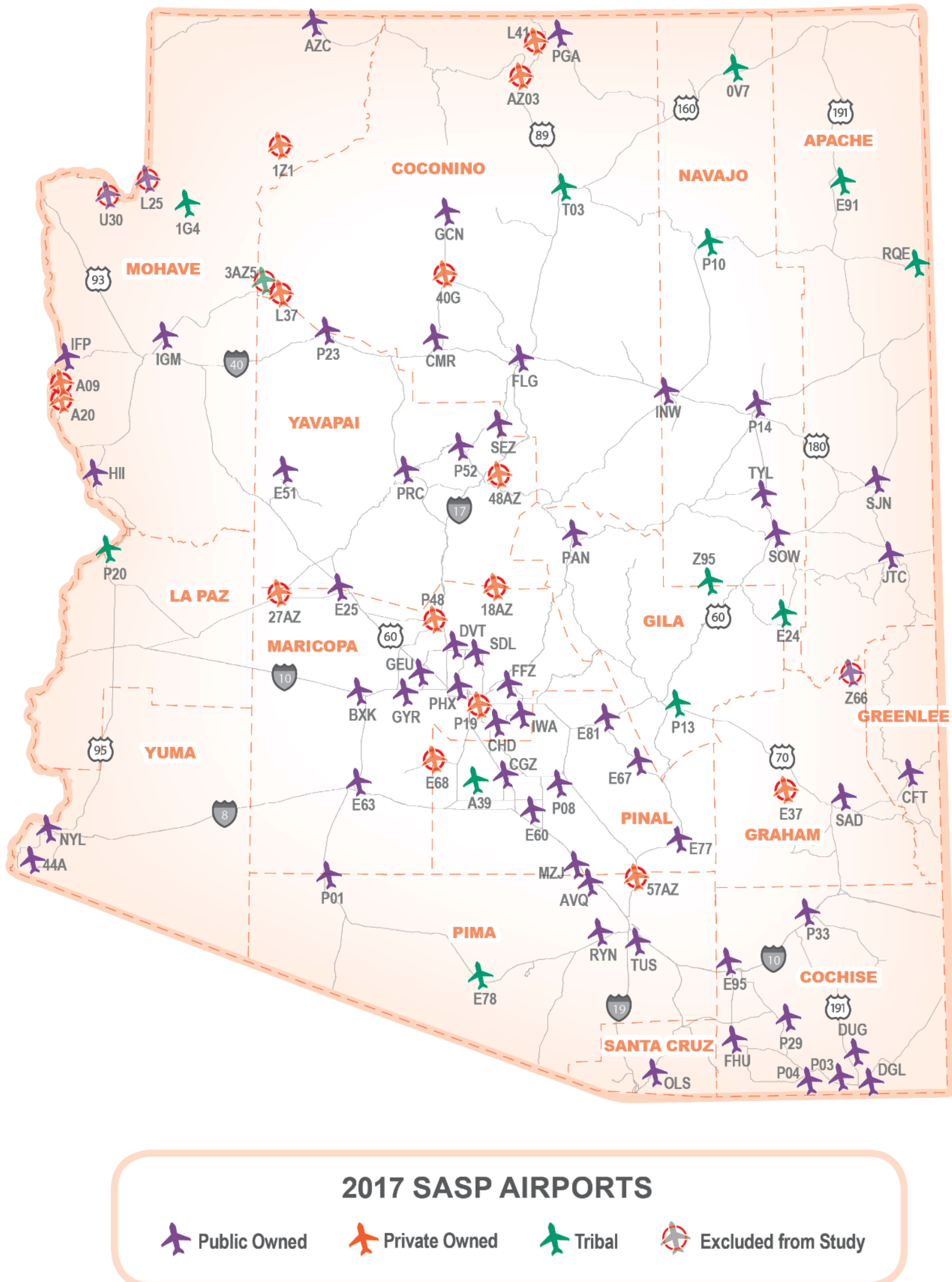
[2] Owned by the U.S. Forest Service, Double Circle Ranch is a dirt airstrip used approximately twice per year by the agency.

Table 2. Airports Removed from Further SASP Analysis

Associated City	Airport	FAA ID	Ownership
Aguila	Eagle Roost	27AZ	Private
Bullhead City	Eagle Airpark	A09	Private
Bullhead City	Sun Valley	A20	Private
Clifton	Double Circle Ranch	Z66	NPS
Marble Canyon	Cliff Dwellers Lodge	AZ03	Private
Marble Canyon	Marble Canyon	L41	Private
Maricopa	Estrella Sailport	E68	Private
Meadview	Pearce Ferry	L25	NPS
Peach Springs	Grand Canyon Caverns	L37	Private
Peach Springs	Hualapai	3AZ5	Private
Peoria	Pleasant Valley	P48	Private
Temple Bar	Temple Bar	U30	NPS
Tucson	La Cholla Airpark	57AZ	Private
Whitmore	Grand Canyon Bar 10	1Z1	Private

Source: Kimley-Horn 2017

Figure 1 identifies the 67 airports included in the 2018 SASP Update and depicts the 19 airports that were excluded.



Source: Kimley-Horn 2017

Figure 1. 2018 SASP Airports

EXISTING AIRPORT FACILITIES

The SASP Update inventory effort included the identification of airport facilities at system airports. Airport facilities are categorized by airside facilities primarily comprising runways and taxiways (standards based on the airport reference code [ARC]) and landside facilities including aircraft parking and storage, fuel, and terminal buildings.

Existing Airside Facilities

The following sections detail the most significant airside facilities available at airports in the Arizona system.

Runway Summary

Of the 109 runways in the Arizona airport system, there are six runways over 10,000 feet. These are located at Yuma International (longest runway measuring 13,000 feet), Sierra Vista Municipal, Tucson International, Phoenix Mesa-Gateway, and two at Phoenix Sky Harbor International. The shortest runways in the system are located at Bisbee Municipal, Rolle Airfield, and Page Municipal (shortest measuring 2,201 feet as a secondary runway). Sixty-three runways measure over 5,000 feet in length, which is significant because most 5,000-foot-long runways are considered to be of sufficient length to accommodate many corporate aircraft. Twenty-six airports in the system have multiple runways.

The FAA recognizes three types of runway lighting: High, Medium, and Low Intensity Runway Lights, respectively referred to as HIRL, MIRL, and LIRL. Runway lighting is necessary for night-time operations and is present at 91 percent (64) of Arizona's system airports. Of the 109 runways in the Arizona airport system, 12 runways have HIRLs, 71 runways have MIRLs, 4 runways have LIRLs, and 24 runways do not have lights. Polacca Airport has non-standard lighting (NSTD) which has been identified as solar powered runway edge lighting.

Airport Reference Code Summary

The FAA classifies airports by an ARC which subsequently drives the overall planning and design criteria for airports. Establishing an ARC starts with selecting a "critical aircraft" or "design aircraft" that uses, or is expected to use, the runway. That design aircraft determines the Runway Design Code (RDC) that reflects the design standard for the runway. The ARC signifies the airport's highest RDC, minus the third (visibility) component of the RDC.[3] An airport's critical aircraft can reflect either a specific aircraft model or a grouping of aircraft with similar characteristics considered collectively.

The ARC classification system is based on groupings of aircraft types relative to their operating performance and geometric characteristics. It is comprised of an alpha-numeric identifier representing the Aircraft Approach Category (AAC) and Airplane Design Group (ADG). The AAC reflects the approach speed of the aircraft, and the ADG reflects the aircraft's wingspan and tail height. The classifications are summarized in **Table 3**. It should be noted that both airports and aircraft can be referred to by these characteristics.

[3] FAA AC 150/5300-13A, Change 1, *Airport Design*

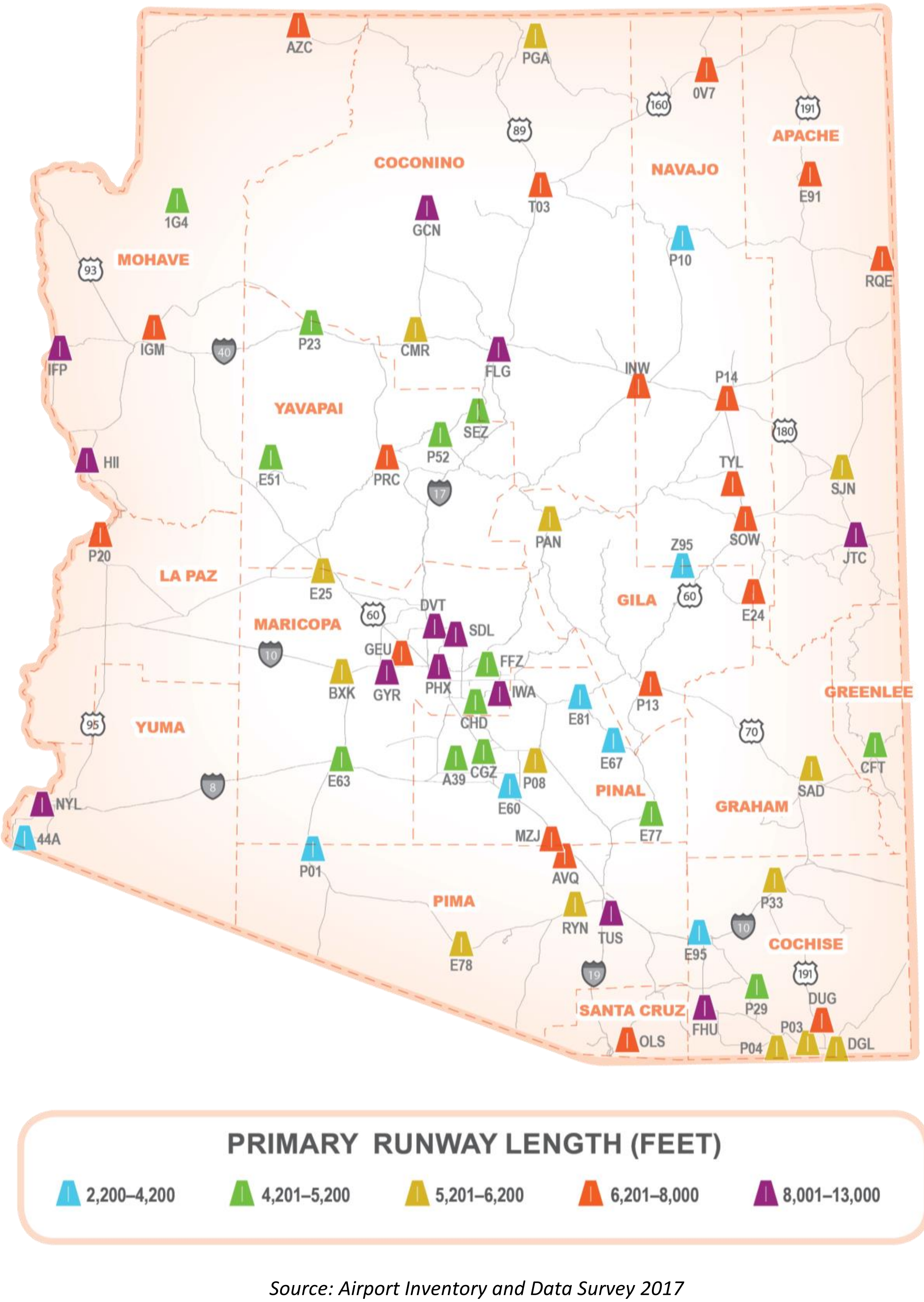
Table 3. Airport Reference Code Summary

Aircraft Approach Category		Airplane Design Group		
Category	**Approach Speed**	**Group**	**Wing Span (ft.)**	**Tail Height (ft.)**
A	Less than 91	**I**	Less than 49	Less than 20
B	91 to 120	**II**	49 to 78	21 to 29
C	121 to 140	**III**	79 to 117	30 to 44
D	141 to 165	**IV**	118 to 170	45 to 59
E	166 or Greater	**V**	171 to 213	60 to 65
		VI	214 up to but less than 262	66 up to but less than 80

Source: FAA AC 150/5300-13A, Change 1

Aircraft with approach speeds included in categories A and B are typically smaller piston-engine aircraft, whereas C, D, and E are normally larger turboprop or turbine powered aircraft. Similarly, the wingspan and tail height of small, piston-engine aircraft normally correspond to design group I. Typical aircraft in design group II include a Beechcraft King Air, Cessna Citation, or smaller Gulfstream business jet. Design group III includes larger corporate jets such as Gulfstream G500/550 and air carrier aircraft such as the DeHavilland Dash-8 and Boeing B-737. Design groups IV and V represent larger narrow-body and wide-body air carrier aircraft such as Boeing B-757 and B-747, respectively. Group VI includes the largest of aircraft, such as an Airbus A-380 or a C-5 military transport aircraft.

It should be noted that ARC does not prohibit larger aircraft from landing at an airport, nor does it mean that safety is being compromised if aircraft of greater ARCs are operating at an airport. **Figure 2** depicts airports within the system by primary runway length according to data obtained from the airports during the SASP Update inventory process. **Table 4** identifies the airports by runway length and ARC. It should be noted that Yuma International Airport (NYL) and Sierra Vista Municipal Airport (FHU) have the most demanding ARCs in the system, at E-VI and E-V, respectively. Both airports are joint use facilities with a high volume of military operations. Military fixed-wing aircraft typically have greater approach speeds, longer wingspans, and higher tail heights than most GA aircraft, requiring longer runways and greater runway and taxiway separation.



Source: Airport Inventory and Data Survey 2017

Figure 2. Primary Runway Length

Table 4. Runway Lengths and ARCs

Associated City	Airport Name	FAA ID	Primary Runway Length (ft.)	ARC
		Commercial Service		
Bullhead City	Laughlin/Bullhead City International	IFP	8,500	C-III
Flagstaff	Flagstaff Pulliam	FLG	8,800	C-III
Grand Canyon	Grand Canyon National Park	GCN	8,999	C-III
Page	Page Municipal	PGA	5,950	B-II
Peach Springs	Grand Canyon West	1G4	5,000	B-II
Phoenix	Phoenix Sky Harbor International	PHX	11,489	D-V
Phoenix	Phoenix-Mesa Gateway	IWA	10,201	D-V
Prescott	Ernest A. Love Field	PRC	7,619	C-III
Show Low	Show Low Regional	SOW	7,200	C-II
Tucson	Tucson International	TUS	10,966	D-IV
Yuma	Yuma International	NYL	13,000	E-VI
		General Aviation		
Ajo	Eric Marcus Municipal	P01	3,800	B-I
Bagdad	Bagdad	E51	4,552	B-I
Benson	Benson Municipal	E95	4,002	B-II
Bisbee	Bisbee Municipal	P04	5,929	B-II
Buckeye	Buckeye Municipal	BXK	5,500	B-II
Casa Grande	Casa Grande Municipal	CGZ	5,200	B-II
Chandler	Chandler Municipal	CHD	4,870	B-II
Chinle	Chinle Municipal	E91	6,902	B-I
Cibecue	Cibecue	Z95	4,200	A-I
Clifton	Greenlee County	CFT	4,978	B-II
Colorado City	Colorado City Municipal	AZC	6,300	B-II
Coolidge	Coolidge Municipal	P08	5,564	C-IV
Cottonwood	Cottonwood Municipal	P52	4,252	B-I
Douglas	Bisbee-Douglas International	DUG	6,430	C-I
Douglas	Cochise College	P03	5,551	B-I
Douglas	Douglas Municipal	DGL	5,760	B-II
Eloy	Eloy Municipal	E60	3,901	A-II
Gila Bend	Gila Bend Municipal	E63	5,200	B-II
Glendale	Glendale Municipal	GEU	7,150	B-II
Globe	San Carlos Apache	P13	6,500	C-II
Goodyear	Phoenix Goodyear	GYR	8,501	D-IV
Holbrook	Holbrook Municipal	P14	6,698	B-I
Kayenta	Kayenta	0V7	7,101	B-II
Kearny	Kearny	E67	3,400	A-I
Kingman	Kingman	IGM	6,825	C-III
Lake Havasu City	Lake Havasu City	HII	8,001	C-III
Marana	Marana Regional	AVQ	6,901	C-II
Marana	Pinal Airpark	MZJ	6,849	D-V
Maricopa	Ak-Chin Regional	A39	4,751	B-I

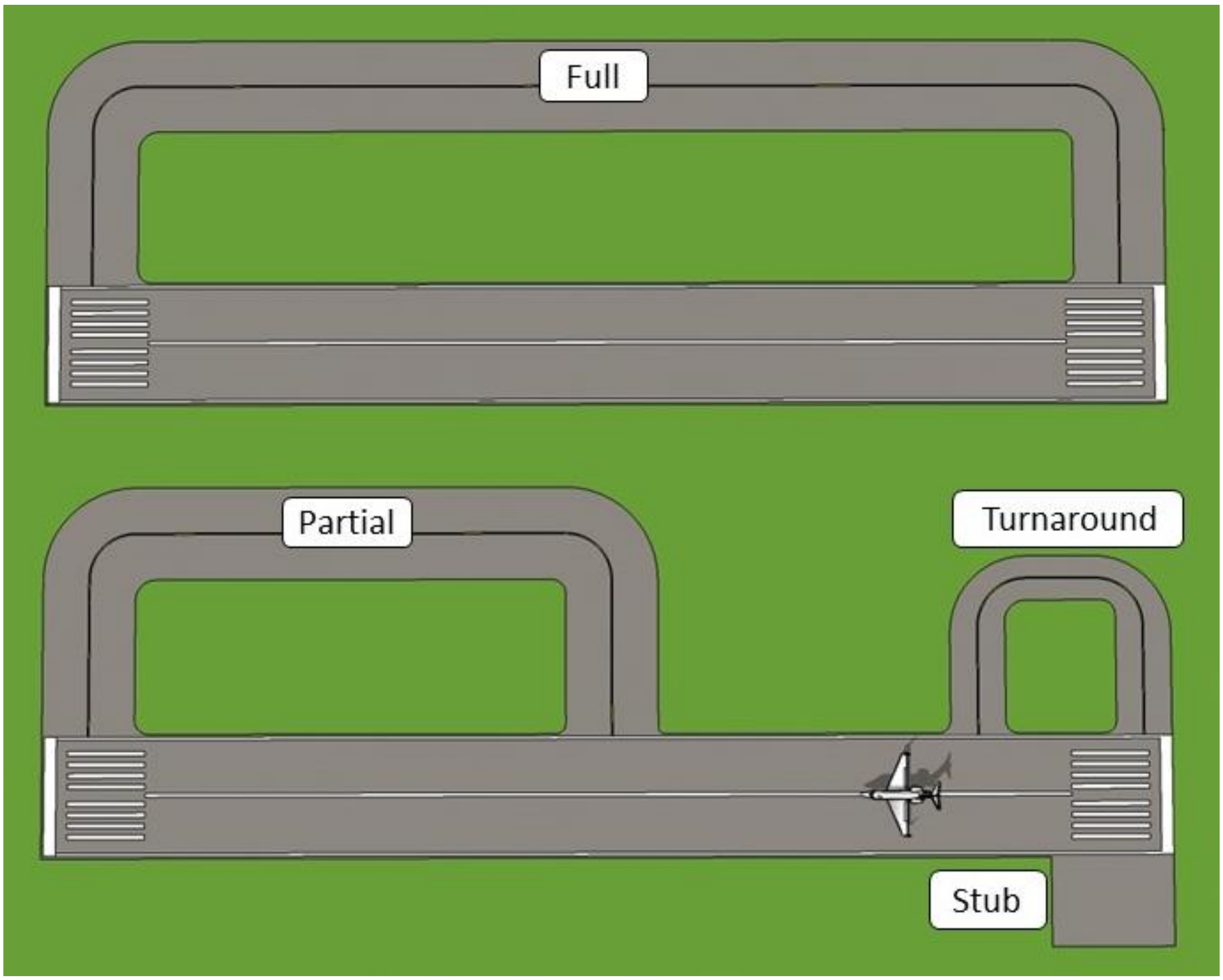
Associated City	Airport Name	FAA ID	Primary Runway Length (ft.)	ARC
Mesa	Falcon Field	FFZ	5,101	B-II
Nogales	Nogales	OLS	7,199	C-II
Parker	Avi Suquilla	P20	6,250	C-II
Payson	Payson	PAN	5,504	B-I
Phoenix	Phoenix Deer Valley	DVT	8,196	C-II
Polacca	Polacca	P10	4,200	A-I
Safford	Safford Regional	SAD	6,006	B-II
San Luis	Rolle Airfield	44A	2,800	B-I
San Manuel	San Manuel	E77	4,207	B-I
Scottsdale	Scottsdale	SDL	8,249	B-II
Sedona	Sedona	SEZ	5,132	B-II
Seligman	Seligman	P23	4,800	B-I
Sells	Sells	E78	5,830	A-I
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	12,001	E-V
Springerville	Springerville Municipal	JTC	8,422	B-II
St. Johns	St. Johns Industrial Air Park	SJN	5,322	B-II
Superior	Superior	E81	3,250	B-II
Taylor	Taylor	TYL	7,001	B-II
Tombstone	Tombstone Municipal	P29	4,430	A-I
Tuba City	Tuba City	T03	6,230	B-II
Tucson	Ryan Field	RYN	5,500	B-II
Whiteriver	Whiteriver	E24	6,350	B-II
Wickenburg	Wickenburg Municipal	E25	6,101	B-II
Willcox	Cochise County	P33	6,095	B-II
Williams	H.A. Clark Memorial Field	CMR	6,000	B-II
Window Rock	Window Rock	RQE	7,000	B-II
Winslow	Winslow-Lindbergh Regional	INW	7,100	C-II

Source: Airport Inventory and Data Survey 2017

Taxiway Summary

As depicted in **Figure 3,** there are four types of taxiways recognized by the FAA:

1. Full-length parallel
2. Partial-parallel
3. Stub
4. Turnaround



Source: Kimley-Horn 2017

Figure 3. FAA Recognized Taxiway Types

The Arizona airport system comprises 65 full-length parallel, 20 partial-parallel, seven stub, and 17 turnaround taxiways which accounts for airports with multiple taxiways. The taxiway breakdown by airport is depicted in **Table 5**.

Visual Aids Summary

A Visual Glide Slope Indicator (VGSI) is a system of lights on the runway end that provides vertical guidance to the pilot on final approach to help determine if the aircraft is approaching too high, too low, or on course. VGSIs, such as Precision Approach Path Indicators (PAPIs), Visual Approach Slope Indicators (VASIs), and Runway End Identifier Lights (REILs), provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

1. **PAPI.** Provide vertical-approach slope guidance to aircraft during approach to landing. PAPIs consist of a single row of either two or four lights normally installed on the left side of the runway. PAPIs have an effective visual range of approximately five miles during the day and up to 20 miles at night. PAPIs radiate a directional pattern of high-intensity red and white focused light beams that indicate whether the pilot is "on-path" if the pilot sees an equal number of white lights and red lights, "above path" if the pilot sees more white than red lights, or "below path" if the pilot sees more red than white lights. The four types of PAPIs include:

- **P2L.** Two-light PAPI on left side of runway
- **P2R.** Two-light PAPI on right side of runway
- **P4L.** Four-light PAPI on left side of runway
- **P4R.** Four-light PAPI on right side of runway

2. **VASI.** Provide visual vertical approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high-intensity red and white focused light beams. These beams indicate if the pilot is "on path" (pilot sees red/white), "above path" (pilot sees white/white), and "below path" (pilot sees red/red). Some airports serving large aircraft have three-bar VASIs that provide two visual glide paths to the same runway. The two types of VASIs include:

- **V2L.** Two-box VASI on left side of runway
- **V4L.** Four-box VASI on left side of runway

3. **REIL.** Provide rapid and positive identification of the end of the runway. The system consists of two synchronized, unidirectional flashing lights. The lights are positioned on each corner of the runway landing threshold facing the approach area and aimed at a 10 to 15-degree angle. The REIL provides three intensity settings with an approximate range of three miles in the daylight and twenty miles at night.

Table 5 summarizes the runway orientation, runway dimensions, ARC, type of runway lighting, availability of VGSIs and REILs, and taxiway type in the Arizona airport system by FAA NPIAS category.

Table 5. Existing Airside Facilities

Associated City	Airport	Runway Orientation	Length (ft.)	Width (ft.)	ARC	Runway Lighting	VGSI	REIL (Y/N*)	Taxiway Type
Commercial Service									
Bullhead City	Laughlin/Bullhead City International	16/34	8,500	150	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Flagstaff	Flagstaff Pulliam	03/21	8,800	150	C-III	HIRL	PAPI/PAPI	N/N	Full Parallel
Grand Canyon	Grand Canyon National Park	03/21	8,999	150	C-III	MIRL	None/VASI	N/Y	Full Parallel
Page	Page Municipal	07/25 15/33	2,201 5,950	75 150	B-II	None MIRL	None VASI/VASI	N/N Y/Y	None Full Parallel
Peach Springs	Grand Canyon West	17/35	5,000	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Phoenix	Phoenix Sky Harbor International	08/26 7L/25R 7R/25L	11,489 10,300 7,800	150 150 150	D-V	HIRL HIRL HIRL	PAPI/PAPI PAPI/PAPI PAPI/PAPI	N/Y N/N N/N	Full Parallel Full Parallel Full Parallel
Phoenix	Phoenix-Mesa Gateway	12C/30C 12L/30R 12R/30L	10,201 9,300 10,401	150 150 150	D-V	HIRL HIRL MIRL	PAPI/PAPI PAPI/PAPI PAPI/PAPI	N/N Y/Y N/N	None Partial Parallel Full Parallel
Prescott	Ernest A. Love Field	03R/21L 12/30 03L/21R	7,619 4,408 4,846	150 75 60	C-III	MIRL MIRL MIRL	PAPI/PAPI PAPI/PAPI PAPI/PAPI	Y/N Y/Y N/N	Full Parallel Partial Parallel Full Parallel
Show Low	Show Low Regional	03/21 06/24	3,938 7,200	60 100	C-II	None MIRL	None/None PAPI/PAPI	N/N Y/Y	Partial Parallel Full Parallel
Tucson	Tucson International	11L/29R 11R/29L 03/21	10,966 8,408 7,000	150 75 150	D-IV	HIRL MIRL MIRL	PAPI/PAPI PAPI/None None/PAPI	N/Y N/Y N/Y	Full Parallel None None
Yuma	Yuma International	03L/21R 03R/21L 08/26 17/35	13,000 9,240 6,146 5,710	200 150 150 150	E-VI	HIRL HIRL HIRL HIRL	PAPI/PAPI PAPI/PAPI None/None VASI/None	N/N N/N N/N N/Y	Full Parallel Full Parallel Full Parallel Full Parallel
General Aviation									
Ajo	Eric Marcus Municipal	12/30	3,800	60	B-I	MIRL	PAPI/PAPI	N/N	None
Bagdad	Bagdad	05/23	4,552	60	B-I	None	None/None	N/N	None
Benson	Benson Municipal	10/28	4,002	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Bisbee	Bisbee Municipal	17/35 02/20	5,929 2,650	60 100	B-II	MIRL None	PAPI/PAPI None	N/N N/N	Full Parallel None

Associated City	Airport	Runway Orientation	Length (ft.)	Width (ft.)	ARC	Runway Lighting	VGSI	REIL (Y/N*)	Taxiway Type
Buckeye	Buckeye Municipal	17/35	5,500	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Casa Grande	Casa Grande Municipal	05/23	5,200	100	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Chandler	Chandler Municipal	04L/22R 04R/22L	4,401 4,870	75 75	B-II	MIRL MIRL	PAPI/PAPI PAPI/PAPI	N/N Y/Y	Full Parallel Full Parallel
Chinle	Chinle Municipal	18/36	6,902	60	B-I	MIRL	PAPI/PAPI	N/N	Turnaround
Cibecue	Cibecue	07/25	4,200	100	A-I	None	None/None	N/N	None
Clifton	Greenlee County	07/25	4,978	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Colorado City	Colorado City Municipal	11/29 02/20	6,300 5,100	75 60	B-II	MIRL MIRL	PAPI/PAPI PAPI/None	Y/Y N/N	Stub Partial Parallel
Coolidge	Coolidge Municipal	05/23 17/35	5,564 3,873	150 75	C-IV	MIRL MIRL	PAPI/PAPI None/None	N/N N/N	Partial Parallel Partial Parallel
Cottonwood	Cottonwood Municipal	14/32	4,252	75	B-I	MIRL	PAPI/PAPI	Y/Y	Partial Parallel
Douglas	Bisbee-Douglas International	08/26 17/35	4,966 6,430	60 100	C-I	MIRL None	None/None VASI/None	N/N N/N	None None
Douglas	Douglas Municipal	03/21	5,760	75	B-II	MIRL	PAPI/PAPI	N/N	Partial Parallel
Douglas	Cochise College	05/23	5,551	60	B-I	MIRL	PAPI/PAPI	N/N	Full Parallel
Eloy	Eloy Municipal	02/20	3,901	75	A-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Gila Bend	Gila Bend Municipal	04/22	5,200	75	B-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Glendale	Glendale Municipal	01/19	7,150	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Globe	San Carlos Apache	09/27	6,500	100	C-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Goodyear	Phoenix Goodyear	03/21	8,501	150	D-IV	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Holbrook	Holbrook Municipal	03/21 11/29	6,698 3,202	75 120	B-I	MIRL MIRL	PAPI/PAPI None/None	Y/Y N/N	Partial Parallel None
Kayenta	Kayenta	05/23	7,101	75	B-II	MIRL	PAPI/PAPI	N/N	Turnaround
Kearny	Kearny	08/26	3,400	60	A-I	None	None/None	N/N	Turnaround
Kingman	Kingman	03/21 17/35	6,825 6,725	150 75	C-III	MIRL MIRL	PAPI/PAPI PAPI/PAPI	Y/Y N/N	Full Parallel Partial Parallel
Lake Havasu City	Lake Havasu City	14/32	8,001	100	C-III	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Marana	Marana Regional	03/21 12/30	3,892 6,901	75 100	C-II	MIRL MIRL	PAPI/PAPI PAPI/PAPI	N/N Y/Y	Full Parallel Full Parallel
Marana	Pinal Airpark	12/30	6,849	150	D-V	MIRL	None/None	N/N	Full Parallel
Maricopa	Ak-Chin Regional	04/22	4,751	50	B-I	MIRL	None/None	N/N	Full Parallel

Associated City	Airport	Runway Orientation	Length (ft.)	Width (ft.)	ARC	Runway Lighting	VGSI	REIL (Y/N*)	Taxiway Type
Mesa	Falcon Field	4R/22L 4L/22R	5,101 3,799	100 75	B-II	MIRL MIRL	PAPI/PAPI PAPI/PAPI	Y/Y Y/Y	Full Parallel Full Parallel
Nogales	Nogales	3/21	7,199	100	C-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Parker	Avi Suquilla	01/19	6,250	100	C-II	MIRL	PAPI/PAPI	N/N	Full Parallel
Payson	Payson	06/24	5,504	75	B-I	MIRL	None/PAPI	N/N	Full Parallel
Phoenix	Phoenix Deer Valley	7L/25R 7R/25L	4,500 8,196	75 100	C-II	MIRL MIRL	PAPI/PAPI PAPI/PAPI	Y/Y Y/Y	Full Parallel Full Parallel
Polacca	Polacca	04/22	4,200	50	C-III	NSTD	None/None	N/N	Stub
Safford	Safford Regional	12/30 08/26	6,006 4,799	100 75	B-II	MIRL MIRL	PAPI/PAPI PAPI/PAPI	N/N N/N	Full Parallel Full Parallel
San Luis	Rolle Airfield	17/35	2,800	60	B-I	None	None/None	N/N	Stub
San Manuel	San Manuel	11/29	4,207	75	B-II	MIRL	PAPI/PAPI	N/N	Partial Parallel
Scottsdale	Scottsdale	03/21	8,249	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Sedona	Sedona	03/21	5,132	100	B-II	MIRL	PAPI/PAPI	Y/Y	Partial Parallel
Seligman	Seligman	04/22	4,800	75	B-I	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Sells	Sells	04/22	5,830	60	A-I	None	None/None	N/N	Stub
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	08/26 12/30 03/21	12,001 5,366 3,032	150 100 75	E-V	HIRL MIRL MIRL	PAPI/PAPI PAPI/PAPI None/None	N/N N/N N/N	Full Parallel Partial Parallel Partial Parallel
Springerville	Springerville Municipal	03/21 11/29	8,422 4,603	75 60	B-II	MIRL MIRL	PAPI/PAPI PAPI/None	N/N N/N	Full Parallel Partial Parallel
St. Johns	St. Johns Industrial Air Park	03/21 14/32	3,400 5,322	60 75	B-II	MIRL MIRL	None/None PAPI/PAPI	N/N Y/Y	Full Parallel Full Parallel
Superior	Superior	04/22	3,250	75	B-II	None	None/None	N/N	Full Parallel
Taylor	Taylor	03/21	7,001	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Tombstone	Tombstone Municipal	06/24	4,430	60	A-I	None	None/None	N/N	None
Tuba City	Tuba City	15/33	6,230	75	B-II	MIRL	VASI/VASI	N/N	Turnaround
Tucson	Ryan Field	6R/24L 6L/24R 15/33	5,500 4,900 4,000	75 75 75	B-II	MIRL None None	None/VASI None/None None/None	Y/N N/N N/N	Full Parallel Full Parallel Partial Parallel
Whiteriver	Whiteriver	01/19	6,350	75	B-II	MIRL	PAPI/None	Y/Y	Full Parallel
Wickenburg	Wickenburg Municipal	05/23	6,101	75	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Willcox	Cochise County	03/21	6,095	75	B-II	MIRL	None/None	N/N	Partial Parallel

Associated City	Airport	Runway Orientation	Length (ft.)	Width (ft.)	ARC	Runway Lighting	VGSI	REIL (Y/N*)	Taxiway Type
Williams	H.A. Clark Memorial Field	18/36	6,000	100	B-II	MIRL	PAPI/PAPI	Y/Y	Full Parallel
Window Rock	Window Rock	02/20	7,000	75	B-II	MIRL	PAPI/None	Y/N	Turnaround
Winslow	Winslow-Lindbergh Regional	11/29 04/22	7,100 7,499	150 100	C-II	MIRL MIRL	None/None VASI/VASI	N/Y Y/N	Full Parallel Full Parallel

Note: Y=Yes, N=No

Source: Airport Inventory and Data Survey 2017

Existing Landside Facilities

Existing landside facilities examined in the 2018 SASP Update include aircraft storage facilities such as the number of hangars and available tie-down spaces, type(s) of fuel sold, and the presence of a terminal building.

Aircraft Parking/Storage Summary

Aircraft parking and storage facilities were analyzed to provide a measure of landside capacity within the Arizona system of airports. A total of 4,166 hangars were identified as part of the inventory effort. Of these, 2,792 were T-hangar units, 940 were conventional hangars, and 434 were identified as portable/other.

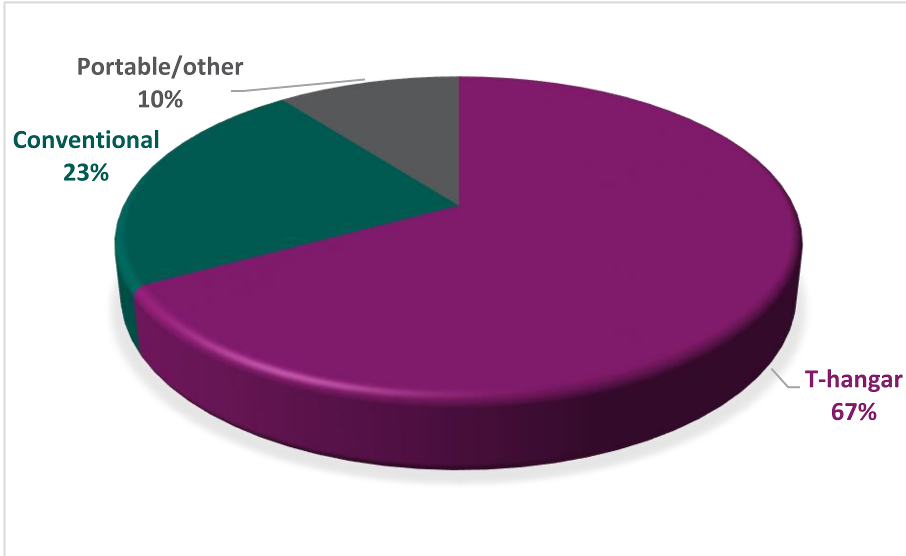


Figure 4. Aircraft Parking/Storage

Additionally, the capacity of apron tie-down spaces was measured at airports in the system. Due to the high heat and sun exposure in Arizona, tie-down spaces were distinguished between covered and uncovered. A total of 4,198 tie-downs were identified at airports in the system, of which 702 tie-downs were covered and 3,496 were uncovered.

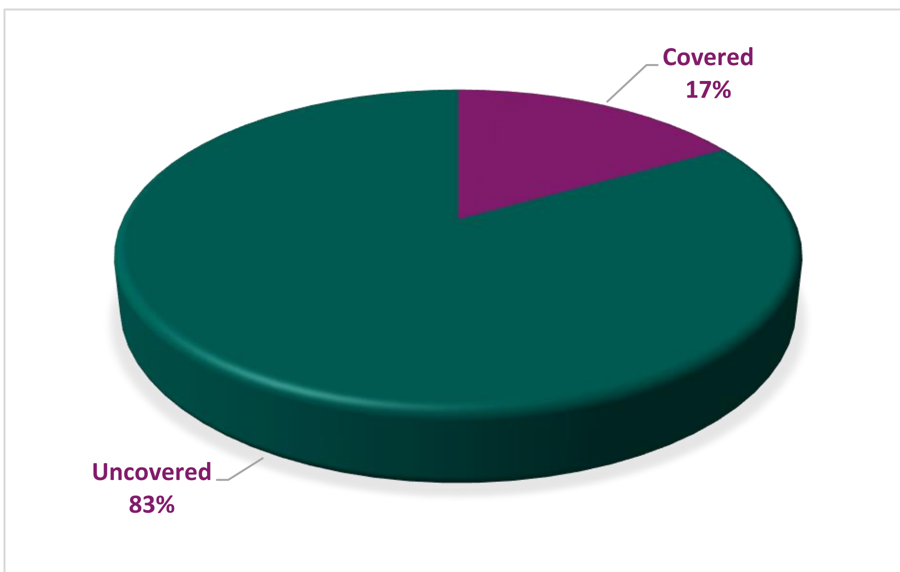


Figure 5. Aircraft Tie-Downs

Similar to the 2008 SASP, airports serving as relievers in the major metropolitan areas were determined to provide the most hangars when compared to other airports in the system. There are eight reliever airports in the system that provide 2,705 hangars, while the system's 34 GA airports provide 775 hangars. Consistent with the 2008 SASP, Phoenix Deer Valley Airport has the most hangars in the system with 783—more than all other non-reliever GA airports combined.

Fuel Summary

The availability of fuel at airports, and most specifically GA airports, can be one of the most influential factors driving activity at airports. Fuel sales at GA airports are a substantial component of airport revenues. A total of 54 Arizona airports offer some type of fuel, AvGas, Jet A, or both fuels. Forty-nine airports offer AvGas, 44 airports offer Jet A, and 39 airports offered both AvGas and Jet A. Of the 54 total airports with fuel, 44 are GA airports. Additionally, Phoenix-Mesa Gateway is the only airport that offers automobile gas (Mogas), which can be used in some piston aircraft.

Terminal Summary

For this study, a terminal was accounted for if the airport offered any sort of terminal building for GA users or commercial passengers. Some terminal buildings included minimal services while larger GA, reliever, and commercial service airports offered pilot's lounges, phone services, and other amenities. Approximately 62 airports in the system have terminal buildings.

Table 6 details existing landside facilities including total hangars, tie-down apron capacity, fuel availability, and the presence of a terminal building at airports in the Arizona system.

Table 6. Existing Landside Facilities

Associated City	Airport	Hangars (Number)	Tie-downs (Number)	Fuel (Type)	Terminal Building (Y/N)
Commercial Service					
Bullhead City	Laughlin/Bullhead City International	32	55	AvGas; Jet A	Y
Flagstaff	Flagstaff Pulliam	61	60	AvGas; Jet A	Y
Grand Canyon	Grand Canyon National Park	1	96	AvGas; Jet A	Y
Page	Page Municipal	68	104	AvGas; Jet A	Y
Peach Springs	Grand Canyon West	0	42	Jet A	Y
Phoenix	Phoenix Sky Harbor International	52	42	AvGas; Jet A	Y
Phoenix	Phoenix-Mesa Gateway	57	115	AvGas; Jet A; Mogas	Y
Prescott	Ernest A. Love Field	254	222	AvGas; Jet A	Y
Show Low	Show Low Regional	39	100	AvGas; Jet A	Y
Tucson	Tucson International*	Unknown	85	AvGas; Jet A	Y
Yuma	Yuma International	60	144	AvGas; Jet A	Y
General Aviation					
Ajo	Eric Marcus Municipal	3	9	None	Y
Bagdad	Bagdad	1	12	None	N
Benson	Benson Municipal	26	65	AvGas; Jet A	Y
Bisbee	Bisbee Municipal	3	35	AvGas	Y
Buckeye	Buckeye Municipal	46	59	AvGas	Y
Casa Grande	Casa Grande Municipal	52	18	AvGas; Jet A	Y
Chandler	Chandler Municipal	247	286	AvGas; Jet A	Y
Chinle	Chinle Municipal	0	3	Jet A	N
Cibecue	Cibecue	0	0	None	N
Clifton	Greenlee County	3	20	None	Y
Colorado City	Colorado City Municipal	10	17	AvGas; Jet A	Y
Coolidge	Coolidge Municipal	25	30	AvGas; Jet A	Y
Cottonwood	Cottonwood Municipal	16	82	AvGas	Y
Douglas	Bisbee-Douglas International	6	4	AvGas; Jet A	Y
Douglas	Cochise College	1	35	AvGas	Y
Douglas	Douglas Municipal	18	45	AvGas; Jet A	Y
Eloy	Eloy Municipal	17	27	AvGas; Jet A	Y
Gila Bend	Gila Bend Municipal	38	56	AvGas	Y
Glendale	Glendale Municipal	400	0	AvGas; Jet A	Y
Globe	San Carlos Apache	8	40	AvGas	N
Goodyear	Phoenix Goodyear	127	93	AvGas; Jet A	Y
Holbrook	Holbrook Municipal	4	5	AvGas	Y

Associated City	Airport	Hangars (Number)	Tie-downs (Number)	Fuel (Type)	Terminal Building (Y/N)
Kayenta	Kayenta	0	17	Jet A	Y
Kearny	Kearny	5	7	None	Y
Kingman	Kingman	62	160	AvGas; Jet A	Y
Lake Havasu City	Lake Havasu City	107	185	AvGas; Jet A	Y
Marana	Marana Regional	238	131	AvGas; Jet A	Y
Marana	Pinal Airpark	3	0	AvGas; Jet A	Y
Maricopa	Ak-Chin Regional	1	12	AvGas	Y
Mesa	Falcon Field	507	436	AvGas; Jet A	Y
Nogales	Nogales	21	31	AvGas; Jet A	Y
Parker	Avi Suquilla	21	78	AvGas; Jet A	Y
Payson	Payson	19	53	AvGas; Jet A	Y
Phoenix	Phoenix Deer Valley	783	366	AvGas; Jet A	Y
Polacca	Polacca	0	2	None	N
Safford	Safford Regional	26	32	AvGas; Jet A	Y
San Luis	Rolle Airfield	1	4	None	N
San Manuel	San Manuel	28	20	AvGas	Y
Scottsdale	Scottsdale	152	227	AvGas; Jet A	Y
Sedona	Sedona	85	95	AvGas; Jet A	Y
Seligman	Seligman	0	14	None	Y
Sells	Sells	0	0	Jet A	N
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	62	28	AvGas; Jet A	Y
Springerville	Springerville Municipal	12	41	AvGas; Jet A	Y
St. Johns	St. Johns Industrial Air Park	9	20	AvGas; Jet A	Y
Superior	Superior	0	0	None	N
Taylor	Taylor	13	24	None	Y
Tombstone	Tombstone Municipal	2	4	None	N
Tuba City	Tuba City	0	8	None	N
Tucson	Ryan Field	251	93	AvGas; Jet A	Y
Whiteriver	Whiteriver	0	17	None	N
Wickenburg	Wickenburg Municipal	53	38	AvGas; Jet A	Y
Willcox	Cochise County	15	22	AvGas; Jet A	Y
Williams	H.A. Clark Memorial Field	12	0	AvGas	Y
Window Rock	Window Rock	2	12	Jet A	Y
Winslow	Winslow-Lindbergh Regional	1	15	AvGas; Jet A	Y

Note: Tucson International Airport reports total hangars in square footage

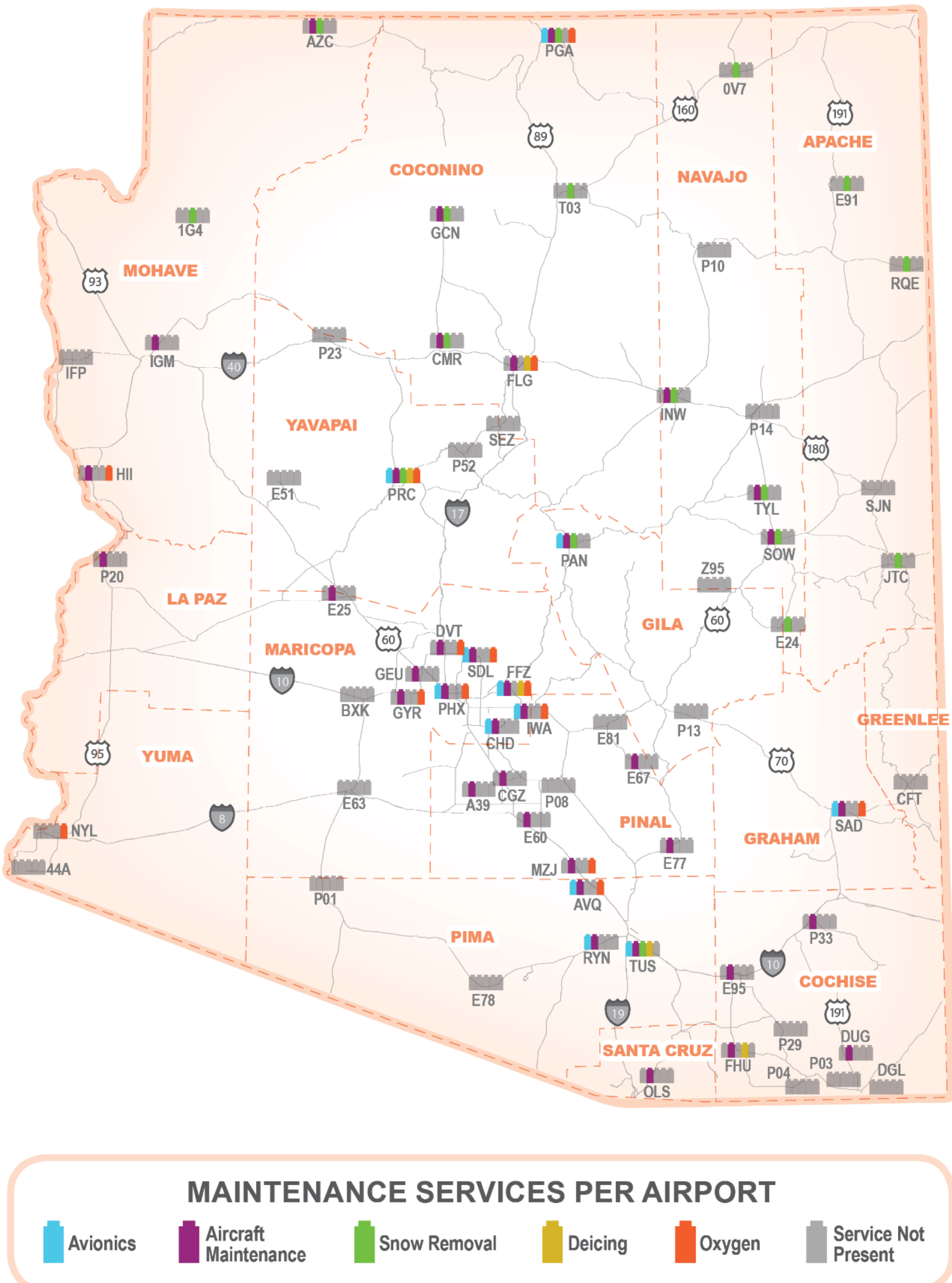
Source: Airport Inventory and Data Survey 2017

EXISTING SERVICES

Similar to the types of facilities, services provided at airports typically vary depending on the role within the system. The following services were identified through the airport inventory process:

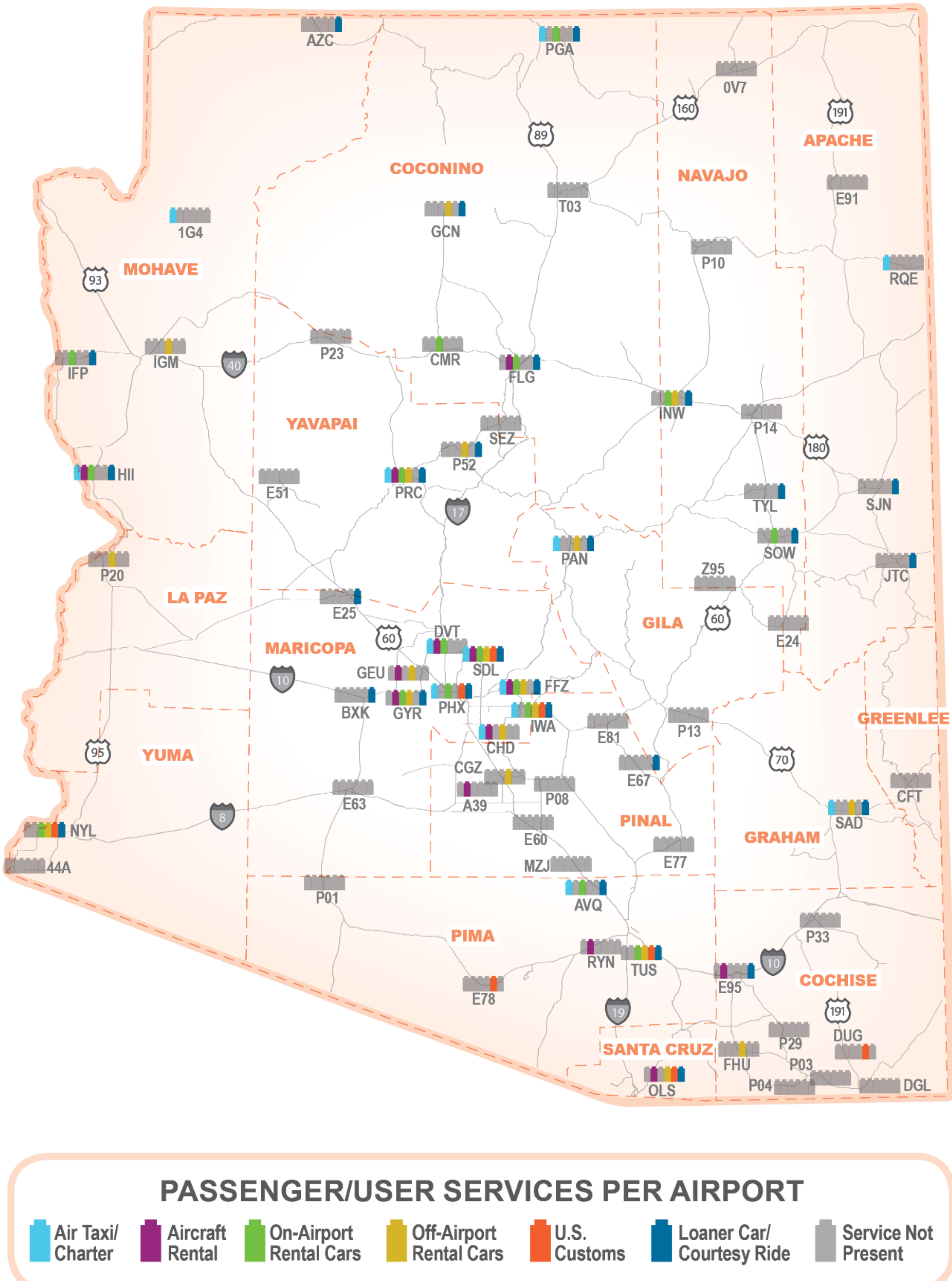
1. Air Taxi/Charter Service
2. Aircraft Rental
3. Avionics Sales & Service
4. Aircraft Maintenance
5. On-Airport Rental Cars
6. Off-Airport Rental Cars
7. U.S. Customs
8. Snow Removal
9. Deicing
10. Oxygen
11. Loaner Car
12. Courtesy Ride

Commercial service and reliever airports frequently provide a wide array of services such as fuel service, overnight aircraft storage rental, rental cars, pilot's lounge, and internet and phone service. The type of services provided at GA airports can be an indicator of the level of activity at the airport, as many of these services attract transient operators. **Figure 6** identifies services available at system airports in relation to the operation and maintenance of GA aircraft. **Figure 7** identifies services available for GA and commercial aircraft passengers at system airports.



Source: Airport Inventory and Data Survey 2017

Figure 6. Maintenance Services Per Airport



Source: Airport Inventory and Data Survey 2017

Figure 7. Passenger/User Services Per Airport

AIRPORT ACTIVITY

One of the best ways to determine the level of activity at an airport is evaluate the number of based aircraft and annual operations at the facility. A based aircraft is generally defined as an aircraft that is stored at an airport for the majority of the year. An aircraft operation represents either a take-off or landing conducted by an aircraft. For example, a touch-and-go, which includes a take-off and landing, counts as two operations.

An accurate based aircraft recording can provide insight to the adequacy of aircraft storage and facility capacity at the airport. Similar to based aircraft, accurate annual aircraft operations data provide a detailed view of the airport's capacity and assists airport planners in determining future facility needs. It is important to note that accurate annual aircraft operations data are only available from airports that have an air traffic control tower. Untowered airports typically estimate the number of operations using different methods that do not always reflect the actual total number of annual operations.

A standard practice for airport management is to conduct quarterly to annual based aircraft inventory counts. ADOT requires airports to provide quarterly based aircraft reports for purposes of aircraft registration and taxation; revenues from registration are used to fund the State Aviation Fund.

Updated based aircraft data were obtained from airport management during the inventory process. If updated based aircraft data were unavailable, data were obtained from the most recent ADOT ASM update. At towered airports, annual operations were derived from FAA Air Traffic Activity Data System (ATADS). At non-towered airports, annual aircraft operations data was derived from updated airport data reported as estimates by the airport manager. If the airport manager did not have the means to accurately report annual operations, recently updated ASM data were used. Generally, ASM data corresponded with FAA 5010 Master Record data.

Based Aircraft

For each system airport, the total number of based aircraft reported in 2016, by type, were identified. **Table 7** summarizes the based aircraft in the Arizona system by type. Since the 2008 SASP, the percentage of single-engine aircraft has decreased, while the percentages of jet and helicopter aircraft have increased. This trend is consistent with national averages per the *FAA Aerospace Forecast 2017-2037*.

Table 7. Statewide Based Aircraft by Type, 2016

Aircraft Type	Number of Aircraft	Percent of Total (%)
Single-engine	4,622	76.7%
Multi-engine	573	9.5%
Jet	332	5.5%
Helicopter	245	4.1%
Glider	15	0.2%
Ultralights/Other	76	1.3%
Military	166	2.8%
Total	**6,029**	**100.0%**

Source: Airport Inventory and Data Survey 2017

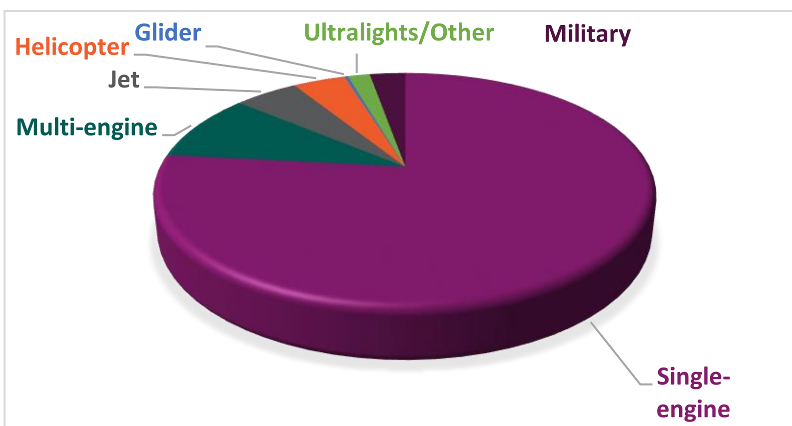


Figure 8. 2016 Based Aircraft

Table 8. Based Aircraft by Type, 2016

Associated City	Airport	Type of Based Aircraft (Number)							
		Single-engine	Multi-engine	Jet	Helicopter	Glider	Ultralight /Other	Military	Total
Commercial Service									
Bullhead City	Laughlin/Bullhead City Int'l	13	2	0	6	0	0	0	21
Flagstaff	Flagstaff Pulliam	113	15	3	4	3	0	1	139
Grand Canyon	Grand Canyon National Park	4	5	0	37	0	0	0	46
Page	Page Municipal	43	6	5	4	0	0	0	58
Peach Springs	Grand Canyon West	0	0	0	0	0	0	0	0
Phoenix	Phoenix Sky Harbor International	18	10	25	13	0	0	8	74
Phoenix	Phoenix-Mesa Gateway	75	16	25	1	0	0	0	117
Prescott	Ernest A. Love Field	256	23	3	37	0	0	0	319
Show Low	Show Low Regional	36	4	0	0	0	0	0	40
Tucson	Tucson International	163	18	26	7	0	0	72	286
Yuma	Yuma International	66	21	3	1	0	1	83	175
General Aviation									
Ajo	Eric Marcus Municipal	7	0	0	0	0	0	0	7
Bagdad	Bagdad	4	0	0	0	0	1	0	5
Benson	Benson Municipal	38	3	0	1	0	2	0	44
Bisbee	Bisbee Municipal	24	0	0	2	0	2	0	28
Buckeye	Buckeye Municipal	51	10	1	3	0	5	0	70
Casa Grande	Casa Grande Municipal	98	2	0	3	2	0	0	105
Chandler	Chandler Municipal	407	17	4	12	0	0	0	440
Chinle	Chinle Municipal	0	3	0	0	0	0	0	3
Cibecue	Cibecue	0	0	0	0	0	0	0	0
Clifton	Greenlee County	1	0	0	0	0	0	0	1
Colorado City	Colorado City Municipal	13	0	0	0	0	0	0	13
Coolidge	Coolidge Municipal	28	9	2	5	0	1	0	45
Cottonwood	Cottonwood Municipal	39	3	0	2	0	0	0	44
Douglas	Bisbee-Douglas International	4	1	0	0	0	0	0	5
Douglas	Cochise College	14	1	0	0	0	0	0	15

Associated City	Airport	Type of Based Aircraft (Number)							
		Single-engine	Multi-engine	Jet	Helicopter	Glider	Ultralight /Other	Military	Total
Douglas	Douglas Municipal	10	1	0	1	0	0	0	12
Eloy	Eloy Municipal	12	7	0	0	0	2	0	21
Gila Bend	Gila Bend Municipal	4	0	0	0	0	0	0	4
Glendale	Glendale Municipal	224	29	3	6	0	24	0	286
Globe	San Carlos Apache	10	1	2	0	0	0	0	13
Goodyear	Phoenix Goodyear	204	15	1	2	0	0	0	222
Holbrook	Holbrook Municipal	9	0	0	0	0	5	0	14
Kayenta	Kayenta	0	1	0	0	0	0	0	1
Kearny	Kearny	4	0	0	0	0	2	0	6
Kingman	Kingman	75	32	38	7	1	2	0	155
Lake Havasu City	Lake Havasu City	110	7	7	3	0	5	0	132
Marana	Marana Regional	218	15	6	1	1	7	0	248
Marana	Pinal Airpark	1	3	1	0	0	0	0	5
Maricopa	Ak-Chin Regional	17	1	0	0	0	12	0	30
Mesa	Falcon Field	583	86	4	24	0	0	0	697
Nogales	Nogales	23	3	0	0	0	0	0	26
Parker	Avi Suquilla	12	3	0	2	0	0	0	17
Payson	Payson	50	2	0	0	2	0	0	54
Phoenix	Phoenix Deer Valley	795	99	23	17	4	0	2	940
Polacca	Polacca	0	0	0	0	0	0	0	0
Safford	Safford Regional	30	26	0	1	0	0	0	57
San Luis	Rolle Airfield	0	0	0	0	0	0	0	0
San Manuel	San Manuel	31	4	1	1	0	0	0	37
Scottsdale	Scottsdale	223	43	145	31	0	0	0	442
Sedona	Sedona	54	2	1	3	1	0	0	61
Seligman	Seligman	2	0	0	0	0	0	0	2
Sells	Sells	0	0	0	0	0	0	0	0
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	44	4	0	3	0	0	0	51
Springerville	Springerville Municipal	11	1	0	1	0	0	0	13
St. Johns	St. Johns Industrial Air Park	14	0	0	0	0	1	0	15

Associated City	Airport	Type of Based Aircraft (Number)							
		Single-engine	Multi-engine	Jet	Helicopter	Glider	Ultralight /Other	Military	Total
Superior	Superior	0	0	0	0	0	0	0	0
Taylor	Taylor	14	0	0	0	0	1	0	15
Tombstone	Tombstone Municipal	2	0	0	0	0	2	0	4
Tuba City	Tuba City	0	0	0	0	0	0	0	0
Tucson	Ryan Field	246	9	2	0	0	0	0	257
Whiteriver	Whiteriver	0	0	0	0	0	0	0	0
Wickenburg	Wickenburg Municipal	37	5	1	1	1	1	0	46
Willcox	Cochise County	23	0	0	1	0	0	0	24
Williams	H.A. Clark Memorial Field	3	0	0	0	0	0	0	3
Window Rock	Window Rock	2	4	0	1	0	0	0	7
Winslow	Winslow-Lindbergh Regional	10	1	0	1	0	0	0	12

Source: Airport Inventory and Data Survey 2017

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Aircraft Operations

Operations measure the activity of an airport and are a factor in determining the health of the system. **Table 9** summarizes estimates of Arizona system airports' operations by type for 2016.

Table 9. Statewide Operations by Type, 2016

Operation Type	Number of Operations	Percent of Total
Commercial Service	433,250	10.7%
GA-Local	1,532,202	37.9%
GA-Itinerant	1,682,040	41.6%
Military	393,759	9.7%
Total	**4,041,251**	**100.0%**

Sources: Airport Inventory and Data Survey 2017, FAA ATADS 2017

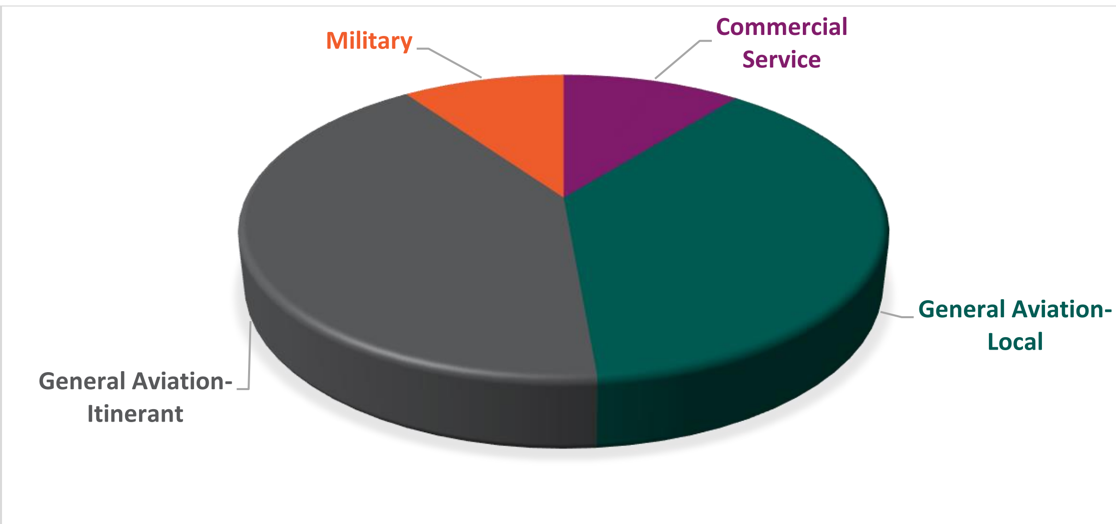

Figure 9. Operations by Type, 2016

Table 10 identifies total annual operations at each airport in the state's system as well as operations by aircraft type. Similar to based aircraft, Arizona's eight reliever airports play a major role in the system, accounting for 1,369,969 operations, or one-third of the 4,041,251 total operations estimated to have been conducted in 2016.

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Table 10. Aircraft Operations by Type, 2016

Associated City	Airport	Type of Operations (Number)				
		Commercial Service	GA-Local	GA-Itinerant	Military	Total
Commercial Service						
Bullhead City	Laughlin/Bullhead City International	1,444	850	8,252	22,657	33,203
Flagstaff	Flagstaff Pulliam	1,769	8,772	36,823	1,113	48,477
Grand Canyon	Grand Canyon National Park	45	1,083	106,111	804	108,043
Page	Page Municipal	0	1,000	16,061	100	17,161
Peach Springs	Grand Canyon West	0	0	130,300	0	130,300
Phoenix	Phoenix Sky Harbor International	361,395	42	76,653	2,553	440,643
Phoenix	Phoenix-Mesa Gateway	11,239	142,617	91,492	5,658	251,006
Prescott	Ernest A. Love Field	9	178,922	74,859	552	254,342
Show Low	Show Low Regional	0	2,242	10,068	72	12,382
Tucson	Tucson International	33,874	20,776	55,221	27,690	137,561
Yuma	Yuma International	18,298	45,981	61,824	113,541	239,644
General Aviation						
Ajo	Eric Marcus Municipal	0	60	240	0	300
Bagdad	Bagdad	0	400	600	0	1,000
Benson	Benson Municipal	0	4,500	12,000	200	16,700
Bisbee	Bisbee Municipal	0	1,100	1,800	0	2,900
Buckeye	Buckeye Municipal	0	15,840	37,060	100	53,000
Casa Grande	Casa Grande Municipal	0	12,720	106,560	400	119,680
Chandler	Chandler Municipal	0	142,184	78,750	278	221,212
Chinle	Chinle Municipal	0	400	7,400	0	7,800
Cibecue	Cibecue	0	0	10	0	10
Clifton	Greenlee County	0	200	910	0	1,110
Colorado City	Colorado City Municipal	0	2,370	2,400	30	4,800
Coolidge	Coolidge Municipal	0	12,000	4,000	1,000	17,000
Cottonwood	Cottonwood Municipal	0	8,000	10,900	100	19,000
Douglas	Bisbee-Douglas International	0	5,575	13,107	7,100	25,782
Douglas	Cochise College	0	45,000	2,000	50	47,050
Douglas	Douglas Municipal	0	650	1,950	730	3,330
Eloy	Eloy Municipal	0	21,300	11,250	100	32,650

Associated City	Airport	Type of Operations (Number)				
		Commercial Service	GA-Local	GA-Itinerant	Military	Total
Gila Bend	Gila Bend Municipal	0	30,340	5,900	50	36,290
Glendale	Glendale Municipal	0	45,788	24,617	118	70,523
Globe	San Carlos Apache	0	400	1,500	6	1,906
Goodyear	Phoenix Goodyear	120	73,079	45,890	1,185	120,274
Holbrook	Holbrook Municipal	0	700	3,000	0	3,700
Kayenta	Kayenta	0	0	1,500	0	1,500
Kearny	Kearny	0	50	1,100	50	1,200
Kingman	Kingman	0	14,000	13,100	20	27,120
Lake Havasu City	Lake Havasu City	0	20,270	23,650	350	44,270
Marana	Marana Regional	0	30,000	40,000	20,252	90,252
Marana	Pinal Airpark	0	7,500	557	48,800	56,857
Maricopa	Ak-Chin Regional	0	2,886	15,434	2	18,322
Mesa	Falcon Field	27	152,579	106,968	3,544	263,118
Nogales	Nogales	0	32,400	12,750	2,600	47,750
Parker	Avi Suquilla	0	1,500	11,000	150	12,650
Payson	Payson	0	11,000	21,750	500	33,250
Phoenix	Phoenix Deer Valley	17	241,742	128,201	74	370,034
Polacca	Polacca	0	0	200	0	200
Safford	Safford Regional	0	6,000	6,750	1,000	13,750
San Luis	Rolle Airfield	0	3,000	0	100	3,100
San Manuel	San Manuel	0	12,000	2,000	10	14,010
Scottsdale	Scottsdale	0	58,270	99,354	671	158,295
Sedona	Sedona	0	4,600	28,900	1,800	35,300
Seligman	Seligman	0	500	600	0	1,100
Sells	Sells	0	0	250	10	260
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	5,013	25,803	10,905	110,066	151,787
Springerville	Springerville Municipal	0	286	2,237	48	2,571
St. Johns	St. Johns Industrial Air Park	0	3,500	13,000	300	16,800
Superior	Superior	0	0	200	0	200
Taylor	Taylor	0	2,000	830	0	2,830
Tombstone	Tombstone Municipal	0	40	300	0	340

Associated City	Airport	Type of Operations (Number)				
		Commercial Service	GA-Local	GA-Itinerant	Military	Total
Tuba City	Tuba City	0	0	250	0	250
Tucson	Ryan Field	0	54,535	39,226	15,895	109,656
Whiteriver	Whiteriver	0	850	3,000	30	3,880
Wickenburg	Wickenburg Municipal	0	11,500	24,600	50	36,150
Willcox	Cochise County	0	1,500	7,500	1,000	10,000
Williams	H.A. Clark Memorial Field	0	1,500	5,000	0	6,500
Window Rock	Window Rock	0	3,500	1,500	0	5,000
Winslow	Winslow-Lindbergh Regional	0	4,000	17,000	250	21,250

Sources: Airport Inventory and Data Survey 2017, FAA ATADS

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Passenger Enplanements

A passenger enplanement is defined as a revenue-paying passenger who boards an aircraft and departs to travel to a different city destination. There are different levels of commercial service provided throughout the state from the largest airport, Phoenix Sky Harbor International to small airports such as Ernest A. Love Field (Prescott) and Show Low Regional. The FAA's latest NPIAS identifies Ernest A. Love Field (Prescott) as a non-primary commercial service airport and Show Low as a non-primary GA airport, but both have scheduled commercial airline service by small regional carriers. For calendar year 2016, these 11 Arizona airports served over 24.6 million passenger enplanements. It should be noted that other than Grand Canyon West and Show Low Regional Airports whose enplanement data were obtained from the FAA TAF, all other airport's enplanements were obtained from the Airport Inventory and Data Survey. **Table 11** summarizes the passenger enplanements for these airports in 2016.

Table 11. Arizona Passenger Enplanements, 2016

Associated City	Airport	Enplanements (Number)
Bullhead City	Laughlin/Bullhead City International	105,007
Flagstaff	Flagstaff Pulliam	66,526
Grand Canyon	Grand Canyon National Park	324,682
Page	Page Municipal	85,666
Peach Springs	Grand Canyon West	34,973
Phoenix	Phoenix Sky Harbor International	21,673,418
Phoenix	Phoenix-Mesa Gateway	676,745
Prescott	Ernest A. Love Field	3,435
Show Low	Show Low Regional	3,652
Tucson	Tucson International	1,647,644
Yuma	Yuma International	73,876

Sources: Airport Inventory and Data Survey 2017, FAA TAF 2017

AIRSPACE

The airspace in a state and in various regions affects the airport users and is an important component in examining the state's airport system. The FAA recognizes controlled and uncontrolled airspace known as regulatory and non-regulatory, respectively. The type of airspace is determined by the users and traffic density within the region.

Controlled Airspace

Air Traffic Control (ATC) services are provided in controlled airspace which consists of Class A, B, C, D, and E airspace. The following provides an overview of each airspace classification.

1. **Class A.** Airspace from 18,000 feet mean sea level (MSL) up to and including flight level (FL) 600 or, 60,000 feet MSL. The airspace also includes overlying waters within 12 nautical miles (NM) of the coast of the 48 contiguous states and Alaska. Unless otherwise authorized, all operations in Class A airspace are conducted under instrument flight rules (IFR).

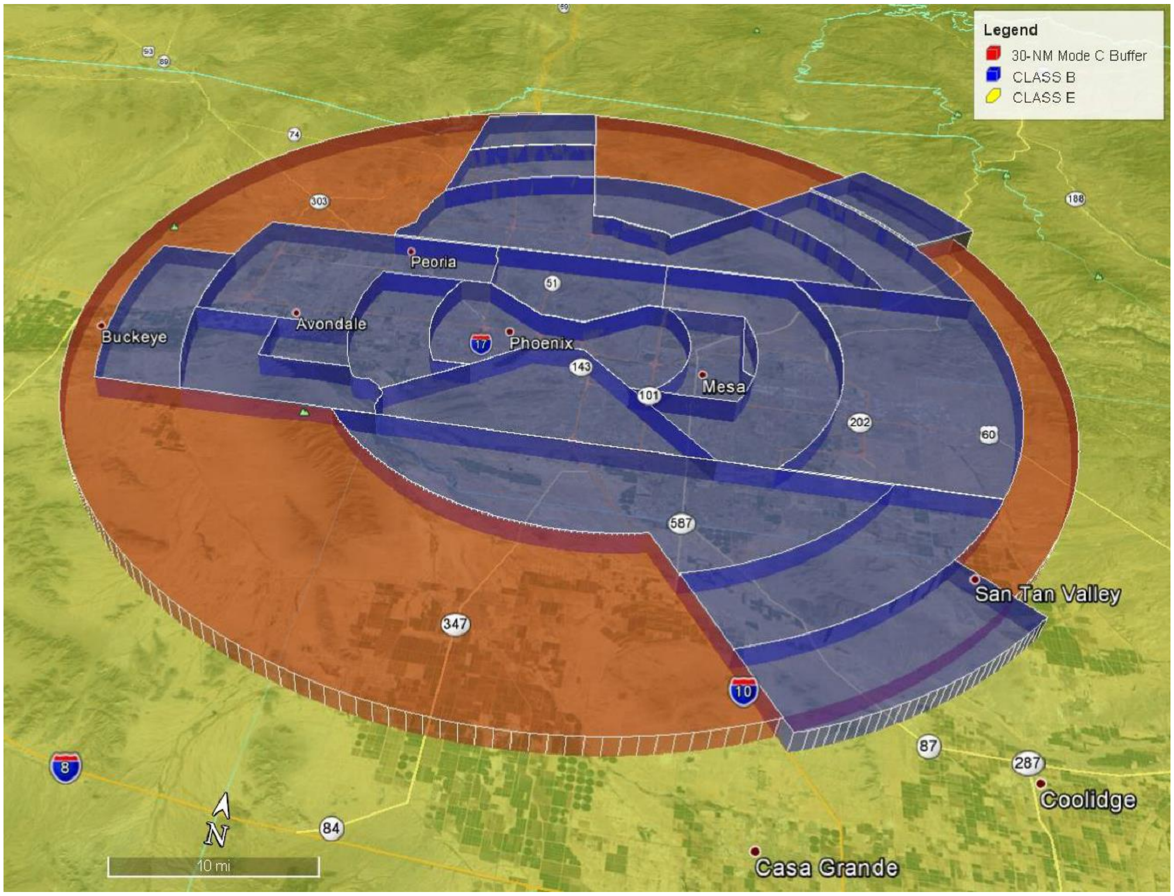
2. **Class B.** Airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. The configuration of each Class B airspace area is individually tailored, consisting of a surface area and two or more layers resembling an upside-down wedding cake. Class B is designed to contain all published instrument procedures once an aircraft enters the airspace. ATC clearance is required for all aircraft to operate in the area, and all aircraft that are cleared receive separation services within the airspace.

3. **Class C.** Airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have a control tower, are serviced by a radar approach control, and have a certain number of IFR operations or passenger enplanements. Although the configuration of each Class C area is individually tailored, the airspace usually consists of a surface area with a five- NM radius, and an outer circle with a ten-NM radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Each aircraft must establish two-way radio communication with the ATC facility providing air traffic services prior to entering the airspace and thereafter must maintain those communications while within the Class C airspace.

Figure 10 displays Class B and Class C airspace surrounding Phoenix, Arizona.

4. **Class D.** Airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have a control tower. The configuration of each Class D airspace area is individually tailored and, when instrument procedures are published, the airspace is normally designed to contain the procedures. Arrival extensions for IAPs may be Class D or Class E Airspace. Unless otherwise authorized, each aircraft must establish two-way radio communication with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace. Class D airspace is present at Arizona airports including Flagstaff Pulliam Airport and Ernest A. Love Field Airport.

5. **Class E.** Controlled airspace not classified as Class A, B, C, or D airspace. A large amount of airspace over the United States is designated as Class E airspace. This provides sufficient airspace for the safe control and separation of aircraft during IFR operations. Sectional and other charts depict all locations of Class E airspace with bases below 14,500 feet MSL. In areas where charts do not depict a Class E base, Class E begins at 14,500 feet MSL. In Arizona, Class E airspace is all remaining airspace (not A, B, C, or D) up to 14,500 MSL.



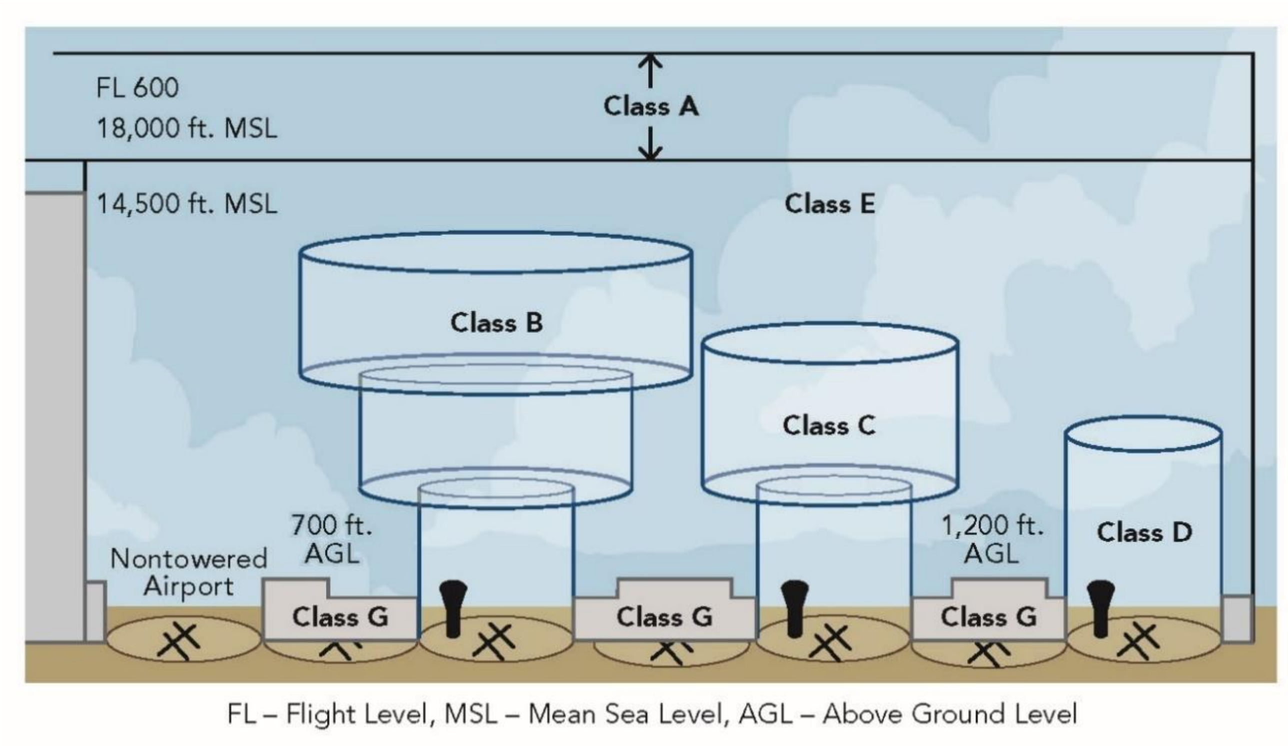
Sources: FAA ADS-B Airspace — Google Earth

Figure 10. Airspace – Phoenix, AZ

Uncontrolled Airspace

6. **Class G/Uncontrolled Airspace.** Airspace that has not been designated as Class A, B, C, D, or E is referred to as uncontrolled or Class G airspace. Class G airspace extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic, there are visual flight rule (VFR) minimums that apply to Class G airspace.

Figure 11 provides a general overview of the different types of airspace in the national airspace system as described above.



Source: FAA 2017

Figure 11. FAA Airspace Classifications

Special-Use Airspace

In accordance with the FAA's policies and regulations handbook, airspace in which certain activities must be contained or where limitations are imposed on aircraft operations that are not part of those activities is known as special use airspace or special area of operations (SAO). Certain special use airspace areas can limit or constrain the mixed-use of airspace. Types of special use airspace comprises:

7. **Prohibited Areas.** Prohibited areas contain airspace-defined dimensions within which the flight of aircraft is prohibited. Such areas are established for security or other reasons associated with national welfare. These areas are published in the Federal Register and are depicted on aeronautical charts. The area is charted "P" followed by a number (e.g., P-40). Examples of prohibited areas include Camp David and the National Mall in Washington D.C., where the White House and the Congressional buildings are located. There are no permanently prohibited areas in Arizona.
8. **Restricted Areas.** Areas where operations are hazardous to nonparticipating aircraft and contain airspace within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Certain types of activities may be confined within these areas, limitations may be imposed upon aircraft operations that are not part of such activities, or both. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft (e.g., artillery firing, aerial gunnery, or guided missiles). IFR flights may be authorized to transit the airspace and are routed accordingly. Penetration of restricted areas without

authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. There are several restricted (R) areas in Arizona, some of which are located southwest of Phoenix and include R-2301, R-2304, R-2307.

9. **Military Operational Areas (MOAs).** Airspace with defined vertical and lateral limits established for the purpose of separating certain military training activities from IFR traffic. Whenever an MOA is used, nonparticipating IFR traffic may be cleared through an MOA if IFR separation can be provided by ATC. Otherwise, ATC reroutes or restricts nonparticipating IFR traffic. There are many MOAs in Arizona with a high concentration located around Tucson such as Sells 1 MOA, Jackal MOA, Ruby 1 MOA, and Fuzzy MOA.
10. **Alert Areas.** Airspace that contains a high volume of pilot training or unusual type of aerial activity that may present a hazard to an aircraft. These areas are depicted on an aeronautical chart with an "A" followed by a number (e.g., A-211) to direct nonparticipating pilots to exercise caution in alert areas. All activity within an alert area shall be conducted in accordance with all applicable regulations, without waiver. Pilots of participating aircraft, as well as pilots transitioning through area, shall be equally responsible for collision avoidance. There is an alert area located to the west and northwest of Phoenix, Alert Area A-231 for concentrated student jet transition training.

Other Arizona Airspace

In addition to special use airspace, there are other specialized airspace areas within Arizona. The following describe "other" airspace within the state:

11. **Military Training Routes (MTRs).** The MTR Program is a joint venture by the FAA and the Department of Defense (DOD) developed for use by military aircraft to gain and maintain proficiency in tactical low-level flying. MTRs are generally established below 10,000 feet MSL for speeds in excess of 250 knots to accommodate both VFR and IFR. Pilots utilizing MTRs are held to strict standards while utilizing these routes. Non-participating aircraft are not prohibited from flying within an MTR; however, extreme vigilance should be exercised when conducting flight through or near such airspace. There are numerous MTRs in Arizona that support the flying missions of the military.
12. **National Parks, National Forests, and Wildlife Areas**. Arizona has numerous National Parks, National Forests, and Wildlife Areas. Many of these areas are noise sensitive and are marked on FAA aeronautical charts. Airspace over the Grand Canyon National Park is subject to special air traffic rules. VFR flight through the Grand Canyon Special Flight Rules Area (GCN SFRA) is not authorized except through designated corridors. There are many aerial tours originating from Las Vegas or the Grand Canyon which are protected with these special flight rules.

NextGen

The Next Generation Air Transportation System (NextGen) is an FAA initiative to transform the National Airspace System (NAS). The primary transformation phases out the existing radar-based ATC system to a satellite-based ATC system using Automatic Dependent Surveillance – Broadcast (ADS-B) technology. This technology reduces in-flight aircraft separation, shortens routes, increases airspace capacity, reduces fuel consumption, and increases safety. The FAA's goal is to have NextGen fully implemented by 2025, however, full implementation is unlikely by that timeframe according to current progress.

NAVAIDS

Navigational aids (NAVAIDs) were initially developed to provide directional information suitable for navigation from place-to-place. With the proliferation of NAVAIDs and improvements in technology over time, it became possible to use NAVAIDs to obtain information about a fixed physical location known as a fix. A fix is a radio-generated landmark. As a result, pilots can use a series of fixes to follow a specific course to align aircraft with the runway without the need to first circle and obtain visual confirmation of its physical location. A series of fixes can also be used to regulate an aircraft's rate of descent, with pilots descending to a lower altitude when reaching a certain point. The following are different types of NAVAIDs that can be used in Arizona:

1. **Very High Frequency (VHF) Omni-directional Range (VOR).** This system radiates a VHF radio signals to compatible airborne receivers. This type of approach provides pilots with a direct indication of bearing relative to the facility. The VOR is one of the most widely used non-precision approach types in the NAS. VOR approaches use facilities both on and off the and incorporate the use of a wide variety of equipment such as Distance Measuring Equipment (DME) and Tactical Area Navigation (TACAN). As a result of technology advances, including NextGen, the FAA has begun to decommission lesser-used VORs. The plan is to create a minimum operational network (MON) that will serve as a backup to ensure aircraft can land safely in the event of a widespread satellite navigation outage.[4]
2. **VOR + DME (VOR/DME).** A VOR radial with a DME distance allows a one-station position fix. The use of DME in confluence with VOR provides an accurate determination of position without timing to greatly increase situational awareness throughout the approach.
3. **Non-Directional Beacon (NDB).** An NDB is a radio beacon that aids the pilot of an aircraft with direction-finding equipment. It can be part of an instrument landing system (ILS). NDBs are most commonly used as compass locators for the outer marker of an ILS. NDBs may designate the starting area for an ILS approach or a path to follow for a standard terminal arrival procedure (STAR). Similar to the VOR approach, an NDB approach can be designed using facilities both on and off the airport, with or without a Final Approach Fix (FAF), and with or without DME availability. While it was once common for an instrument student to learn to fly an NDB approach, NDB approaches are becoming obsolete with the increasing use of Global Positioning Systems (GPS). The FAA plans to gradually phase-out NDB facilities.
4. **TACAN.** TACAN is the military equivalent of the VOR/DME system and provides both distance and direction guidance. The system includes a DME distance feature and a separate TACAN azimuth feature that provides data similar to a VOR. A co-located VOR and TACAN beacon is called a VORTAC

APPROACH TYPES

The series of procedures dictating route, direction, and rate of descent is known as an approach. The precision of the course guidance provided by NAVAIDS has improved to such a degree that it is possible to execute an approach within a few hundred feet of the ground. There are four types of approaches including visual, non-precisions, near-precision, and precision.

[4] Aircraft Owners and Pilots Association

Visual Approach Procedures

A visual approach procedure is conducted under Visual Meteorological Conditions (VMC), which are defined as a cloud ceiling greater than 1,000 feet above ground level (AGL) and visibility conditions equal to or greater than three statute miles. Under VMC conditions, pilots approach an airport using only visual standards or cues. There are 29 airports in the Arizona system that have only visual approach procedures to land.

Instrument Approach Procedures

IAPs are a series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority. The three types of IAPs are described in the following sections.

Non-Precision Instrument Approaches

Non-precision Instrument (NPI) approaches provide only lateral guidance from either ground based or satellite based GPS NAVAIDs. There are 28 airports in the Arizona system that use NPI approaches as their primary approach procedure.

Near-Precision Approaches

Near-precision approaches, also known as Approach Procedures with Vertical Guidance (APV) are a relatively recent outcome of the FAA's NextGen program. These approach procedures use GPS technology to provide ILS-like approach capability without the need for traditional ground-based ILS NAVAID equipment.

1. **Lateral Navigation (LNAV).** LNAV is a function of area navigation (RNAV) equipment that calculates, displays, and provides lateral guidance to a profile or path.
2. **Vertical Navigation (VNAV).** VNAV is a function of RNAV equipment that calculates, displays, and provides vertical guidance to a profile or path.
3. **Localizer Performance with Vertical Guidance (LPV).** LPV is a type of approach with APV based on Wide Area Augmentation System (WAAS) published on RNAV (GPS) approach charts. This procedure takes advantage of the precise lateral guidance available from WAAS.[5] The minima are published as a decision altitude (DA).
4. **Required Navigation Performance (RNP).** RNP is similar to RNAV, however, RNP requires on-board navigation performance monitoring and alerting capability to ensure that the aircraft stays within a specific containment area.

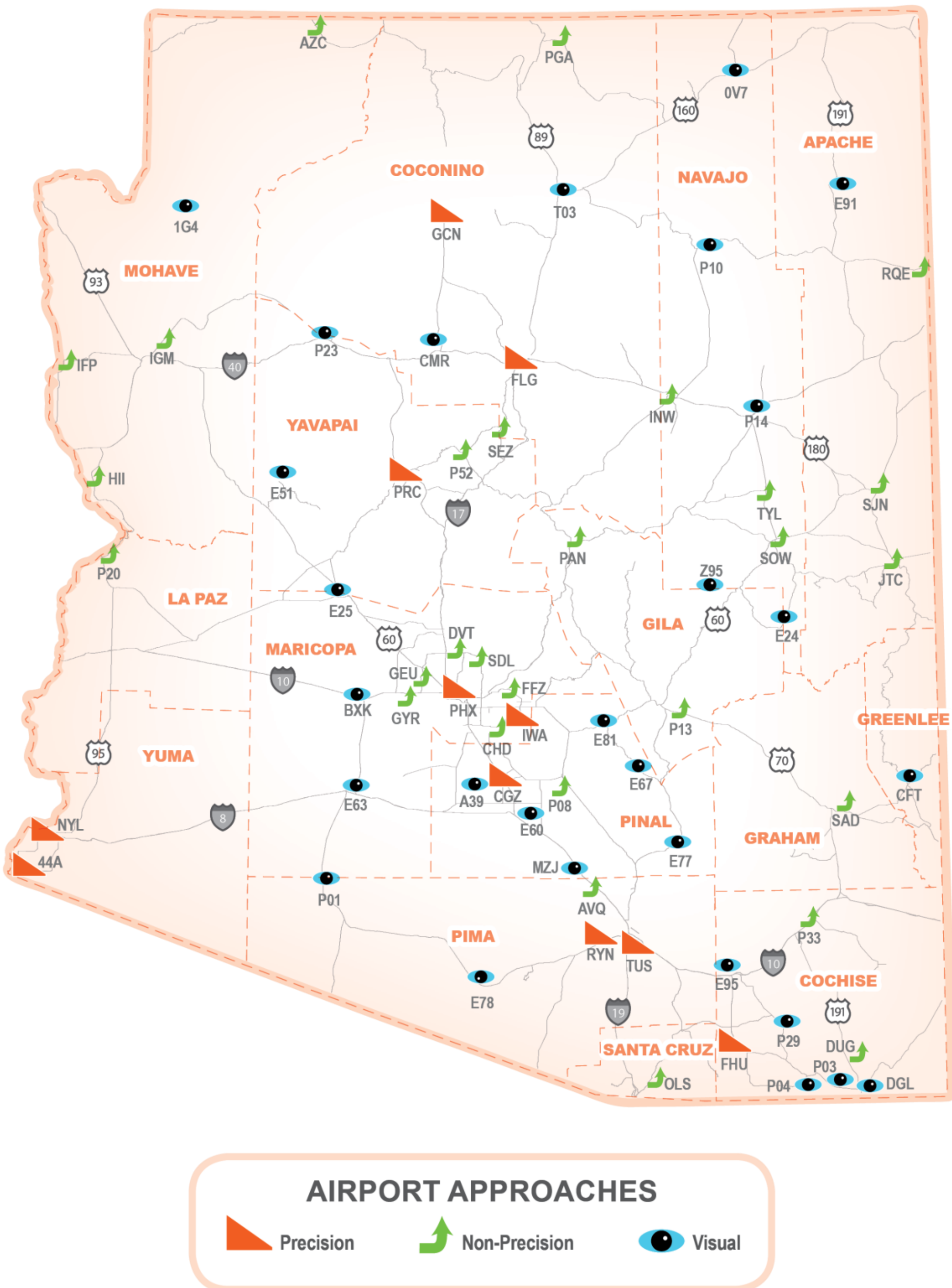
While some Arizona system airports have APV capabilities, there are no airports that use APV approaches as their primary approach procedure.

[5] The WAAS is a satellite navigation system consisting of the equipment and software which augments the GPS Standard Positioning Service (SPS). The WAAS provides enhanced integrity, accuracy, availability, and continuity over and above GPS SPS. The differential correction function provides improved accuracy required for precision approach.

Precision Approaches

Precision instrument approaches provide both lateral and vertical guidance and have traditionally been supported by multiple ground based NAVAIDs collectively called an ILS. An ILS includes a Localizer (providing lateral guidance), a Glideslope (providing vertical guidance), and an ALS (providing close-in visual guidance). There are 10 Arizona system airports that use precision approaches as their primary approach procedure.

Figure 12 depicts the primary airport approach at the 67 SASP airports.



Source: Airport Inventory and Survey Form 2017

Figure 12. Airport Approaches

Approach Visibility Minimums

Before a pilot is allowed to make an approach and attempt to land, he or she must have visual confirmation of the runway. The approach visibility minima define 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. The following are general visibility minimums and their related markings and lighting:

1. Visibility minimums of one mile can be supported with visual runway markings and LIRLs for nighttime operations.
2. MIRL and precision or non-precision runway markings are required to reduce visibility minima to ¾ mile.
3. To establish below ½ mile visibility minimums, additional equipment requirements comprise precision runway markings, MIRLs for nighttime operations, and an approved approach lighting system.

Approach Lighting Systems

An ALS provides a means to transition from IFR to VFR for landing. An ALS is a series of marker lights off the runway end to signal the aircraft toward the touchdown zone. Some systems include high-intensity sequenced flashing lights that appear to the pilot as a ball of light traveling toward the runway. Medium Approach Light Systems with Runway Alignment Indicator Lights (MALSRs) are the only ALSs in Arizona's system of airports.

Surface Weather Observation Stations

Surface weather observation stations are increasingly common at airports. These systems consist of various sensors, a processor, computer-generated voice subsystem, and transmitter to broadcast local, minute-by-minute weather data directly to the pilot. Prior to the initiation of an instrument approach, specific weather data including the altimeter setting must be obtained. Pilots obtain weather data from the Air Traffic Control Tower (ATCT) at towered airports; information is primarily disseminated via automated weather reporting systems at airports without ATCTs. The following describes surface weather observation systems at airports in Arizona:

1. **Automated Weather Observing System (AWOS).** An AWOS is a weather-data sensing, processing, and disseminating system designed to support weather forecast activities and aviation operations. The AWOS observes, archives, and transmits observations through an automatic terminal information service (ATIS) on a VHF (132.125 MHz) to pilots operating at or near the airport. An AWOS can include multiple types of systems based on the types of weather data needed.
2. **Automated Surface Observing System (ASOS).** Similar to an AWOS, the ASOS is a weather data sensing, processing, and disseminating system; however, unlike the AWOS, the ASOS converts surface winds to magnetic direction.

Table 12 presents the instrument approach type and approach minimums for each runway and the presence of an approach lighting system and automated weather reporting system at each airport in the Arizona airport system.

Table 12. Navigational Aids and Approach Types

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
Commercial Service						
Bullhead City	Laughlin/Bullhead City International	16 34	GPS GPS, VOR	1300 / 1-1/4 700 / 2-1/2	None None	AWOS IIIP/T
Flagstaff	Flagstaff Pulliam	3 21	GPS ILS OR LOC/DME, GPS, VOR/DME	300 / 1 300 / 3/4	None MALSR	ASOS
Grand Canyon	Grand Canyon National Park	3 21	ILS OR LOC/DME, GPS, VOR N/A	200 / 3/4 N/A	None None	ASOS
Page	Page Municipal	15 33 7 25	GPS GPS N/A N/A	300 / 1-1/4 300 / 1 N/A N/A	None None None None	ASOS
Peach Springs	Grand Canyon West	17 35	N/A N/A	N/A N/A	None None	ASOS
Phoenix	Phoenix Sky Harbor International	8 26 7L 25R 7R 25L	ILS OR LOC, RNP, GPS ILS OR LOC, RNP, GPS ILS OR LOC/DME, RNP, GPS RNP, GPS ILS OR LOC, RNP, GPS ILS OR LOC, RNP, GPS	300 / 1 300 / 3/4 200 / 1/2 500 / 1-1/2 300 / 3/4 200 / 1/2	MALSF None MALSR None MALSR MALSR	ASOS
Phoenix	Phoenix-Mesa Gateway	12R 30L 12C 30C 12L 30R	GPS GPS GPS ILS OR LOC, RNP, GPS, VOR OR TACAN N/A N/A	400 / 1 500 / 1 300 / 1 200 / 3/4 N/A N/A	None None None None None None	AWOS IIIP/T
Prescott	Ernest A. Love Field	3R 21L 3L 21R 12 30	RNP, GPS ILS OR LOC/DME, GPS N/A N/A GPS, VOR N/A	300 / 1 200 / 1/2 N/A N/A 300 / 1 N/A	None MALSR None None None None	ASOS
Show Low	Show Low Regional	6 24	N/A GPS	N/A 300 / 3/4	None None	AWOS III

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
		3 21	N/A N/A	N/A N/A	None None	
Tucson	Tucson International	11L 29R 11R 29L 3 21	ILS OR LOC, RNP, GPS, VOR OR TACAN RNP, GPS, LOC/DME BC, VOR/DME OR TACAN GPS GPS GPS GPS	200 / 1/2 300 / 1 400 / 1-1/4 400 / 1-3/8 700 / 2-1/2 600 / 2	MALSR None None None None None	ASOS
Yuma	Yuma International	3R 21L 3L 21R 8 26 17 35	N/A N/A GPS, HI-TACAN, TACAN ILS OR LOC/DME, GPS, HI-TACAN, TACAN N/A N/A GPS, VOR/DME OR TACAN, VOR N/A	N/A N/A 400 / 1 200 / 1/2 N/A N/A 400 / 1 N/A	None None None MALSR None None None None	ASOS
General Aviation						
Ajo	Eric Marcus Municipal	12 30	N/A N/A	N/A N/A	None None	None
Bagdad	Bagdad	5 23	N/A N/A	N/A N/A	None None	None
Benson	Benson Municipal	10 28	N/A N/A	N/A N/A	None None	AWOS III
Bisbee	Bisbee Municipal	17 35 2 20	N/A N/A N/A N/A	N/A N/A N/A N/A	None None None None	None
Buckeye	Buckeye Municipal	17 35	N/A N/A	N/A N/A	None None	AWOS III
Casa Grande	Casa Grande Municipal	5 23	ILS OR LOC/DME, GPS, VOR N/A	300 / 3/4 N/A	None MALSR	AWOS IIIP/T
Chandler	Chandler Municipal	4R 22L 4L 22R	GPS, VOR, NDB N/A N/A N/A	500 / 1 N/A N/A N/A	None None None None	AWOS III

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
Chinle	Chinle Municipal	18 36	N/A N/A	N/A N/A	None None	None
Cibecue	Cibecue	7 25	N/A N/A	N/A N/A	None None	None
Clifton	Greenlee County	7 25	N/A N/A	N/A N/A	None None	AWOS III
Colorado City	Colorado City Municipal	11 29 2 20	N/A N/A N/A N/A	N/A N/A N/A N/A	None None None None	AWOS IIIP/T
Coolidge	Coolidge Municipal	5 23 17 35	VOR/DME GPS N/A N/A	500 / 1 500 / 1 N/A N/A	None None None None	AWOS IIIP/T
Cottonwood	Cottonwood Municipal	14 32	N/A GPS	N/A 700 / 1	None None	AWOS-AV
Douglas	Bisbee-Douglas International	17 35 8 26	GPS, VOR/DME, VOR N/A N/A N/A	500 / 1 N/A N/A N/A	None None None None	ASOS
Douglas	Cochise College	5 23	N/A N/A	N/A N/A	None None	None
Douglas	Douglas Municipal	3 21	N/A N/A	N/A N/A	None None	None
Eloy	Eloy Municipal	2 20	N/A N/A	N/A N/A	None None	None
Gila Bend	Gila Bend Municipal	4 22	N/A N/A	N/A N/A	None None	None
Glendale	Glendale Municipal	1 19	GPS GPS	400 / 1-1/4 300 / 1	None None	AWOS III
Globe	San Carlos Apache	9 27	GPS N/A	600 / 1 N/A	None None	AWOS III
Goodyear	Phoenix Goodyear	3 21	GPS N/A	400 / 1 N/A	None None	None

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
Holbrook	Holbrook Municipal	3 21 11 29	N/A N/A N/A N/A	N/A N/A N/A N/A	None None None None	AWOS III
Kayenta	Kayenta	5 23	N/A N/A	N/A N/A	None None	AWOS IIIP/T
Kearny	Kearny	8 26	N/A N/A	N/A N/A	None None	None
Kingman	Kingman	3 21 17 35	GPS GPS, VOR/DME N/A N/A	400 / 1 300 / 1 N/A N/A	None None None None	AWOS III
Lake Havasu City	Lake Havasu City	14 32	GPS GPS	1400 / 1-1/4 500 / 1-3/4	None None	AWOS III
Marana	Marana Regional	12 30 3 21	GPS, NDB N/A GPS GPS	400 / 1 N/A 500 / 1 400 / 1	None None None None	AWOS III
Marana	Pinal Airpark	12 30	N/A N/A	N/A N/A	None None	AWOS III
Maricopa	Ak-Chin Regional	4 22	N/A N/A	N/A N/A	None None	None
Mesa	Falcon Field	4R 22L 4L 22R	GPS N/A GPS N/A	300 / 1 N/A 400 / 1 N/A	None None None None	None
Nogales	Nogales	3 21	GPS N/A	5,200 / 1-1/4 N/A	None None	ASOS
Parker	Avi Suquilla	1 19	GPS, VOR/DME N/A	300 / 1 N/A	None None	AWOS IIIP/T
Payson	Payson	6 24	N/A N/A	N/A N/A	None None	AWOS III
Phoenix	Phoenix Deer Valley	7R 25L	GPS GPS	400 / 1-1/4 400 / 1-1/4	None None	ASOS

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
		7L 25R	N/A N/A	N/A N/A	None None	
Polacca	Polacca	4 22	N/A N/A	N/A N/A	None None	
Safford	Safford Regional	12 30 8 26	GPS GPS N/A N/A	300 / 1 300 / 1 N/A N/A	None None None None	None
San Luis	Rolle Airfield	17 35	N/A N/A	N/A N/A	None None	
San Manuel	San Manuel	11 29	N/A N/A	N/A N/A	None None	AWOS IIIP/T
Scottsdale	Scottsdale	3 21	RNP RNP	400 / 1/4 500 / 1-1/4	None None	ASOS
Sedona	Sedona	3 21	GPS N/A	1400 / 1-1/2 N/A	None None	AWOS IIIP/T
Seligman	Seligman	4 22	N/A N/A	N/A N/A	None None	None
Sells	Sells	4 22	N/A N/A	N/A N/A	None None	None
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	8 26 12 30 3 21	GPS, TACAN ILS OR LOC, GPS, VOR, TACAN, NDB N/A N/A N/A N/A	200 / 3/4 200 / 3/4 N/A N/A N/A N/A	None None None None None None	ASOS
Springerville	Springerville Municipal	3 21 11 29	N/A GPS N/A N/A	N/A 500 / 1 N/A N/A	None None None None	AWOS IIIP/T
St. Johns	St. Johns Industrial Air Park	14 32 3 21	GPS GPS N/A N/A	500 / 1 500 / 1-1/2 N/A N/A	None None None None	ASOS

Associated City	Airport	Runway End	Instrument Approach	Approach Minimums (Decision Height [ft.]/Visibility)	Approach Lighting System	Surface Weather Observation Station
Superior	Superior	4 22	N/A N/A	N/A N/A	None None	None
Taylor	Taylor	3 21	N/A GPS	N/A 300 / 1	None None	AWOS III
Tombstone	Tombstone Municipal	6 24	N/A N/A	N/A N/A	None None	None
Tuba City	Tuba City	15 33	N/A N/A	N/A N/A	None None	None
Tucson	Ryan Field	6R 24L 6L 24R 15 33	ILS OR LOC, NDB/DME OR GPS N/A N/A N/A N/A N/A	300 / 1 N/A N/A N/A N/A N/A	None None None None None None	AWOS III
Whiteriver	Whiteriver	1 19	N/A N/A	N/A N/A	None None	None
Wickenburg	Wickenburg Municipal	5 23	N/A N/A	N/A N/A	None None	AWOS III
Willcox	Cochise County	3 21	GPS GPS	400 / 1 300 / 7/8	None None	None
Williams	H.A. Clark Memorial Field	18 36	N/A N/A	N/A N/A	None None	AWOS III
Window Rock	Window Rock	2 20	GPS N/A	700 / 1 N/A	None None	ASOS
Winslow	Winslow-Lindbergh Regional	11 29 4 22	VOR OR GPS N/A N/A N/A	500 / 1 N/A N/A N/A	None None None None	ASOS

Source: Airport Inventory and Data Survey 2017

AIRPORT PLANNING DOCUMENTATION

During the inventory process, the 67 airports in the study provided dates of their most recent MP and ALP. An airport master plan represents the airport's blueprint for long-term development and typically includes an update of the ALP during the study process. The following describe the goals of an MP:

1. Provide a graphic representation of the existing airport features, future airport development, and anticipated land use
2. Establish a realistic schedule for implementation of the proposed development
3. Identify a realistic financial plan to support the proposed development
4. Validate the plan technically and procedurally through an investigation of concepts and alternatives on technical, economic, and environmental grounds
5. Prepare and present a plan to the public that adequately addresses all relevant issues and satisfies local, state, and federal regulations
6. Establish a framework for a continuous planning process

The FAA approves specific components of an MP as opposed to the entire document. These components consist of the forecasts of aviation demand, selection of critical aircraft, and the ALP. It is from these elements that the FAA makes a determination regarding eligibility of Airport Improvement Program (AIP) funding for proposed development.[6]

In addition to the airport MP, the ALP serves as a critical planning tool that depicts both existing facilities and planned development for an airport. A current ALP is a prerequisite for issuance of a grant for airport development. Any sponsor who has received an FAA grant for airport development is obligated by grant assurance to "keep the ALP up-to-date at all times." The following describes the specific goals of an ALP:

1. Identifies the boundaries and proposed additions to all areas owned or controlled by the sponsor for airport purposes
2. Depicts the location and nature of existing and proposed airport facilities and structures
3. Establishes the location on the airport of existing and proposed non-aviation areas and improvements[7]

Table 13 details the reported completion dates on the most recent MPs and ALPs at airports in the Arizona system.

Table 13. Completion Dates of Airport Master Plans and Airport Layout Plans

Associated City	Airport	FAA ID	Year Completed	
			MP	ALP
		Commercial Service		
Bullhead City	Laughlin/Bullhead City International	IFP	2009	2009
Flagstaff	Flagstaff Pulliam	FLG	2008	2008
Grand Canyon	Grand Canyon National Park	GCN	2005 (2017 in progress)	2014
Page	Page Municipal	PGA	2009	2009

[6] There are many non-eligible projects that can be included in a MP and depicted on the ALP, however, FAA approval/acceptance of anything in the master plan or ALP does not constitute a guarantee of future FAA funding.
[7] AIP Sponsor Guide 500 — Airport Planning

Associated City	Airport	FAA ID	Year Completed	
			MP	ALP
Peach Springs	Grand Canyon West	1G4	1997	2015
Phoenix	Phoenix Sky Harbor International	PHX	Estimated 2018	2011
Phoenix	Phoenix-Mesa Gateway	IWA	2008	2015
Prescott	Ernest A. Love Field	PRC	2010	2014
Show Low	Show Low Regional	SOW	Unknown	2012
Tucson	Tucson International	TUS	2014	2012
Yuma	Yuma International	NYL	2009	2012
General Aviation				
Ajo	Eric Marcus Municipal	P01	2010	2010
Bagdad	Bagdad	E51	2014	2014
Benson	Benson Municipal	E95	2007	2007
Bisbee	Bisbee Municipal	P04	2011	2011
Buckeye	Buckeye Municipal	BXK	2007	2012
Casa Grande	Casa Grande Municipal	CGZ	2009	2015
Chandler	Chandler Municipal	CHD	2010	2017
Chinle	Chinle Municipal	E91	2016	2016
Cibecue	Cibecue	Z95	Unknown	Unknown
Clifton	Greenlee County	CFT	Unknown	2002
Colorado City	Colorado City Municipal	AZC	2008	2008
Coolidge	Coolidge Municipal	P08	Unknown	2010
Cottonwood	Cottonwood Municipal	P52	2006	2006
Douglas	Bisbee-Douglas International	DUG	2015	2015
Douglas	Cochise College	P03	2014	Unknown
Douglas	Douglas Municipal	DGL	2017	2017
Eloy	Eloy Municipal	E60	2012	2013
Gila Bend	Gila Bend Municipal	E63	2014	2014
Glendale	Glendale Municipal	GEU	2009	2017
Globe	San Carlos Apache	P13	2007	2007
Goodyear	Phoenix Goodyear	GYR	2018	2018
Holbrook	Holbrook Municipal	P14	2015	2015
Kayenta	Kayenta	0V7	Unknown	2006
Kearny	Kearny	E67	2008	Unknown
Kingman	Kingman	IGM	Unknown	2009
Lake Havasu City	Lake Havasu City	HII	2009	2009
Marana	Marana Regional	AVQ	2017	2017
Marana	Pinal Airpark	MZJ	2015	2015
Maricopa	Ak-Chin Regional	A39	2016	2016
Mesa	Falcon Field	FFZ	2009	2016
Nogales	Nogales	OLS	2012	2012
Parker	Avi Suquilla	P20	2014	2016
Payson	Payson	PAN	2009	2014
Phoenix	Phoenix Deer Valley	DVT	2015	2015
Polacca	Polacca	P10	Unknown	Unknown
Safford	Safford Regional	SAD	2000	2012

Associated City	Airport	FAA ID	Year Completed	
			MP	ALP
San Luis	Rolle Airfield	44A	2016	2016
San Manuel	San Manuel	E77	2015	2015
Scottsdale	Scottsdale	SDL	2015	2013
Sedona	Sedona	SEZ	2015	2017
Seligman	Seligman	P23	2005	2005
Sells	Sells	E78	Unknown	Unknown
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	2012	2014
Springerville	Springerville Municipal	JTC	2007	2009
St. Johns	St. Johns Industrial Air Park	SJN	2013	2013
Superior	Superior	E81	2018	2018
Taylor	Taylor	TYL	2005	2010
Tombstone	Tombstone Municipal	P29	Unknown	2018
Tuba City	Tuba City	T03	2016	2016
Tucson	Ryan Field	RYN	2010	2011
Whiteriver	Whiteriver	E24	Unknown	2006
Wickenburg	Wickenburg Municipal	E25	2012	2012
Willcox	Cochise County	P33	2015	2015
Williams	H.A. Clark Memorial Field	CMR	2007	2008
Window Rock	Window Rock	RQE	2016	2016
Winslow	Winslow-Lindbergh Regional	INW	1998	2015

Source: Airport Inventory and Data Survey 2017

AIRPORT DEVELOPMENT CONSTRAINTS

A final measure to assess the needs of airports within the system was to examine development constraints at each facility. The 2008 SASP identified four airport development constraint factors: man-made, environmental, community, and financial. For the 2018 SASP Update, a different approach was undertaken to examine the development constraints (in 2016). During the inventory process, airport sponsors were asked to provide a short answer to detail development constraints facing their airport. Responses were organized generally within four main topics as defined below:

1. **Human-caused.** Constraints due to roads, utilities, housing, or other structures
2. **Environmental.** Constraints due to noise impacts, endangered species, superfund sites, and others
3. **Community.** Constraints due to organized community opposition
4. **Financial.** Constraints due to lack of funding within local town, county, or state

These responses are valuable to ADOT Aeronautics in examining future decisions related to the airport development needs and potential policy decisions.

While community constraints were the most common response from airport representatives, funding continues to remain the backbone of development issues at airports throughout the state of Arizona.

Table 14 summarizes development constraints at the 67 SASP airports.

Table 14. Airport Development Constraints

Associated City	Airport	Human-Caused	Environmental	Community	Financial
			Commercial Service		
Bullhead City	Laughlin/Bullhead City International		✓	✓	
Flagstaff	Flagstaff Pulliam	✓		✓	
Grand Canyon	Grand Canyon National Park		✓	✓	
Page	Page Municipal		✓		
Peach Springs	Grand Canyon West			✓	
Phoenix	Phoenix Sky Harbor International		✓		
Phoenix	Phoenix-Mesa Gateway	✓	✓		
Prescott	Ernest A. Love Field		✓	✓	
Show Low	Show Low Regional		✓		
Tucson	Tucson International		✓		
Yuma	Yuma International				
			General Aviation		
Ajo	Eric Marcus Municipal			✓	
Bagdad	Bagdad	✓		✓	✓
Benson	Benson Municipal				✓
Bisbee	Bisbee Municipal				
Buckeye	Buckeye Municipal	✓			✓
Casa Grande	Casa Grande Municipal				
Chandler	Chandler Municipal			✓	
Chinle	Chinle Municipal				

Associated City	Airport	Human-Caused	Environmental	Community	Financial
Cibecue	Cibecue			✓	
Clifton	Greenlee County				
Colorado City	Colorado City Municipal			✓	
Coolidge	Coolidge Municipal		✓	✓	✓
Cottonwood	Cottonwood Municipal		✓	✓	
Douglas	Bisbee-Douglas International				✓
Douglas	Cochise College			✓	
Douglas	Douglas Municipal	✓			✓
Eloy	Eloy Municipal			✓	
Gila Bend	Gila Bend Municipal	✓			
Glendale	Glendale Municipal			✓	
Globe	San Carlos Apache				
Goodyear	Phoenix Goodyear				
Holbrook	Holbrook Municipal				
Kayenta	Kayenta			✓	
Kearny	Kearny	✓			
Kingman	Kingman			✓	
Lake Havasu City	Lake Havasu City	✓			✓
Marana	Marana Regional			✓	
Marana	Pinal Airpark	✓	✓		
Maricopa	Ak-Chin Regional				
Mesa	Falcon Field				
Nogales	Nogales			✓	
Parker	Avi Suquilla		✓		
Payson	Payson	✓	✓		✓
Phoenix	Phoenix Deer Valley				
Polacca	Polacca			✓	
Safford	Safford Regional				
San Luis	Rolle Airfield			✓	
San Manuel	San Manuel	✓	✓	✓	
Scottsdale	Scottsdale				
Sedona	Sedona	✓	✓		
Seligman	Seligman	✓	✓	✓	
Sells	Sells				
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield				
Springerville	Springerville Municipal			✓	
St. Johns	St. Johns Industrial Air Park	✓	✓		
Superior	Superior				
Taylor	Taylor			✓	✓
Tombstone	Tombstone Municipal			✓	
Tuba City	Tuba City			✓	
Tucson	Ryan Field			✓	
Whiteriver	Whiteriver	✓		✓	✓
Wickenburg	Wickenburg Municipal				✓

Associated City	Airport	Human-Caused	Environmental	Community	Financial
Willcox	Cochise County				✓
Williams	H.A. Clark Memorial Field	✓			✓
Window Rock	Window Rock			✓	
Winslow	Winslow-Lindbergh Regional			✓	

Source: Airport Inventory and Data Survey 2017

SUMMARY

This chapter presented an in-depth view of Arizona's system airport assets, including number of airports in the system, airside and landside facilities, airport activity, airspace, NAVAIDs, approach types, planning documentation, and airport development constraints. This data is essential to the subsequent evaluation of the system's needs. In terms of identifying the number of airports in the system, it was determined that the State Statute definition would be used, a notable change from the previous plan. Eligible airports were defined as all public-use airports owned by a political subdivision of the state or Tribal government. As such, the Arizona system was reduced to 67 airports from the previous 83 airports identified in the 2008 SASP. Results from this chapter are used as the baseline for analysis in future chapters.

CHAPTER FOUR: FORECASTS OF AVIATION DEMAND

INTRODUCTION

Forecasting aviation activity in the state is an important exercise in the system planning process. It provides a historical reference of activity changes in the past, and projects changes to come over the 20-year planning horizon. Developing accurate and reliable forecasts can be challenging as changes in the economy, government regulations, and technological advances can impact aviation activity at any time. As such, a variety of forecasting methods are employed to identify the most realistic projections of demand, including enplanements, operations, and based aircraft. Results of the forecasting effort help identify system capacity constraints and are used to make recommendations for system enhancement that will meet the needs of existing and future system users.

The aviation demand elements are separated into commercial service and general aviation (GA). The Federal Aviation Administration (FAA) utilizes the terms "primary" and "non-primary" in defining its terms for the airports included in the National Plan of Integrated Airport Systems (NPIAS). Primary airports are defined by the FAA as those public airports with scheduled airline service that have more than 10,000 enplaned passengers a year. In Arizona, nine airports met this criterion and were defined as primary based on calendar year 2016 data. Two additional airports have scheduled airline service but had fewer than 10,000 enplanements in 2016. For purposes of the State Aviation System Plan (SASP), all airports with scheduled airline service, regardless of their number of enplanements are included as commercial service airports. All other airports are identified as GA airports.

The following sections include an overview of factors impacting aviation demand in the state, followed by a review of commercial service trends and forecasts for Arizona's 11 commercial airports, as well as GA trends and forecasts for the remaining 56 GA system airports. The forecasts presented are optimistic based on the significant economic growth anticipated in the state over the 20-year planning horizon.

SOCIOECONOMIC AND OTHER FACTORS IMPACTING AVIATION DEMAND

There is a strong relationship between socioeconomic factors and an airport's and system's activity levels. In addition to providing a general understanding of the existing conditions in an airport area, socioeconomic data is instrumental in developing future projections of aviation activity. Tourism has a direct relationship to socioeconomic factors and is a critical factor in Arizona's aviation demand levels. Six factors were examined in this analysis:

1. Population
2. Age
3. Employment
4. Gross Regional Product (GRP)
5. Income
6. Tourism

This section provides an overview of demand factors in Arizona to indicate the origin of the forecasts of aviation demand. A more detailed analysis of these factors is provided in **Appendix D**. Much of the data was obtained from Woods & Poole Economics, Inc., an independent firm specializing in long-term country, state, and county economic and demographic projections.

Population

Population in Arizona is projected to increase from 6.9 million to over 9.5 million (37 percent) between 2016 and 2036, nearly doubling the national average rate of growth. The growth in population is not limited to only one county; 12 of 14 counties are projected to experience higher growth rates than the national average.[1]

Age

Due to an inflow of retirees in the state, Arizona's median age is projected to continue rising through the planning horizon. By 2036, Arizona's median age is projected to be 1.34 years older than the state's 2016 median age of 37.28.

Employment

There was a steady increase in workforce levels in Arizona between 1980 and 2007. In 2007, the state was severely impacted by the Great Recession and was unable to reach pre-Recession workforce levels until 2014. It is projected that by 2036 the workforce will reach 5 million, indicating a growing economy requiring more workers.

Gross Regional Product

GRP is Gross Domestic Product (GDP) on a state level. Between 1980 and 2007 the state experienced significant annual increases in GRP. The Great Recession caused a decline in GRP from 2007 until 2009. Since 2010 the GRP has been increasing at pre-Recession levels and is anticipated to reach nearly $500 billion by 2036.

Income

Income was measured by examining the median household income of the state's residents. Over the last 20 years the state's median household income maintained around $45,000, however, by 2036 it is projected that only 31 percent of households will earn less than $45,000.

Tourism

With many national parks and a diverse environment, Arizona is a destination for tourists and as such, the resultant economic impact has become an indicator of economic health in the state. The Great Recession caused a decline in tourism between 2007 and 2009 but tourism levels have since recovered.

Summary of Anticipated Impact Trends

Overall, Arizona was rapidly increasing in population and economy until the Great Recession from 2007-2009. The state experienced economic declines across the board but has since recovered and healthy growth is

[1] Woods & Poole Economics, Inc. elected to combine La Paz and Yuma counties into one entity. There are 15 counties in Arizona.

projected through the planning period. Assuming the nation doesn't experience another significant recession, the projected population and economic levels should create a positive ripple effect in air travel in Arizona, both commercial service and GA activity.

COMMERCIAL SERVICE

Commercial air service activity accounts for a significant portion of all aviation operations in Arizona annually. As a large sector of activity in the state, it is critical to understand the trends affecting the commercial aviation industry in order to better forecast future operations. Some trends may impact the industry significantly while others may have minimal effect. This section focuses on the trends related to commercial aviation in the U.S. and Arizona.

To identify current and projected national and state commercial trends, data from the FAA's Terminal Area Forecast (TAF) issued January 2017 and the *FAA Aerospace Forecast Fiscal Years 2017-2037* were analyzed. Additionally, data obtained from the 2017 Airport Inventory and Data Survey Form were also reviewed. The trends are presented in two groups, followed by a look at Arizona's commercial service forecasts:

1. National Commercial Aviation Trends
2. Arizona Commercial Aviation Trends

National Commercial Aviation Trends

Several trends have impacted commercial aviation in recent history and new trends are (or will) impact projected aviation activity in the future. A look at the historical and current trends impacting the nation's aviation system is included below.

Historical Trends

Over the past four decades, the U.S. commercial air carrier industry has been volatile, experiencing notable swings in activity resulting from economic, political, and social impacts. Most notably:

1. Enplanements have experienced large fluctuations in the last 20 years which can be attributed to events such as September 11, 2001 and the Great Recession of 2007-2009
2. Enplanements rebounded to almost pre-September 11, 2001 levels before the Great Recession of 2007 and were back to pre-September 11, 2001 levels in 2011
3. The Great Recession in 2007 sparked fundamental changes in the way the airline industry operated with commercial airline industry becoming lean, minimizing losses by lowering operating costs and increasing fees, eliminating unprofitable routes, and upgrading the fleet to larger, more fuel-efficient aircraft
4. Enplanements grew at a 3.3 percent annual growth rate from 2010-2016, from 548 million to 665 million, respectively, with significant expansion of ultra-low-cost carriers such as Spirit and Allegiant and continued growth on the mainline carriers
5. Since 2015, domestic enplanements have outpaced the international market, however, this is projected to change by 2018 as international demand increases with strengthening worldwide economic growth
6. Commercial airlines experienced record profits in 2016 due to healthy demand and low energy costs

Current Trends

According to the *FAA Aerospace Forecast Fiscal Years 2017-2037*, there are three main trends that impacted aviation in 2016:

1. Industry consolidation and restructuring
2. Continued capacity discipline in response to external shocks
3. Proliferation of ancillary revenues

Additional trends in the national commercial service industry include economic cycles, oil price fluctuations, regulatory changes, a decline in the U.S. pilot population, and Air Traffic Control (ATC) changes.

Industry Consolidation and Restructuring

Data shows there is a strong relationship between growth in enplanements and the U.S. GDP (FAA 2017), meaning the airline industry and commercial passenger traffic are significantly impacted by national economic upturns and downturns. As an example, the Great Recession from 2007 to 2009 had a substantial effect on the level of air traffic in the U.S. during that same timeframe and for several years beyond.

Challenging economic times prompted several airline mergers and acquisitions over the past decade. U.S. airline consolidation and restructuring became commonplace after the Great Recession. Ten U.S. airline mergers/acquisitions have occurred since 2009, as presented in **Table 1**.

Table 1. Recent Airline Mergers and Acquisitions

Airlines	Date Announced	Date Closed	Resulting Entity
Republic Airways / Midwest Airlines	6/23/2009	7/31/2009	Republic Airways
Republic Airways / Frontier Airlines	8/14/2009	10/1/2009	Republic Airways
Delta Air Lines / Northwest Airlines	4/14/2008	12/31/2009	Delta Air Lines
Pinnacle Airlines / Mesaba Airlines	7/1/2010	7/1/2010	Pinnacle Airlines / Mesaba Airlines
United Airlines / Continental Airlines	5/3/2010	10/1/2010	United Airlines
SkyWest / Atlantic Southeast Airlines / ExpressJet	8/4/2010	11/15/2010	SkyWest / SureJet
Southwest Airlines / Air Tran Airways	9/27/2010	5/2/2011	Southwest Airlines
US Airways / AMR / American Airlines	2/14/2013	12/9/2013	American Airlines
Atlas Air / Southern Air	1/19/2016	4/7/2016	Atlas Air Worldwide
Alaska Airlines / Virgin America	4/4/2016	12/14/2016	Alaska Airlines

Source: Airlines.org 2017

In 2005, there were 12 major mainline airlines in the U.S.; today there are six.[2] The Alaska Airlines / Virgin America merger in 2016 made Alaska Airlines the fifth largest airline in the nation; and one of six legacy or mainline airlines — American, Delta, Southwest, United, Alaska/Virgin, and JetBlue — that control roughly 85 percent of the domestic market, as measured by revenue passenger miles (RPMs).[3] Generally, airline consolidations decrease competition, which can lead to higher passenger fares and service reductions as airlines

[2] Mainline carriers are defined as those providing service primarily via aircraft with 90 or more seats. Regionals are defined as those providing service primarily via aircraft with 89 or less seats and whose routes serve mainly as feeders to the mainline carriers.

[3] A RPM is a fare-paying passenger transported one mile; the most common measure of demand for air travel. Sometimes measured as revenue passenger kilometers (RPKs).

eliminate less-profitable routes. However, consolidations among smaller regional carriers can result in different impacts such as a reduction in fares as these airlines strive to compete with each other.

Mainline carriers are also facing challenges brought by low-cost and ultra-low-cost carriers (LCC/ULCC) such as Spirit, Frontier, and Allegiant airlines and many new international carriers that are impacting global demand. These providers promise low base fares, but typically charge high fees for amenities such as baggage and food—a trend now emulated by many of the U.S. mainline carriers. LCCs/ULCCs focus their business models on targeting specific routes underserved by the existing marketplace, reducing costs per available seat mile, and maintaining extremely high levels of aircraft utilization. LCCs/ULCCs will continue to push mainline carriers to reduce flight costs and implement improvements to increase their competitive positions. As a result, demand for commercial service is anticipated to rise, which will force airports to find new ways to increase passenger throughout (FAA 2017).

Continued Capacity Discipline

As a result of the semi-recent industry consolidation and restructuring, airlines continue to maintain capacity discipline – making sure capacity doesn't outweigh demand. To sustain a lean business practice and rebound from recent economic downfalls, airlines are doing their due diligence to ensure that their aircraft are running as close to capacity as possible in an effort to earn maximum revenue per flight. Capacity discipline is measured by available seat mile (ASM), which according to the *FAA Aerospace Forecast Fiscal Years 2017-2037*, has increased at an average rate of two percent per year since 2009.[4] The mainline carrier group provided five percent more capacity than it did in 2007 while carrying eight percent more passengers (FAA 2017).

Ancillary Revenues

A recent outcome of the domestic and global economic downturn is the development of airline ancillary revenues. Ancillary revenue is revenue from non-ticket sources such as food and drink services, wireless internet, baggage, and in-flight entertainment. Prior to September 11, 2001 and the Great Recession, many air travelers purchased tickets which included these amenities. The un-bundling of services has proven to be a successful tactic by the airlines to increase their bottom line. As ancillary revenues continue to generate increased revenue, they will remain standard practice within the air travel experience (FAA 2017).

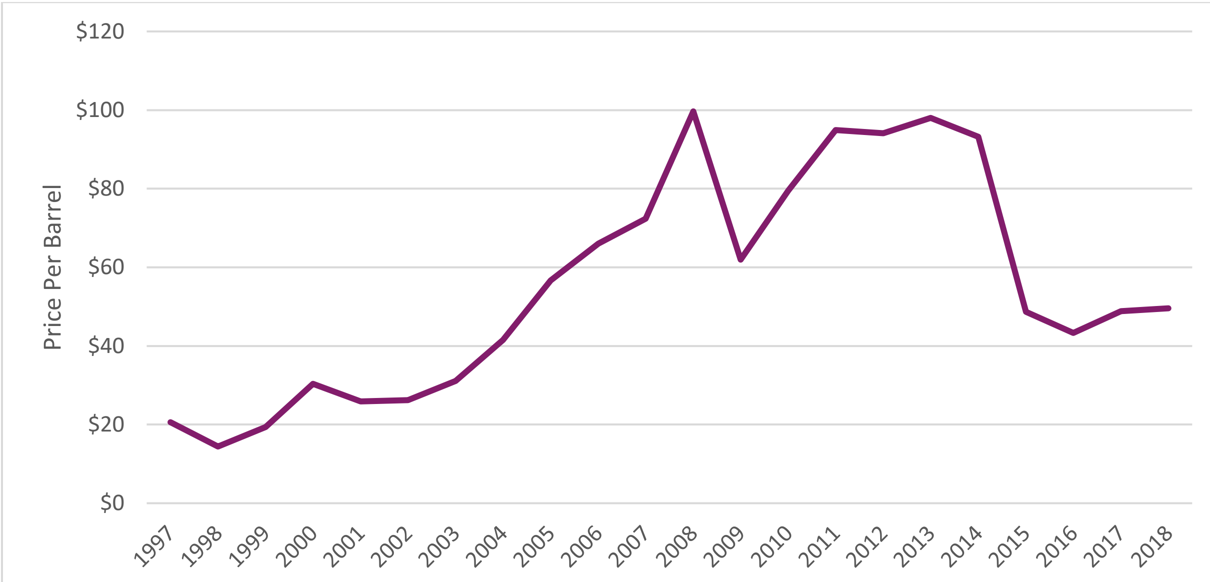
Oil Prices

Oil is the largest operating expense for aircraft operators, and fluctuations in the oil and gas industry impact all types of aviation operations, both commercial and GA. Jet fuel prices comprise nearly three-quarters of airline expenses and as such, can impact air carriers' choices in fleet mix, routes served, and ticket prices for end users.

As shown in **Figure 1**, over the past 20 years, the price of oil has swung significantly from a low of $20.59/barrel in 1997 to a high of $99.67/barrel in 2008. Since 2008, oil prices have fluctuated but remained high until 2014 when prices dropped below $50/barrel. The *FAA Aerospace Forecast Fiscal Years 2017-2037* reports that the price of oil is anticipated to rise from around $39/barrel in 2016 to $47 in 2017. Prices are then anticipated to continuously rise to exceed $100 by 2026 and approach $132 by the end of the 20-year forecast period.

[4] An available seat mile ASM is defined as one seat transported one mile; the most common measure of airline seating capacity or supply. For example, an aircraft with 100 passenger seats, flown a distance of 100 miles, produces 10,000 ASMs. Sometimes measures as an available seat kilometer (ASK).

However, it must also be noted that considerable uncertainty exists in the future of fuel costs given the worldwide geopolitical forces that impact its cost.



Note: Years 2017 and 2018 are projections

Source: Short-Term Energy Outlook – U.S. Energy Information Administration 2017

Figure 1. Historical Oil Prices

Regulatory Changes

Regulatory changes designed to make the country's skies safer, more secure, and better able to meet current demands are impacting all facets of the aviation industry. Some, such as Open Skies agreements, are intended to reduce barriers to international air travel and commerce. Evolving customs and immigration rules are being designed to facilitate legitimate travel while maintaining the highest standards of security and border protection. In recent years, the ATC system has faced intense scrutiny, with some officials advocating for the privatization of the system. Whether privatized or remaining part of the FAA, ATC is also changing with NextGen implementation and the potential integration of remote or virtual towers (RVTs). RVTs will require additional regulatory changes and impact airport development needs.

U.S. Pilot Population

For years, analysts have been anticipating an airline pilot shortage based on the changing federal requirements and fewer numbers of trained pilots coming out of the military. Part of the shortage in experienced pilots can be credited to the recent increase in FAA pilot qualification requirements.[5] In 2013, the FAA published a rule requiring first officers—also known as co-pilots—to hold an Airline Transport Pilot (ATP) certificate, requiring 1,500 hours of total time as a pilot. Previously, first officers were required to have only a commercial pilot certificate, which requires 250 hours of flight time. This new requirement has discouraged many students from

[5] Pilot Certification and Qualification Requirements for Air Carrier Operations, 78 F.R. § 42323 (2013).

entering flight training programs due to the increased cost associated with the new training requirements or led U.S. pilots to look for jobs with foreign airlines where flight-hour requirements are not as stringent.

The pilot population is also still responding to a 2010 FAA regulatory change that increased duration of validity of student pilot certificates for those under the age of 40 years old from 36 months to 60 months (FAA 2017). The new regulation created an immediate increase in active student pilot licenses from 72,280 in 2009 to 119,119 by the end of 2010. During that same period, active private pilot licenses decreased from 211,619 to 202,020 and commercial licenses fell from 125,738 to 123,705 (U.S. Civil Airmen Statistics 2016). The student pilot population has continued to increase year-over-year since that time, while private and commercial pilot populations continue to decline.

Further, this inverse relationship between student and active pilots is not anticipated to reverse in the projected future. According to the *FAA Aerospace Forecasts Fiscal Years 2017-2037*, the number of student pilot certificates is anticipated to grow to 141,200 by 2037, while the populations of private and commercial pilots are anticipated to decline to 139,000 and 83,300, respectively. This indicates that new airmen are not matriculating into fully licensed pilots at a sufficient enough rate to maintain the existing pilot population in the U.S.

Additionally, the industry is confronting waning interests in students interested in a career as a pilot due to high educational costs, low salary expectations post-graduation, demanding travel schedules, and general industry upheaval since September 11, 2001. This issue is compounded by the declining availability of military-trained pilots to meet the aviation industry's growing needs. A 2014 Government Accountability Office (GAO) Report, *Aviation Workforce – Current and Future Availability of Airline Pilots,* notes that 70 percent of airline pilots hired had come from the military prior to 2001; and fewer than 30 percent are hired from the military today. This is likely a result of financial incentives for military pilots to stay in service longer, civil job market opportunities, and changing post-war military missions.

Yet while many of these trends have challenged the aviation community, the FAA recently revised its stringent medical clearance requirements for pilots. Prior to this change, pilots over 40 years old were required to pass a comprehensive medical exam once every two years, which deterred or prohibited aging pilots from obtaining and renewing their licenses. Recognizing the negative impact this strict regulation had on pilots and the aviation community, Congress mandated the FAA to revise its existing medical clearance regulations in Section 2307 of the FAA Extension, Safety, and Security Act of 2016 (Public Law [PL] 114-190), *Medical Certification of Certain Small Aircraft Pilots*. In response, the FAA implemented the alternative pilot physical examination and education requirements known as BasicMed to effectively re-open the sky to thousands of GA pilots across the U.S.

Air Traffic Control

The FAA operates the U.S. ATC system through a three-pronged system of local airport tower controllers, terminal radar approach control (TRACON), and regional air route traffic control centers, also known as enroute centers. Originating in the 1960s, the FAA has received intense scrutiny for inefficiency and failing to keep pace with modern technologies and airspace demands. While the FAA continues to implement the NextGen and other modernization initiatives, critics argue that the agency has taken far too long. Agency supporters argue that the FAA has been crippled by inconsistent funding and automatic budget cuts enacted when Congress fails to pass the Federal budget known as sequestration. In March 2013, sequestration cuts forced the FAA to cut $42.9 million from its operations budget and furlough air traffic controllers, leading to a week of severe traffic delays.

The argument over the nation's ATC most recently came to the forefront in June 2017 when President Trump announced his plan to privatize the nation's ATC system. The President argues that he is "proposing reduced wait times, increased route efficiency, and far fewer delays," while rectifying years of wasteful spending and modernization delays that threaten the safety and security of the air system. Under the Trump proposal, a private, nonprofit corporation governed by a board of representatives primarily comprised of the major airlines would take control of the management and operations of ATC in the U.S. The organization would be financed through user fees instead of tax dollars.

Opponents of the Trump proposal argue that privatization will shift costs to passengers and place particular hardship on small, rural airports and the communities they serve. In 2016, Delta Air Lines published a study entitled "The Costs of Privatizing Air Traffic Control and How It Will Impact Airline Travelers" that found that privatization could increase tickets costs by 20 to 29 percent after ten years and result in the closure of small airports located outside of major urban centers (Delta 2016). The proposal has also received criticism for giving too much control of a key asset to special interests and major airlines. Mark Baker, President of the Aircraft Owners Pilots Association (AOPA), said his organization would not support a plan that imposes fees on small aircraft owners (Shepardson 2017). Opponents also argue that the proposal could limit business jet access to airports, create a national security risk, and fail to deliver the rapid modernization promised by the plan, particularly during the three-year transition period between FAA and private control.

While the June 2017 Trump proposal is the latest iteration of the privatization approach, the idea is not new. ABC News reports a similar measure was defeated in 2016, even with the support of Airlines for America (A4A), the major lobbying group of the U.S. airline industry (Cook 2017). Perhaps more notably, the FAA already contracts ATC services to some private sector at visual flight rule (VFR) airports through the Contract Tower Program. According to the U.S. Contract Tower Association, a sub-committee of the American Association of Airport Executive (AAAE), the program allows the FAA to provide ATC at a substantially reduced cost to taxpayers. As of 2017, 253 airports participate in the program (U.S. Contract Tower Association 2017).

However, the President's fiscal year (FY) 2017 budget proposal (released in February 2017) eliminated the guaranteed and dedicated funding language for the Contract Tower Program that had been included in the Department of Transportation (DOT)/FAA appropriations bills for FYs 2015 and 2016. Despite this initial threat, both the Senate and House approved $159 million in statutory bill language for the final DOT/FAA 2017 Appropriations Bill. This amount will fund all existing contract towers, including the 16 towers in cost-share programs and offer the flexibility to add several new towers in FY 2017. The addition of contract towers provides a lower cost ATC option for VFR airports to guide VFR traffic.

While contract towers lower costs and increase safety at certain airports, the impacts of privatizing all ATC services in the U.S. are more complex and represent a major ideological difference about the role of government. President Trump's proposal is one aspect of a broader plan to improve transportation infrastructure in the U.S. and will require Congressional support and approval before any changes are witnessed at the FAA.

Arizona Commercial Aviation Trends

Impacts from the national trends discussed in the previous section trickle down to the state level, impacting Arizona's aviation system both positively and negatively. A look at the historical and current trends impacting Arizona's aviation system is included below.

Historical Trends

The volatility in commercial service activity levels experienced nationally as a result of September 11, 2001 and the Great Recession of 2007-2009 was also experienced at the state level in Arizona. Significant reductions in activity levels were seen after both events, resulting in changes to airline service and structure to counteract reduced demand. Travelers to and from Arizona were faced with reduced flight routes and frequencies and higher airfare in some cases.

Current Trends

Arizona's commercial service airports are not immune to the trends impacting commercial aviation nationally. Airline consolidation has reduced competition among carriers, resulting in higher passenger fares and reduced route options to Arizona's airports, in some cases. On the plus side, smaller regional carriers are competing for passengers and as such are reducing fares to remain competitive.

Arizona's commercial service airports are served by a variety of LCCs and ULCCs that provide air transportation to and from the state at reduced fares including Allegiant, Frontier, JetBlue, Southwest, Spirit, and Sun Country. A mix of mainline and LCCs/ULCCs allows a larger traveling population to reach the state, effectively increasing the economic impact of tourism in Arizona.

Some regional airlines that serve Arizona's commercial service airports are particularly impacted by the shortage in pilots as many are being recruited by mainline carriers to replace their retiring pilots, leaving regional airlines at a loss for pilots who can operate their standard scheduled service. Ultimately this has led to a reduction or complete loss of regional airline service if the regional airlines can't backfill their pilot positions. Communities across Arizona that are served exclusively by smaller regional airlines (such as Great Lakes) have been and may continue to be most impacted.

The implementation of NextGen has many benefits. For commercial aviation specifically, certain elements allow pilots to fly closer together on more direct routes, decreasing wait times and fuel consumption. Quicker travel and reduced fares to the state may result over time from the implementation of NextGen. However, other regulatory changes such as the proposed privatization of ATC may counteract these cost savings by increasing airfares to cover the operation of ATC facilities in Arizona.

Arizona Commercial Service Forecasts

Eleven of the 67 SASP airports offer commercial service which includes all scheduled passenger flights and air tours. Data concerning activity levels of commercial service airports in Arizona is presented in the following sections, including historical and projected enplanements, air carrier and air taxi/commuter aircraft operations, and based aircraft data. These data are reported annually to the FAA and the FAA publishes these data and provides projections of activity for each airport in the TAF. It should be noted that forecasts of enplanements, operations, and based aircraft used in this Chapter are derived from the FAA TAF, however, for many of the commercial service airports, 2016 FAA TAF data does not match the 2016 data identified during the inventory process. For the purposes of the SASP Update, all commercial service forecasts are based on data reported by the 2016 FAA TAF, with the 2016 survey data presented for reference.

Enplanements

An enplanement is defined as a passenger boarding a commercial service flight. The number of enplanements at commercial service airports is heavily dependent on the overall health of the regional market area as well as the air carrier's decisions to operate at an airport. **Table 2** presents enplanements at the 11 commercial service airports in the state. According to FAA TAF growth rates, Page Municipal, Flagstaff Pulliam, and Phoenix-Mesa Gateway are forecasted to have the largest percentage increases in passenger enplanements through 2036, followed by Phoenix Sky Harbor International and Tucson International. Alternatively, Grand Canyon National Park is projected to slightly decrease while Ernest A. Love Field, Laughlin/Bullhead City International, and Tucson International are projected to experience the smallest percentage increases in passenger enplanements over the planning horizon. Three airports, Yuma International, Show Low Regional, and Grand Canyon West, are projected to maintain their current level of passenger enplanements over the 20-year timeframe.

Table 2. Enplanement Projections for Arizona's Commercial Service Airports

Associated City	Airport Name	2016 Survey Data	2016 (TAF Data)	Forecasts			CAGR 2016-2036
				2021	2026	2036	
Bullhead City	**Laughlin/Bullhead City International**	105,007	111,779	122,148	133,559	159,920	1.81%
Flagstaff	**Flagstaff Pulliam**	66,526	65,931	73,888	82,816	104,056	2.31%
Grand Canyon	**Grand Canyon National Park**	324,682	86,321	82,450	82,450	82,450	-0.23%
Page	**Page Municipal**	85,666	14,790	16,688	18,836	23,999	2.45%
Peach Springs	**Grand Canyon West**	34,973	34,973	34,973	34,973	34,973	0.00%
Phoenix	**Phoenix-Mesa Gateway**	676,745	704,616	797,336	882,352	1,078,624	2.15%
Phoenix	**Phoenix Sky Harbor International**	21,673,418	21,020,978	23,418,186	25,779,866	31,148,339	1.99%
Prescott	**Ernest A. Love Field**	3,435	3,044	3,156	3,276	3,519	0.73%
Show Low	**Show Low Regional**	3,652	3,652	3,652	3,652	3,652	0.00%
Tucson	**Tucson International**	1,647,644	1,569,720	1,774,670	1,937,796	2,311,489	1.95%
Yuma	**Yuma International**	73,876	72,795	72,795	72,795	72,795	0.00%
	Total	**24,695,624**	**23,688,599**	**26,399,942**	**29,032,371**	**35,023,816**	**1.97%**

Sources: 2017 Airport Inventory and Data Survey, FAA TAF issued January 2017

Air Carrier and Air Taxi/Commuter Operations

In recent years, operations at commercial service airports declined slightly, primarily due to up-gauging in the airlines' fleet. Up-gauging is a term for airlines increasing aircraft seat capacity which in turn, reduces annual operations. As shown in **Table 3**, many of Arizona's commercial service airports report different operational counts than what the FAA TAF reports. As such, annual growth rates were derived from the FAA TAF since it's the official FAA report of aviation activity for U.S. airports. Over the 20-year planning horizon, Tucson International, Flagstaff Pulliam, and Phoenix Sky Harbor International are projected to have the largest percentage increases in air carrier and air taxi/commuter operations. Ernest A. Love Field, Laughlin/Bullhead City International, and Grand Canyon National Park airports are forecasted to experience the smallest percentage of growth in air carrier and air taxi/commuter operations. Grand Canyon West, Page Municipal, Show Low Regional, and Yuma International are projected to maintain the same level of commercial operations from 2016-2036.

Table 3. Air Carrier and Air Taxi/Commuter Projections for Arizona's Commercial Service Airports

Associated City	Airport Name	2016 Survey Data	2016 TAF Data	Forecasts			CAGR 2016-2036
				2021	2026	2036	
Bullhead City	Laughlin/Bullhead City International	1,444	3,497	3,567	3,649	3,838	0.47%
Flagstaff	Flagstaff Pulliam	1,769	14,314	15,648	17,109	20,429	1.79%
Grand Canyon	Grand Canyon National Park	45	100,728	105,835	111,217	122,818	1.00%
Page	Page Municipal	0	40,421	40,421	40,421	40,421	0.00%
Peach Springs	Grand Canyon West	0	130,000	130,000	130,000	130,000	0.00%
Phoenix	Phoenix-Mesa Gateway	11,239	44,165	47,624	50,980	58,348	1.40%
Phoenix	Phoenix Sky Harbor International	361,395	417,870	451,974	495,116	594,613	1.78%
Prescott	Ernest A. Love Field	9	3,620	3,694	3,770	3,920	0.40%
Show Low	Show Low Regional	0	3,190	3,190	3,190	3,190	0.00%
Tucson	Tucson International	33,784	50,429	56,315	61,302	72,125	1.81%
Yuma	Yuma International	18,298	21,777	21,777	21,777	21,777	0.00%
	Total	**427,983**	**830,011**	**880,045**	**938,531**	**1,071,479**	**1.28%**

Sources: Airport Inventory and Data Survey 2017, FAA TAF issued January 2017

GA Activity at Commercial Service Airports

While not a commercial-related metric, there are also based GA aircraft at commercial service airports. Some commercial service airports accommodate a higher level of GA activity than others, especially those with service by only one carrier. As shown in **Table 4**, the TAF projects that Ernest A. Love Field will have the largest increase in the number and percentage of based aircraft over the planning horizon. Other airports projected by the FAA to have more based aircraft over the 20-year period include Flagstaff Pulliam, Phoenix-Mesa Gateway, Tucson International, and Grand Canyon National Park. According to the TAF, the other six of Arizona's commercial service airports are forecasted to maintain the same level of based aircraft from 2016-2036.

Table 4. Based Aircraft Projections for Arizona's Commercial Service Airports

Associated City	Airport Name	2016 Survey Data	2016 TAF Data	Forecasts			CAGR 2016-2036
				2021	2026	2036	
Bullhead City	Laughlin/Bullhead City International	21	20	20	20	20	0.00%
Flagstaff	Flagstaff Pulliam	139	139	148	159	179	1.27%
Grand Canyon	Grand Canyon National Park	46	38	40	41	41	0.38%
Page	Page Municipal	58	54	54	54	54	0.00%
Peach Springs	Grand Canyon West	0	0	0	0	0	0.00%
Phoenix	Phoenix-Mesa Gateway	117	120	122	128	138	0.70%
Phoenix	Phoenix Sky Harbor International	74	61	61	61	61	0.00%
Prescott	Ernest A. Love Field	320	212	243	281	378	2.93%
Show Low	Show Low Regional	40	40	40	40	40	0.00%
Tucson	Tucson International	286	211	226	242	274	1.31%
Yuma	Yuma International	175	85	85	85	85	0.00%
	Total	**1,276**	**980**	**1,039**	**1,111**	**1,270**	**1.30%**

Sources: Airport Inventory and Data Survey 2017, FAA TAF issued January 2017

Table 5 presents GA, military, and commercial service operations forecasts at the 11 commercial service airports in the system. Because military operations are difficult to predict, the FAA TAF assumes military operations will remain the same over the planning horizon. The TAF projects that Phoenix-Mesa Gateway and Ernest A. Love Field will have the largest growth in the number of GA operations over the 20-year period. Airports projected to have a decrease in the number of GA operations include Laughlin/Bullhead International, Tucson International, and Flagstaff Pulliam. Phoenix Sky Harbor International, Grand Canyon National Park, and Tucson International are forecast to have the greatest increase in total operations over the 20-year planning period with 1.70, 0.95, and 0.70 compound annual growth rates, respectively. The 11 commercial service airports are projected to experience and increase in total operations from 1,642,999 in 2016 to 1,915,836 in 2036.

Table 5. TAF Total Operations Projections for Arizona's Commercial Service Airports

Associated City	Airport Name	2016				2021				2026				2036				CAGR 2016-2036
		GA*	Military	CS*	Total	GA	Military	CS	Total	GA	Military	CS	Total	GA	Military	CS	Total	
Bullhead City	Laughlin/Bullhead City International	6,813	16,438	3,497	26,748	6,813	16,438	3,567	26,818	6,288	16,438	3,497	26,223	6,238	16,438	3,497	26,173	-0.11%
Flagstaff	Flagstaff Pulliam	29,827	1,113	14,314	45,254	29,409	1,113	15,648	46,170	29,479	1,113	17,109	47,701	29,619	1,113	20,429	51,161	0.62%
Grand Canyon	Grand Canyon National Park	4,207	918	100,728	105,853	3,306	918	105,835	110,059	4,135	918	111,217	116,270	4,265	918	122,818	128,001	0.95%
Page	Page Municipal	8,300	60	40,421	48,781	8,300	60	40,421	48,781	7,360	60	40,421	47,841	7,360	60	40,421	47,841	-0.10%
Peach Springs	Grand Canyon West	300	0	130,000	130,300	300	0	130,000	130,300	300	0	130,000	130,300	300	0	130,000	130,300	0.00%
Phoenix	Phoenix-Mesa Gateway	186,088	5,537	44,165	235,790	198,502	5,537	47,624	251,663	200,427	5,537	50,980	256,944	204,407	5,537	58,348	268,292	0.65%
Phoenix	Phoenix Sky Harbor International	21,685	2,767	417,870	442,322	21,766	2,767	451,974	476,507	21,766	2,767	495,116	519,649	21,766	2,767	594,613	619,146	1.70%
Prescott	Ernest A. Love Field	251,872	560	3,620	256,052	251,478	560	3,694	255,732	256,771	560	3,770	261,101	267,718	560	3,920	272,198	0.31%
Show Low	Show Low Regional	8,218	57	3,190	11,465	8,218	57	3,190	11,465	8,218	57	3,190	11,465	8,218	57	3,190	11,465	0.00%
Tucson	Tucson International	62,152	26,974	50,429	139,555	57,848	26,974	56,315	141,137	58,951	26,974	61,302	147,227	61,281	26,974	72,125	160,380	0.70%
Yuma	Yuma International	74,629	104,473	21,777	200,879	74,629	104,473	21,777	200,879	74,629	104,473	21,777	200,879	74,629	104,473	21,777	200,879	0.00%
	Arizona Total	**654,091**	**158,897**	**830,011**	**1,642,999**	**660,569**	**158,897**	**880,045**	**1,699,511**	**668,324**	**158,897**	**938,379**	**1,765,600**	**685,801**	**158,897**	**1,071,138**	**1,915,836**	**0.77%**

**Note: GA = general aviation; CS = commercial service*

Source: FAA TAF Issued January 2017

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GENERAL AVIATION

GA is defined as all aviation activity except military, scheduled passenger, and air cargo operations. As previously noted, GA activity takes place at all of Arizona's airports, including the commercial service airports. GA composes the largest sector of aviation activity in the state. As such, understanding the historical and current trends impacting activity levels helps to better forecast future GA activity in the state, which ultimately impacts recommendations of the system plan to meet GA user needs.

Similar to what was provided for commercial service activity, a review of national and state GA trends is provided in this section, followed by an evaluation of socioeconomic indicators and forecasts of GA activity (operations and based aircraft) in the state:

1. National GA Trends
2. Arizona GA Trends
3. Arizona Historical and Projected Demographics
4. Arizona GA Forecasts

Please note that the GA forecasts presented here are optimistic. With ideal flying conditions and healthy economic and population growth anticipated over the next two decades, GA activity is projected to outpace the growth experienced in other places in the U.S. through the planning horizon. The state hosts one of the largest concentrations of flight instruction and other aviation-related schools in the nation; numerous maintenance, repair and overhaul (MRO) facilities; active recreational, sport, and experimental flying communities; and a robust air tourism sector—amongst many other types of activities. Each of these factors is projected to play an important role in Arizona's GA future.

National GA Trends

GA has been impacted by some of the same trends impacting commercial service such as fluctuations in oil prices and implementation of NextGen. Both historical and current trends are discussed in the following sections.

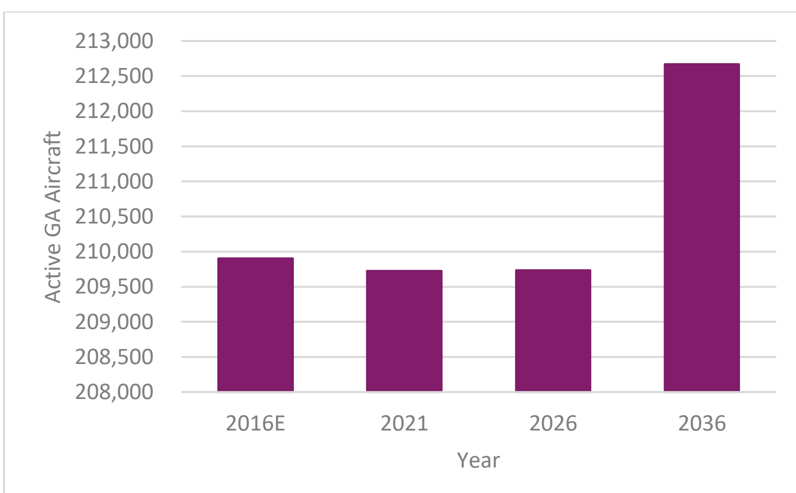
Historical and Current Trends

Each year, the FAA and the General Aviation Manufacturers Association (GAMA) publish a GA industry outlook for the country. The FAA's publication, *FAA Aerospace Forecast Fiscal Years 2017-2037*, is the same publication referenced in the commercial service section of this Chapter. Its GA outlook focuses on the nation's "active" GA fleet, defined as aircraft that fly at least one hour during the year. GAMA's *2016 General Aviation Statistical Databook & 2017 Industry Outlook* focuses on aircraft billings and shipments.

The following summarizes recent GA activity trends in the U.S. based on the information provided in the FAA and GAMA publications and other industry happenings in order to provide context for based aircraft and GA activity forecasts in Arizona:

1. There were an estimated 209,905 active GA aircraft based in the U.S. in 2016.
2. GA aircraft flew over 24.5 million hours in the U.S. in 2016, of which two-thirds are for business purposes.
3. Fractional aircraft use is growing. In 2016, 882 aircraft were used in fractional operations. Total fractional owners were 4,415.
4. While their production rates have decreased, single-engine aircraft continue to be the most popular aircraft and they exist in the greatest number in the U.S. as compared to other aircraft. In 2016, 890 single-engine aircraft were manufactured and shipped worldwide.
5. Turbo-prop aircraft popularity has grown slightly. In 2016, 582 units manufactured and shipped worldwide.
6. While jet aircraft use has continued to grow since 2013, shipments have declined since 2014. In 2016, 611 units were manufactured and shipped worldwide.
7. Domestic shipments of new GA aircraft have declined for the second year in a row.
8. The FAA has revised 14 CFR Part 23 related to air worthiness standards, which should make it easier to certify products and technologies for small airplanes (U.S. Government Publishing Office 2017).
9. The FAA revised medical requirements for private pilots, known as BasicMed under 14 CFR Part 68 (U.S. Government Publishing Office 2017), which is supposed to help counter a decline in GA activity.
10. Flight training activity has increased (FAA 2016), including programs like “Cirrus Embark” where Cirrus provides free Cirrus flight training for buyers of used Cirrus SR20 and SR22 aircraft.

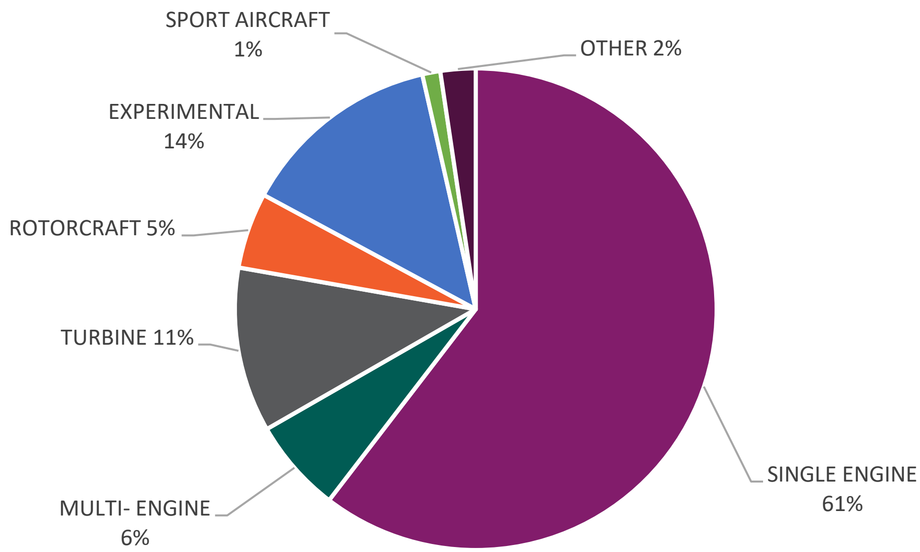
The FAA’s total active GA aircraft forecast as provided in the *FAA Aerospace Forecast Fiscal Years 2017-2037* is presented in **Figure 2**, while the national GA fleet mix forecast is presented in **Figure 3** and **Table 6**.



E = estimated

Source: FAA Aerospace Forecast Fiscal Years 2017-2037

Figure 2. Estimated Current and Forecasted Total Active GA Aircraft in the U.S.



Source: FAA Aerospace Forecast Fiscal Years 2017-2037

Figure 3. U.S. GA Aircraft Fleet Mix

Overall, total GA aircraft are projected to remain relatively stable through 2026, and then experience growth through 2036. Within each category of the fleet mix presented in **Table 6**, fixed wing piston aircraft are expected to decline (-15.44 percent) over the forecast period while all other categories are expected to grow. Sport aircraft are expected to grow by the greatest percentage, 126.48 percent, followed by turbine fixed wing aircraft at 45.16 percent. Rotorcraft are projected to grow by 38.32 percent and experimental aircraft by 22.97 percent.

Table 7 shows the forecasted hours expected to be flown by GA aircraft as predicted by the FAA. Over the forecast period, total GA hours flown are projected to increase by 20 percent. Hours flown in every category in the fleet mix are expected to increase except for fixed wing piston, which coincides with the anticipated decrease in fixed wing piston aircraft.

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Table 6. Estimated Current and Forecasted Total Active GA Aircraft Fleet Mix in the U.S.

Year	Fixed Wing						Rotorcraft			Experi-mental	Sport	Other	Total
	Piston			Turbine									
	Single Engine	Multi-Engine	Total	Turbo Prop	Turbo Jet	Total	Piston	Turbine	Total				
2016E	126,820	13,200	140,020	9,460	13,770	23,230	3,335	7,365	10,700	28,475	2,530	4,950	209,905
Forecast													
2021	121,645	13,005	134,650	9,075	15,480	24,555	3,560	8,055	11,615	30,640	3,315	4,950	209,725
2026	116,335	12,765	129,100	9,570	17,345	26,915	3,785	8,775	12,560	32,065	4,125	4,970	209,735
2036	106,350	12,045	118,395	12,150	21,570	33,720	4,325	10,475	14,800	35,015	5,730	5,010	212,670
% Change 2016-2036	-16.14%	-8.75%	-15.44%	28.44%	56.64%	45.16%	29.69%	42.23%	38.32%	22.97%	126.48%	1.21%	1.32%

Source: FAA Aerospace Forecast Fiscal Years 2017-2037

Table 7. FAA Aerospace Forecast for GA Hours Flown (in Thousands)

Year	Fixed Wing						Rotorcraft			Experi-mental	Sport	Other	Total
	Piston			Turbine									
	Single Engine	Multi-Engine	Total	Turbo Prop	Turbo Jet	Total	Piston	Turbine	Total				
2016E	11,191	1,603	12,794	2,539	4,173	6,712	784	2,565	3,350	1,335	204	162	24,558
Forecast													
2021	10,295	1,570	11,865	2,554	5,250	7,804	848	2,905	3,754	1,515	275	163	25,375
2026	9,807	1,547	11,354	2,706	6,039	8,745	934	3,235	4,169	1,669	351	164	26,451
2036	9,205	1,563	10,768	3,439	7,583	11,022	1,101	3,923	5,024	1,980	512	167	29,473
% Change 2016-2036	-17.75%	-2.50%	-15.84%	35.45%	81.72%	64.21%	40.43%	52.94%	49.97%	48.31%	150.98%	3.09%	20.01%

Source: FAA Aerospace Forecast Fiscal Years 2017-2037

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Arizona GA Trends

In Arizona, GA aircraft are flown for a wide variety of reasons including business travel, agricultural spraying, flight instruction, emergency airlift, firefighting, recreation, and more. In 2016, 8,244 FAA registered aircraft were based in Arizona along with 18,278 FAA certificated pilots (FAA n.d.) (FAA 2016). Of the 8,244 FAA registered aircraft, 6,066 were based at system airports (73.6%). These aircraft included home built/experimental, glider, agricultural, military, antique and classic/warbirds, ultra-light airplanes, helicopters, single and multi-engine aircraft, and corporate and private jets.

Before reviewing trends currently impacting GA in Arizona specifically, an analysis of historical GA activity in the state was conducted. Current GA trends in Arizona are included following the historical analysis.

Historical Trends

The two activity indicators used in this analysis are the number of based aircraft at an airport and annual GA operations. The next two sections review the historical changes in both of these indicators between 2007 and 2016.

Arizona Based Aircraft

The FAA maintains a database of all registered aircraft in the U.S., which includes the state and county of the aircraft owner; however, it does not indicate where aircraft are based. **Table 8** shows the total number of aircraft in Arizona by county as registered with the FAA. For comparison, it also shows the number of based aircraft in 2016 reported by airports on the 2017 Airport Inventory and Data Survey, along with the number of based aircraft the *2008 Arizona State Airports System Plan Update* for historical context. It is important to note that the registered and based aircraft counts provided in the table include aircraft at commercial service airports. Even with the inclusion of commercial service airports, this data provides a state-level snapshot of based aircraft trends in Arizona.

Table 8. Historic and Current Arizona Aircraft by County

	FAA Registered Aircraft in Arizona					Based Aircraft in Arizona				
County	2007	2016	% Total	Difference	% Change	2007	2016	% Total	Difference	% Change
Apache	57	31	0.38%	-26	-45.61%	42	38	0.63%	-4	-9.52%
Cochise	307	272	3.30%	-35	-11.40%	247	183	3.02%	-64	-25.91%
Coconino	271	274	3.32%	3	1.11%	280	246	4.06%	-34	-12.14%
Gila	130	84	1.02%	-46	-35.38%	133	67	1.10%	-66	-49.62%
Graham	61	66	0.80%	5	8.20%	41	57	0.94%	16	39.02%
Greenlee	7	5	0.06%	-2	-28.57%	2	1	0.02%	-1	-50.00%
La Paz	139	132	1.60%	-7	-5.04%	42	17	0.28%	-25	-59.52%
Maricopa	5,314	4,330	52.52%	-984	-18.52%	4,499	3,338	55.03%	-1,161	-25.81%
Mohave	569	474	5.75%	-95	-16.70%	578	321	5.29%	-257	-44.46%
Navajo	187	192	2.33%	5	2.67%	109	82	1.35%	-27	-24.77%
Pima	1,391	1,231	14.93%	-160	-11.50%	1,024	798	13.16%	-226	-22.07%
Pinal	377	368	4.46%	-9	-2.39%	267	286	4.71%	19	7.12%

County	FAA Registered Aircraft in Arizona					Based Aircraft in Arizona				
	2007	2016	% Total	Difference	% Change	2007	2016	% Total	Difference	% Change
Santa Cruz	45	47	0.57%	2	4.44%	35	26	0.43%	-9	-25.71%
Yavapai	738	532	6.45%	-206	-27.91%	530	431	7.11%	-99	-18.68%
Yuma	276	206	2.50%	-70	-25.36%	178	175	2.88%	-3	-1.69%
Total	**9,869**	**8,244**	**100.00%**	**-1,625**	**-16.47%**	**8,007**	**6,066**	**100.00%**	**-1,941**	**-24.24%**

Note: Includes commercial service airports

Sources: FAA Registry – Aircraft Inquiry (August 2017); Arizona State Aviation System Plan Update 2008; 2017 Airport Inventory and Data Survey

As shown in **Table 8**, the number of based aircraft at Arizona's system airports have fluctuated over the years. These fluctuations are based on several factors including pilot preferences, airport services, and the availability of storage units and their prices. Total based aircraft at system airports were recorded at 8,007 in the 2008 SASP (using 2007 data). From 2007 to 2016, this number dropped by a total of 1,941 aircraft, or 24 percent. Although this may seem significant, it is important to note that the total number of FAA registered aircraft in Arizona also decreased by 16 percent during the same time period, while active GA aircraft dropped by nine percent nationally—from 231,606 (FAA 2010) in 2007 to 209,905 in 2016 (FAA 2016). This is a contributing factor in the reduction of aircraft at SASP airports. Another factor is the overall reduction in SASP airports; there are 16 fewer airports in the current system as compared to 2007 (83 versus 67 today). The decrease in registered and based aircraft in Arizona from 2007 to 2016 mirrors a similar decrease on the national level during the same timeframe.

FAA's National Based Aircraft Inventory Program (basedaircraft.com)

The FAA maintains an electric online inventory system of based aircraft counts for all non-primary airports included in the NPIAS. The FAA uses the information as a direct feed into the FAA Airport Data and Information Program's Airport Master Record Form 5010-1 report, as part of its evaluation regarding approach procedures such as localizer performance with vertical guidance (LPV), in its biennial update of the NPIAS, and in reviewing an airport's project requests. The inventory, which is required to be updated and confirmed annually, requires verification of the aircraft's tail or "N" number and entry of the information into the online system. The FAA reviews the submitted lists of reported based aircraft in order to determine which aircraft are included in the ultimate "count" maintained in the system. The FAA provides specific direction that aircraft should be counted as "base" if the aircraft is operational and airworthy and based the "majority" of the year, considered to be six months or more, and that aircraft associated with through-the-fence operations should not be included.

As of April 25, 2018, the FAA's inventory showed a total of 4,102 "validated" based aircraft in Arizona compared to the 4,382 identified through the FAA Form 5010 process. This compares to 6,029 aircraft reported through the on-site inventory process of the SASP Update. A few reasons for the discrepancies include the following:

1. Only non-primary airports are required to participate in the effort. This is 58 of 67 system airports included in the SASP Update. During the on-site visits, 1,118 based aircraft were reported at the nine primary airports.

2. Many airports have not updated the website recently (nine airports had never updated nor verified the numbers). Of the 50 airports included on the website, the dates of the original and updated information ranged from 2009 to 2018 (eight airports), with the highest number of updates (22) between 2014 and 2017.
3. With Arizona's numerous second homeowners and high level of winter visitors, there are many aircraft than an airport reports as based due to the rental of hangars or a tie-down, even though those aircraft do not meet the FAA's definition of being based at the airport the "majority" of the year. Even if these aircraft do reside in Arizona at an airport for more than six months, if the aircraft's tail number has been reported by another airport, that aircraft will show as a duplicate and the two airports would have to work through the disagreement with the FAA before an aircraft could be "claimed" as based at the airport. This also affect the differences reported by an airport vs. what is identified on the website.
4. Some airports include aircraft based off-site but "through-the-fence" which the FAA does not include, but which does impact the operational activity at an airport. During the on-site visits, there was no distinction made in the number of based aircraft that were considered "through-the-fence," although information on which airports have these activities was obtained.
5. The FAA's counts only include single-engine, multi-engine, jet, and helicopters. Ultralights and military aircraft are not required since they aren't validated through the process, but it does help an airport understand it's overall activity. Of the 6,029 based aircraft identified during the on-site inventory effort, 166 are military and 76 are ultralight.

Due to the many and varied reasons for the discrepancies between aircraft validated through the FAA's inventory system and those reported by airports during the on-site inventory, the on-site inventory numbers are used for the purpose of estimating future demand in the SASP Update. A listing of April 2018 FAA inventory data (including the date of the last edit) and the numbers reports through the on-site inventory are presented in **Table 9**.

Table 9. Based Aircraft Reporting Comparison

Associated City	Airport Name	FAA ID	5010 Based Aircraft Count	Validated Based Aircraft	Last Edit Date	On-Site Inventory Count
Maricopa	Ak-Chin Regional	A39	11	7	4/26/2013	30
Parker	Avi Suquilla	P20	19	12	4/9/2013	17
Bagdad	Bagdad	E51	4	4	—	5
Benson	Benson Municipal	E95	36	24	7/18/2012	44
Bisbee	Bisbee Municipal	P04	27	26	1/9/2017	28
Douglas	Bisbee-Douglas International	DUG	3	3	3/10/2014	5
Buckeye	Buckeye Municipal	BXK	61	61	4/10/2013	70
Casa Grande	Casa Grande Municipal	CGZ	82	58	4/26/2015	105
Chandler	Chandler Municipal	CHD	268	151	5/16/2014	440
Chinle	Chinle Municipal	E91	0	0	1/26/2018	3
Cibecue	Cibecue	Z95	—	—	—	0
Douglas	Cochise College	P03	—	—	—	15
Willcox	Cochise County	P33	20	20	3/10/2014	24

Associated City	Airport Name	FAA ID	5010 Based Aircraft Count	Validated Based Aircraft	Last Edit Date	On-Site Inventory Count
Colorado City	Colorado City Municipal	AZC	16	16	8/14/2015	13
Coolidge	Coolidge Municipal	P08	42	44	4/9/2018	45
Cottonwood	Cottonwood Municipal	P52	13	13	2/25/2014	44
Douglas	Douglas Municipal	DGL	—	—	—	12
Eloy	Eloy Municipal	E60	20	19	4/10/2017	21
Ajo	Eric Marcus Municipal	P01	4	4	10/23/2012	7
Bullhead City	Laughlin/Bullhead City Int'l	IFP	—	—	—	319
Mesa	Falcon Field	FFZ	637	635	3/14/2018	697
Flagstaff	Flagstaff Pulliam	FLG	—	—	—	139
Gila Bend	Gila Bend Municipal	E63	4	4	2/24/2014	4
Glendale	Glendale Municipal	GEU	202	113	5/10/2011	286
Grand Canyon	Grand Canyon National Park	GCN	—	—	—	46
Peach Springs	Grand Canyon West	1G4	—	—	—	0
Clifton	Greenlee County	CFT	1	1	—	1
Williams	H.A. Clark Memorial Field	CMR	3	3	2/24/2014	3
Holbrook	Holbrook Municipal	P14	9	9	2/25/2014	14
Kayenta	Kayenta	0V7	—	—	—	1
Kearny	Kearny	E67	—	—	—	6
Kingman	Kingman	IGM	100	99	5/2/2014	155
Lake Havasu City	Lake Havasu City	HII	123	123	6/23/2016	132
Page	Page Municipal	PGA	—	—	—	21
Marana	Marana Regional	AVQ	239	253	4/20/2018	248
Nogales	Nogales	OLS	19	19	6/11/2010	26
Phoenix	Phoenix Sky Harbor	PHX	—	—	—	58
Payson	Payson	PAN	49	44	2/13/2018	54
Phoenix	Phoenix Deer Valley	DVT	944	923	4/24/2018	940
Goodyear	Phoenix Goodyear	GYR	199	198	4/20/2018	222
Phoenix	Phoenix-Mesa Gateway	IWA	—	—	—	74
Prescott	Ernest A. Love Field	PRC	318	316	4/20/2017	117
Marana	Pinal Airpark	MZJ	14	14	12/18/2017	5
Polacca	Polacca	P10	—	—	—	0
San Luis	Rolle Airfield	44A	—	—	—	0
Tucson	Ryan Field	RYN	237	233	4/19/2018	257
Safford	Safford Regional	SAD	49	50	4/23/2018	57
Globe	San Carlos Apache	P13	3	3	1/0/1900	13
San Manuel	San Manuel	E77	16	15	12/18/2017	37
Scottsdale	Scottsdale	SDL	374	371	5/31/2017	442
Sedona	Sedona	SEZ	52	52	7/20/2017	61
Seligman	Seligman	P23	—	—	—	2
Sells	Sells	E78	—	—	—	0
Show Low	Show Low Regional	SOW	39	39	8/7/2014	40
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	54	54	4/12/2017	51
Springerville	Springerville Municipal	JTC	13	13	3/9/2018	13

Associated City	Airport Name	FAA ID	5010 Based Aircraft Count	Validated Based Aircraft	Last Edit Date	On-Site Inventory Count
St. Johns	St. Johns Industrial Air Park	SJN	5	5	1/0/1900	15
Superior	Superior	E81	—	—	—	0
Taylor	Taylor	TYL	10	10	5/7/2009	15
Tombstone	Tombstone Municipal	P29	—	—	—	4
Tuba City	Tuba City	T03	—	—	—	0
Tucson	Tucson International	TUS	—	—	—	286
Whiteriver	Whiteriver	E24	—	—	—	0
Wickenburg	Wickenburg Municipal	E25	33	33	2/19/2010	46
Window Rock	Window Rock	RQE	—	—	—	7
Winslow	Winslow-Lindbergh Regional	INW	8	8	8/13/2008	12
Yuma	Yuma International	NYL	—	—	—	175
		Total	4,380	4,102	—	6,029

Sources: Airport Inventory and Data Survey 2017, FAA National Based Aircraft Inventory Program

Arizona GA Operations

Tracking operations at GA airports can be difficult because the vast majority do not have Air Traffic Control Towers (ATCTs) where controllers are tracking and recording each aircraft that arrives at or departs from the airport. The difficulty in understanding historic GA operations for this SASP Update is further compounded by the change in the airports included in the system as previously mentioned. At the national level, GA operations at airports with ATCTs have declined by 18 percent from 2007 to 2016 (FAA 2010). At the state level, operations at GA airports have declined at a lesser rate, ten percent over the same period, even with fewer airports in the system plan (see **Table 10**).

Table 10. Historic and Current AZ GA Operations and U.S. GA Operations

GA Operations	Operations	% Change
2007 SASP Airports (83 airports)	2,879,219	-10%
2016 SASP Airports (67 airports)	2,603,063	
2007 FAA Tower & Contract Controlled Airports	31,132,000	-18%
2016 FAA Tower & Contract Controlled Airports	25,536,000	

Source: FAA Aerospace Forecast Fiscal Years 2017-2037

Current Trends

In addition to the national GA activity trends considered in the previous section, local factors also influence the type and amount of GA activity experienced across Arizona. The following are examples of some of these unique factors:

1. Agricultural spraying accounts for a large number of aircraft operations and hours flown in Arizona.
2. Arizona ranks third in the nation for attractiveness for aerospace manufacturing (PWC 2017).
3. Air tourism is a prominent part of the Arizona economy because of its numerous state and national parks (Elliot D. Pollack & Company 2012).

4. Arizona is home to several MRO facilities, including 188 FAA-certified operations (Arizona Commerce Authority n.d.).
5. Five airports in Arizona are ranked by the FAA in the top 25 in the country for GA operations (Arizona Commerce Authority n.d.).
6. Arizona is home to several exceptional universities and community colleges that offer 78 programs related to aerospace and defense careers (Arizona Commerce Authority n.d.).
7. Arizona has the second highest number of flight instructors per capita in the U.S., in large part directly attributable to the State's excellent flying conditions (Elliot D. Pollack & Company 2012).
8. The Greater Phoenix area offers exceptional flying weather with 330 VFR days a year for easy flying and flight training (Gilbert Arizona Economic Development n.d.).

Arizona GA Forecasts

As previously mentioned, GA activity includes all operations except military, scheduled passenger, and air cargo. All 67 SASP airports support GA operations; however only 56 are included in the GA operations and based aircraft forecasts presented in this section as GA operations projections for commercial service airports are presented at the beginning of this chapter in **Table 5**.

GA activity forecasts help airport sponsors, the Arizona Department of Transportation (ADOT), and the FAA plan ahead to meet future capacity needs at GA system airports. The GA activity and socioeconomic trends discussed in the previous section impact the projections provided in this section. To identify the most accurate activity projections, several forecasting methodologies were sampled— each of which are also discussed in this section.

Forecasting Methodologies

According to FAA Advisory Circular (AC) 150/5070-7, *The Airport System Planning Process*, the level of detail in the forecasts contained in a system plan should be based upon the airports' activity, the planning issues to be addressed, and the future use of the forecasts. Several methods for forecasting GA activity at Arizona's airports were evaluated. Traditional aviation forecasting methods for GA airport activity include:

1. Regression analysis using trends developed from several years of historic aviation activity
2. Regression analysis using several years of historic socioeconomic indicators (i.e., populations, employment, and income) and aviation activity
3. Market share using an airport's share of the national GA fleet.

Because historical aviation activity information for GA airports in Arizona is either not known or its accuracy is uncertain, regression analysis using historical aviation activity or socioeconomic data or trends is not able to be performed. Based on the limited available historical aviation data from a common, reliable source for the airports, the following methodologies were identified as logical approaches to forecasting GA airport activity:

1. **Based Aircraft**
   - Top-down Market Share
   - Bottom-up Forecasted Population Growth

2. **GA Operations**
   - Operations Per Based Aircraft (OPBA)
   - Airport Reference Code (ARC) Category Growth Rate

It is important to note that future facilities and design standards for Arizona airports will be determined primarily on the basis of their future system role, as opposed to the actual demand projections that are developed as part of this study. Therefore, these methods are appropriate considering the forecasts will not be used to determine the exact future facilities needed for each airport – rather the general capacity needs across the system. Each of these methods is further detailed in the sections that follow.

Based Aircraft Forecasts

The first forecasting method used for based aircraft projections is the top-down Market Share method. This method assumes that an airport's existing share of the national GA aircraft fleet will continue into the future and it will share in the national rate of growth or decline at its same share. This approach can be used when there is a reliable forecast for the total GA activity in the nation, which exists for active aircraft in the *FAA Aerospace Forecast Fiscal Years 2017-2037*. For this approach, the number and type of based aircraft at each system airport was analyzed to calculate their existing share of the national GA fleet, and those percentages were applied to the FAA's forecast to determine future based aircraft counts (and fleet mix) at each system airport, using current based aircraft counts provided on the 2017 Airport Inventory and Data Survey as a base. Because the aircraft categories in the 2017 Airport Inventory and Data Survey did not exactly match the FAA's categories in their forecast, some aircraft had to be grouped. Specifically, the FAA's experimental aircraft and single-engine aircraft categories are added together and the resulting rate is applied to the Arizona airport's single-engine aircraft category to determine the existing market share and future aircraft. Additionally, the FAA's sport aircraft and "other" aircraft categories are added together and the resulting rate is applied to the Arizona airport's ultralight and glider categories to determine their market shares.

Table 11 includes the grouping of the fleet mix in *FAA Aerospace Forecast Fiscal Years 2017-2037* as it is applied to Arizona's system airports.

Table 11. FAA Aerospace Forecast Grouped and Applied to SASP Update Forecasts

Year	Fixed Wing				Rotorcraft	Sport & Other**	Total Arizona Projected GA Aviation Fleet
	Single Engine & Experimental*	Multi-Engine	Total Piston	Turbine			
2016E	155,295	13,200	168,495	23,230	10,700	7,480	209,905
Forecast							
2021	152,285	13,005	165,290	24,555	11,615	8,265	209,725
2026	148,400	12,765	161,165	26,915	12,560	9,095	209,735
2036	141,365	12,045	153,410	33,720	14,800	10,740	212,670

Notes: *Applied to single engine aircraft at Arizona airports.
*****Applied to gliders at Arizona airports.***
*****Applied to ultralights at Arizona Airports.***
Sources: FAA Aerospace Forecast Fiscal Years 2017-2037, Woolpert 2017

If an airport did not report having any based aircraft in 2016 on the 2017 Airport Inventory and Data Survey Form, no aircraft forecasts for that airport were conducted. Additionally, the existing number of military aircraft at system airports in 2016 was held for the entire forecast period (i.e., no military aircraft growth is shown). **Table 12** shows the 2016 market share (of the U.S. total GA fleet) for each airport's fleet mix. **Table 13** shows the resulting total based aircraft forecasted for each airport and the resulting annual growth rates based on the market shares shown in **Table 12**. Using the market share method, some airports experience considerable growth while other airports do not. This is largely due to whether or not the airport had a large number of fixed wing, single-engine aircraft. Even when grouping as previously mentioned, there is still a negative growth rate applied to fixed wing, single-engine aircraft due to the negative national growth rate projected by the FAA.

Table 12. 2016 Market Shares of U.S. GA Fleet

Associated City	Airport Name	SEP*	MEP*	Jet*	R*	G*	U*
Ajo	Eric Marcus Municipal	0.005%	0.000%	0.000%	0.000%	0.000%	0.000%
Bagdad	Bagdad	0.003%	0.000%	0.000%	0.000%	0.000%	0.013%
Benson	Benson Municipal	0.024%	0.023%	0.000%	0.009%	0.000%	0.027%
Bisbee	Bisbee Municipal	0.015%	0.000%	0.000%	0.019%	0.000%	0.027%
Buckeye	Buckeye Municipal	0.033%	0.076%	0.004%	0.028%	0.000%	0.067%
Casa Grande	Casa Grande Municipal	0.063%	0.015%	0.000%	0.028%	0.027%	0.000%
Chandler	Chandler Municipal	0.262%	0.129%	0.017%	0.112%	0.000%	0.000%
Chinle	Chinle Municipal	0.000%	0.023%	0.000%	0.000%	0.000%	0.000%
Cibecue	Cibecue	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Clifton	Greenlee County	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%
Colorado City	Colorado City Municipal	0.008%	0.000%	0.000%	0.000%	0.000%	0.000%
Coolidge	Coolidge Municipal	0.018%	0.068%	0.009%	0.047%	0.000%	0.013%
Cottonwood	Cottonwood Municipal	0.025%	0.023%	0.000%	0.019%	0.000%	0.000%
Douglas	Bisbee-Douglas International	0.003%	0.008%	0.000%	0.000%	0.000%	0.000%
Douglas	Cochise College	0.009%	0.008%	0.000%	0.000%	0.000%	0.000%
Douglas	Douglas Municipal	0.006%	0.008%	0.000%	0.009%	0.000%	0.000%
Eloy	Eloy Municipal	0.008%	0.053%	0.000%	0.000%	0.000%	0.027%
Gila Bend	Gila Bend Municipal	0.003%	0.000%	0.000%	0.000%	0.000%	0.000%
Glendale	Glendale Municipal	0.144%	0.220%	0.013%	0.056%	0.000%	0.321%
Globe	San Carlos Apache	0.006%	0.008%	0.009%	0.000%	0.000%	0.000%
Goodyear	Phoenix Goodyear	0.131%	0.114%	0.004%	0.019%	0.000%	0.000%
Holbrook	Holbrook Municipal	0.006%	0.000%	0.000%	0.000%	0.000%	0.067%
Kayenta	Kayenta	0.000%	0.008%	0.000%	0.000%	0.000%	0.000%
Kearny	Kearny	0.003%	0.000%	0.000%	0.000%	0.000%	0.027%
Kingman	Kingman	0.048%	0.242%	0.164%	0.065%	0.013%	0.027%
Lake Havasu City	Lake Havasu City	0.071%	0.053%	0.030%	0.028%	0.000%	0.067%
Marana	Marana Regional	0.140%	0.114%	0.026%	0.009%	0.013%	0.094%
Marana	Pinal Airpark	0.001%	0.023%	0.004%	0.000%	0.000%	0.000%
Maricopa	Ak-Chin Regional	0.011%	0.008%	0.000%	0.000%	0.000%	0.160%
Mesa	Falcon Field	0.375%	0.652%	0.017%	0.224%	0.000%	0.000%

Associated City	Airport Name	SEP*	MEP*	Jet*	R*	G*	U*
Nogales	Nogales	0.015%	0.023%	0.000%	0.000%	0.000%	0.000%
Parker	Avi Suquilla	0.008%	0.023%	0.000%	0.019%	0.000%	0.000%
Payson	Payson	0.032%	0.015%	0.000%	0.000%	0.027%	0.000%
Phoenix	Phoenix Deer Valley	0.512%	0.750%	0.099%	0.159%	0.053%	0.000%
Polacca	Polacca	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Safford	Safford Regional	0.019%	0.197%	0.000%	0.009%	0.000%	0.000%
San Luis	Rolle Airfield	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
San Manuel	San Manuel	0.020%	0.030%	0.004%	0.009%	0.000%	0.000%
Scottsdale	Scottsdale	0.144%	0.326%	0.624%	0.290%	0.000%	0.000%
Sedona	Sedona	0.035%	0.015%	0.004%	0.028%	0.013%	0.000%
Seligman	Seligman	0.001%	0.000%	0.000%	0.000%	0.000%	0.000%
Sells	Sells	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	0.028%	0.030%	0.000%	0.028%	0.000%	0.000%
Springerville	Springerville Municipal	0.007%	0.008%	0.000%	0.009%	0.000%	0.000%
St. Johns	St. Johns Industrial Air Park	0.009%	0.000%	0.000%	0.000%	0.000%	0.013%
Superior	Superior	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Taylor	Taylor	0.009%	0.000%	0.000%	0.000%	0.000%	0.013%
Tombstone	Tombstone Municipal	0.001%	0.000%	0.000%	0.000%	0.000%	0.027%
Tuba City	Tuba City	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Tucson	Ryan Field	0.158%	0.068%	0.009%	0.000%	0.000%	0.000%
Whiteriver	Whiteriver	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Wickenburg	Wickenburg Municipal	0.024%	0.038%	0.004%	0.009%	0.013%	0.013%
Willcox	Cochise County	0.015%	0.000%	0.000%	0.009%	0.000%	0.000%
Williams	H.A. Clark Memorial Field	0.002%	0.000%	0.000%	0.000%	0.000%	0.000%
Window Rock	Window Rock	0.001%	0.030%	0.000%	0.009%	0.000%	0.000%
Winslow	Winslow-Lindbergh Regional	0.006%	0.008%	0.000%	0.009%	0.000%	0.000%

Notes: SEP=single engine aircraft; MEP=multi-engine aircraft; R=rotorcraft/helicopter; G=glider; U=ultralight

Sources: FAA Aerospace Forecast Fiscal Years 2017-2037, Woolpert 2017, Airport Inventory and Data Survey 2017

Table 13. Forecasted Total Based Aircraft Using 2016 Market Share

Associated City	Airport Name	2016	2021	2026	2036	Annual Growth Rate
Ajo	Eric Marcus Municipal	7	7	7	6	-0.77%
Bagdad	Bagdad	5	5	5	5	0.00%
Benson	Benson Municipal	44	43	42	42	-0.23%
Bisbee	Bisbee Municipal	28	28	27	28	0.00%
Buckeye	Buckeye Municipal	70	70	70	67	-0.22%
Casa Grande	Casa Grande Municipal	105	103	102	98	-0.34%
Chandler	Chandler Municipal	440	433	424	409	-0.36%
Chinle	Chinle Municipal	3	3	3	3	0.00%
Cibecue	Cibecue	0	0	0	0	0.00%
Clifton	Greenlee County	1	1	1	1	0.00%
Colorado City	Colorado City Municipal	13	13	12	12	-0.40%
Coolidge	Coolidge Municipal	45	44	45	44	-0.11%
Cottonwood	Cottonwood Municipal	44	43	42	42	-0.23%
Douglas	Bisbee-Douglas International	5	5	5	5	0.00%
Douglas	Cochise College	15	15	14	14	-0.34%
Douglas	Douglas Municipal	12	12	12	11	-0.43%
Eloy	Eloy Municipal	21	21	20	20	-0.24%
Gila Bend	Gila Bend Municipal	4	4	4	4	0.00%
Glendale	Glendale Municipal	286	286	279	276	-0.18%
Globe	San Carlos Apache	13	13	13	13	0.00%
Goodyear	Phoenix Goodyear	222	218	213	204	-0.42%
Holbrook	Holbrook Municipal	14	15	15	15	0.35%
Kayenta	Kayenta	1	1	1	1	0.00%
Kearny	Kearny	6	6	6	7	0.77%
Kingman	Kingman	155	157	158	166	0.34%
Lake Havasu City	Lake Havasu City	132	131	130	127	-0.19%
Marana	Marana Regional	248	245	240	233	-0.31%
Marana	Pinal Airpark	5	5	5	5	0.00%
Maricopa	Ak-Chin Regional	30	31	30	33	0.48%
Mesa	Falcon Field	697	687	673	648	-0.36%
Nogales	Nogales	26	26	25	24	-0.40%
Parker	Avi Suquilla	17	17	16	17	0.00%
Payson	Payson	54	53	52	51	-0.29%
Phoenix	Phoenix Deer Valley	940	926	910	879	-0.33%
Polacca	Polacca	0	0	0	0	0.00%
Safford	Safford Regional	57	56	55	52	-0.46%
San Luis	Rolle Airfield	0	0	0	0	0.00%
San Manuel	San Manuel	37	36	36	34	-0.42%
Scottsdale	Scottsdale	442	448	459	495	0.57%

Associated City	Airport Name	2016	2021	2026	2036	Annual Growth Rate
Sedona	Sedona	61	60	60	57	-0.34%
Seligman	Seligman	2	2	2	2	0.00%
Sells	Sells	0	0	0	0	0.00%
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	51	50	50	48	-0.30%
Springerville	Springerville Municipal	13	13	13	12	-0.40%
St. Johns	St. Johns Industrial Air Park	15	15	14	14	-0.34%
Superior	Superior	0	0	0	0	0.00%
Taylor	Taylor	15	15	14	14	-0.34%
Tombstone	Tombstone Municipal	4	4	4	5	1.12%
Tuba City	Tuba City	0	0	0	0	0.00%
Tucson	Ryan Field	257	252	246	235	-0.45%
Whiteriver	Whiteriver	0	0	0	0	0.00%
Wickenburg	Wickenburg Municipal	46	45	44	43	-0.34%
Willcox	Cochise County	24	24	23	22	-0.43%
Williams	H.A. Clark Memorial Field	3	3	3	3	0.00%
Window Rock	Window Rock	7	7	7	7	0.00%
Winslow	Winslow-Lindbergh Regional	12	12	12	11	-0.43%

Sources: FAA Aerospace Forecast Fiscal Years 2017-2037, Woolpert 2017, Airport Inventory and Data Survey 2017

The second method used to project based aircraft is the Population Growth method. This method applies the projected population growth rates of each county to the based aircraft counts at the airports residing within that county. Because of the close inter-relation between population growth and airport activity, the population growth rate is assumed to also be applicable to the number of based aircraft. Annual population growth rates for the forecast period from Woods & Poole Economics, Inc. were used for this method. The annual growth rate was calculated for the population over the time period the based aircraft was forecasted. **Table 14** shows the projected annual population growth rates for system airports based on the county in which they are located, along with the forecasted based aircraft using these rates.

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Table 14. Forecasted Total Based Aircraft Using Population Growth Rates

Associated City	Associated County	Airport Name	2016 Based Aircraft	5-Year Growth Rate	2021 Based Aircraft	10-Year Growth Rate	2026 Based Aircraft	20-Year Growth Rate	2036 Based Aircraft
Ajo	Pima	Eric Marcus Municipal	7	1.25%	8	1.24%	8	1.16%	9
Bagdad	Yavapai	Bagdad	5	1.61%	5	1.59%	6	1.51%	7
Benson	Cochise	Benson Municipal	44	1.13%	47	1.11%	49	1.03%	55
Bisbee	Cochise	Bisbee Municipal	28	1.13%	30	1.11%	31	1.03%	35
Buckeye	Maricopa	Buckeye Municipal	70	1.78%	77	1.76%	84	1.68%	99
Casa Grande	Pinal	Casa Grande Municipal	105	2.17%	117	2.15%	130	2.07%	159
Chandler	Maricopa	Chandler Municipal	440	1.78%	481	1.76%	524	1.68%	619
Chinle	Apache	Chinle Municipal	3	0.96%	3	0.95%	3	0.86%	4
Cibecue	Navajo	Cibecue	0	1.00%	0	0.98%	0	0.90%	0
Clifton	Greenlee	Greenlee County	1	0.78%	1	0.77%	1	0.68%	1
Colorado City	Mohave	Colorado City Municipal	13	1.29%	14	1.27%	15	1.19%	17
Coolidge	Pinal	Coolidge Municipal	45	2.17%	50	2.15%	56	2.07%	68
Cottonwood	Yavapai	Cottonwood Municipal	44	1.61%	48	1.59%	52	1.51%	60
Douglas	Cochise	Bisbee-Douglas International	5	1.13%	5	1.11%	6	1.03%	6
Douglas	Cochise	Cochise College	15	1.13%	16	1.11%	17	1.03%	19
Douglas	Cochise	Douglas Municipal	12	1.13%	13	1.11%	14	1.03%	15
Eloy	Pinal	Eloy Municipal	21	2.17%	23	2.15%	26	2.07%	32
Gila Bend	Maricopa	Gila Bend Municipal	4	1.78%	4	1.76%	5	1.68%	6
Glendale	Maricopa	Glendale Municipal	286	1.78%	312	1.76%	341	1.68%	403
Globe	Gila	San Carlos Apache	13	0.91%	14	0.89%	14	0.81%	15
Goodyear	Maricopa	Phoenix Goodyear	222	1.78%	243	1.76%	265	1.68%	312
Holbrook	Navajo	Holbrook Municipal	14	1.00%	15	0.98%	16	0.90%	17
Kayenta	Navajo	Kayenta	1	1.00%	1	0.98%	1	0.90%	1
Kearny	Pinal	Kearny	6	2.17%	7	2.15%	7	2.07%	9
Kingman	Mohave	Kingman	155	1.29%	165	1.27%	176	1.19%	198
Lake Havasu City	Mohave	Lake Havasu City	132	1.29%	141	1.27%	150	1.19%	169
Marana	Pima	Marana Regional	248	1.25%	264	1.24%	281	1.16%	315
Marana	Pinal	Pinal Airpark	5	2.17%	6	2.15%	6	2.07%	8

Associated City	Associated County	Airport Name	2016 Based Aircraft	5-Year Growth Rate	2021 Based Aircraft	10-Year Growth Rate	2026 Based Aircraft	20-Year Growth Rate	2036 Based Aircraft
Maricopa	Pinal	Ak-Chin Regional	30	2.17%	33	2.15%	37	2.07%	46
Mesa	Maricopa	Falcon Field	697	1.78%	761	1.76%	831	1.68%	981
Nogales	Santa Cruz	Nogales	26	1.57%	28	1.55%	30	1.47%	35
Parker	La Paz	Avi Suquilla	17	1.39%	18	1.37%	19	1.27%	22
Payson	Gila	Payson	54	0.91%	57	0.89%	59	0.81%	64
Phoenix	Maricopa	Phoenix Deer Valley	940	1.78%	1027	1.76%	1120	1.68%	1323
Polacca	Navajo	Polacca	0	1.00%	0	0.98%	0	0.90%	0
Safford	Graham	Safford Regional	57	0.82%	59	0.81%	62	0.72%	66
San Luis	Yuma	Rolle Airfield	0	1.39%	0	1.37%	0	1.27%	0
San Manuel	Pinal	San Manuel	37	2.17%	41	2.15%	46	2.07%	56
Scottsdale	Maricopa	Scottsdale	442	1.78%	483	1.76%	527	1.68%	622
Sedona	Yavapai	Sedona	61	1.61%	66	1.59%	72	1.51%	83
Seligman	Yavapai	Seligman	2	1.61%	2	1.59%	2	1.51%	3
Sells	Pima	Sells	0	1.25%	0	1.24%	0	1.16%	0
Sierra Vista	Cochise	Sierra Vista Municipal-Libby Army Airfield	51	1.13%	54	1.11%	57	1.03%	63
Springerville	Apache	Springerville Municipal	13	0.96%	14	0.95%	14	0.86%	15
St. Johns	Apache	St. Johns Industrial Air Park	15	0.96%	16	0.95%	16	0.86%	18
Superior	Pinal	Superior	0	2.17%	0	2.15%	0	2.07%	0
Taylor	Navajo	Taylor	15	1.00%	16	0.98%	17	0.90%	18
Tombstone	Cochise	Tombstone Municipal	4	1.13%	4	1.11%	4	1.03%	5
Tuba City	Coconino	Tuba City	0	1.49%	0	1.47%	0	1.39%	0
Tucson	Pima	Ryan Field	257	1.25%	274	1.24%	291	1.16%	326
Whiteriver	Navajo	Whiteriver	0	1.00%	0	0.98%	0	0.90%	0
Wickenburg	Maricopa	Wickenburg Municipal	46	1.78%	50	1.76%	55	1.68%	65
Willcox	Cochise	Cochise County	24	1.13%	25	1.11%	27	1.03%	30
Williams	Coconino	H.A. Clark Memorial Field	3	1.49%	3	1.47%	3	1.39%	4
Window Rock	Apache	Window Rock	7	0.96%	7	0.95%	8	0.86%	8
Winslow	Navajo	Winslow-Lindbergh Regional	12	1.00%	13	0.98%	13	0.90%	15

Sources: Woods & Poole Economics, Inc. 2017, Woolpert 2017, Airport Inventory and Data Survey 2017

Preferred Based Aircraft Forecast

To determine the preferred forecast, the results of the two methodologies were compared. The overall growth in based aircraft for all system plan airports using the Population Growth method is 1.59 percent over the 20-year forecast period. To compare, the market share forecast produces a total decline in aircraft of -0.2 percent. While there has been a decline in based aircraft in the state since the last system plan update, this occurred during the Great Recession when there was also a decline in all active GA aircraft across the country. According to FAA forecasts, this decline is not expected to continue. Additionally, recent changes in FAA regulations on small aircraft (14 CFR 23) and on BasicMed (14 CFR 68) should serve to increase GA activity through the planning period. These factors, along with the positive socioeconomic projections for Arizona, all point to a growth in based aircraft. **Table 15** includes the preferred forecast and the resulting projected fleet mix. A comparison of the preferred based aircraft forecasts to the FAA TAF forecasts is provided at the end of this chapter.

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Table 15. Preferred Based Aircraft Forecast

Associated City	Airport Name	2016								2021								2026								2036							
		SEP	MEP	Jet	R	G	U	M	Total	SEP	MEP	Jet	R	G	U	M	Total	SEP	MEP	Jet	R	G	U	M	Total	SEP	MEP	Jet	R	G	U	M	Total
Ajo	Eric Marcus Municipal	7	0	0	0	0	0	0	7	8	0	0	0	0	0	0	8	8	0	0	0	0	0	0	8	9	0	0	0	0	0	0	9
Bagdad	Bagdad	4	0	0	0	0	1	0	5	4	0	0	0	0	1	0	5	5	0	0	0	0	1	0	6	6	0	0	0	0	1	0	7
Benson	Benson Municipal	38	3	0	1	0	2	0	44	41	3	0	1	0	2	0	47	43	3	0	1	0	2	0	49	47	4	0	1	0	3	0	55
Bisbee	Bisbee Municipal	24	0	0	2	0	2	0	28	26	0	0	2	0	2	0	30	27	0	0	2	0	2	0	31	30	0	0	2	0	3	0	35
Buckeye	Buckeye Municipal	51	10	1	3	0	5	0	70	56	11	1	3	0	56	0	77	61	12	1	4	0	6	0	84	73	14	1	4	0	7	0	99
Casa Grande	Casa Grande Municipal	98	2	0	3	2	0	0	105	109	3	0	3	2	0	0	117	121	3	0	4	2	0	0	130	148	3	0	5	3	0	0	159
Chandler	Chandler Municipal	407	17	4	12	0	0	0	440	445	19	4	13	0	0	0	481	485	20	5	14	0	0	0	524	572	24	6	17	0	0	0	619
Chinle	Chinle Municipal	0	3	0	0	0	0	0	3	0	3	0	0	0	0	0	3	0	3	0	0	0	0	0	3	0	4	0	0	0	0	0	4
Cibecue	Cibecue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clifton	Greenlee County	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
Colorado City	Colorado City Municipal	13	0	0	0	0	0	0	13	14	0	0	0	0	0	0	14	15	0	0	0	0	0	0	15	17	0	0	0	0	0	0	17
Coolidge	Coolidge Municipal	28	9	2	5	0	1	0	45	31	10	2	6	0	1	0	50	35	11	3	6	0	1	0	56	42	14	3	7	0	2	0	68
Cottonwood	Cottonwood Municipal	39	3	0	2	0	0	0	44	43	3	0	2	0	0	0	48	46	4	0	2	0	0	0	52	53	4	0	3	0	0	0	60
Douglas	Bisbee-Douglas International	4	1	0	0	0	0	0	5	4	1	0	0	0	0	0	5	5	1	0	0	0	0	0	6	5	1	0	0	0	0	0	6
Douglas	Cochise College	14	1	0	0	0	0	0	15	15	1	0	0	0	0	0	16	16	1	0	0	0	0	0	17	17	2	0	0	0	0	0	19
Douglas	Douglas Municipal	10	1	0	1	0	0	0	12	11	1	0	1	0	0	0	13	12	1	0	1	0	0	0	14	13	1	0	1	0	0	0	15
Eloy	Eloy Municipal	12	7	0	0	0	2	0	21	13	8	0	0	0	2	0	23	15	9	0	0	0	2	0	26	18	11	0	0	0	3	0	32
Gila Bend	Gila Bend Municipal	4	0	0	0	0	0	0	4	4	0	0	0	0	0	0	4	5	0	0	0	0	0	0	5	6	0	0	0	0	0	0	6
Glendale	Glendale Municipal	224	29	3	6	0	24	0	286	244	32	3	7	0	26	0	312	266	35	4	7	0	29	0	341	315	41	4	9	0	34	0	403
Globe	San Carlos Apache	10	1	2	0	0	0	0	13	11	1	2	0	0	0	0	14	11	1	2	0	0	0	0	14	12	1	2	0	0	0	0	15
Goodyear	Phoenix Goodyear	204	15	1	2	0	0	0	222	224	16	1	2	0	0	0	243	243	19	1	2	0	0	0	265	287	21	1	3	0	0	0	312
Holbrook	Holbrook Municipal	9	0	0	0	0	5	0	14	10	0	0	0	0	5	0	15	10	0	0	0	0	6	0	16	11	0	0	0	0	6	0	17
Kayenta	Kayenta	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Kearny	Kearny	4	0	0	0	0	2	0	6	5	0	0	0	0	2	0	7	5	0	0	0	0	2	0	7	6	0	0	0	0	3	0	9
Kingman	Kingman	75	32	38	7	1	2	0	155	81	34	41	8	1	2	0	165	86	36	43	8	1	2	0	176	95	41	49	9	1	3	0	198
Lake Havasu City	Lake Havasu City	110	7	7	3	0	5	0	132	117	8	8	3	0	5	0	141	125	8	8	3	0	6	0	150	141	9	9	4	0	6	0	169
Marana	Marana Regional	218	15	6	1	1	7	0	248	232	16	6	1	1	8	0	264	247	17	7	1	1	8	0	281	277	19	8	1	1	9	0	315
Marana	Pinal Airpark	1	3	1	0	0	0	0	5	1	4	1	0	0	0	0	6	1	4	1	0	0	0	0	6	2	4	2	0	0	0	0	8
Maricopa	Ak-Chin Regional	17	1	0	0	0	12	0	30	19	1	0	0	0	13	0	33	21	1	0	0	0	15	0	37	26	2	0	0	0	18	0	46
Mesa	Falcon Field	583	86	4	24	0	0	0	697	637	94	4	26	0	0	0	761	696	103	5	29	0	0	0	831	820	121	6	34	0	0	0	981
Nogales	Nogales	23	3	0	0	0	0	0	26	25	3	0	0	0	0	0	28	27	3	0	0	0	0	0	30	31	4	0	0	0	0	0	35
Parker	Avi Suquilla	12	3	0	2	0	0	0	17	13	3	0	2	0	0	0	18	14	3	0	2	0	0	0	19	15	4	0	3	0	0	0	22
Payson	Payson	50	2	0	0	2	0	0	54	53	2	0	0	2	0	0	57	55	2	0	0	2	0	0	59	60	2	0	0	2	0	0	64
Phoenix	Phoenix Deer Valley	795	99	23	17	4	0	2	940	867	108	25	19	4	0	2	1027	948	118	27	20	5	0	2	1120	1119	139	32	24	6	0	3	1323
Polacca	Polacca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Safford	Safford Regional	30	26	0	1	0	0	0	57	31	27	0	1	0	0	0	59	33	28	0	1	0	0	0	62	35	30	0	1	0	0	0	66
San Luis	Rolle Airfield	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Manuel	San Manuel	31	4	1	1	0	0	0	37	34	5	1	1	0	0	0	41	39	5	1	1	0	0	0	46	46	6	2	2	0	0	0	56
Scottsdale	Scottsdale	223	43	145	31	0	0	0	442	244	47	158	34	0	0	0	483	266	51	173	37	0	0	0	527	313	61	204	44	0	0	0	622

Associated City	Airport Name	2016 SEP	MEP	Jet	R	G	U	M	Total	2021 SEP	MEP	Jet	R	G	U	M	Total	2026 SEP	MEP	Jet	R	G	U	M	Total	2036 SEP	MEP	Jet	R	G	U	M	Total
Sedona	Sedona	54	2	1	3	1	0	0	61	59	2	1	3	1	0	0	66	64	2	1	4	1	0	0	72	74	3	1	4	1	0	0	83
Seligman	Seligman	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	3	0	0	0	0	0	0	3
Sells	Sells	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	44	4	0	3	0	0	0	51	47	4	0	3	0	0	0	54	50	4	0	3	0	0	0	57	54	5	0	4	0	0	0	63
Springerville	Springerville Municipal	11	1	0	1	0	0	0	13	12	1	0	1	0	0	0	14	12	1	0	1	0	0	0	14	13	1	0	1	0	0	0	15
St. Johns	St. Johns Industrial Air Park	14	0	0	0	0	1	0	15	15	0	0	0	0	1	0	16	15	0	0	0	0	1	0	16	17	0	0	0	0	1	0	18
Superior	Superior	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Taylor	Taylor	14	0	0	0	0	1	0	15	15	0	0	0	0	1	0	16	16	0	0	0	0	1	0	17	17	0	0	0	0	1	0	18
Tombstone	Tombstone Municipal	2	0	0	0	0	2	0	4	2	0	0	0	0	2	0	4	2	0	0	0	0	2	0	4	2	0	0	0	0	3	0	5
Tuba City	Tuba City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tucson	Ryan Field	246	9	2	0	0	0	0	257	262	10	2	0	0	0	0	274	279	10	2	0	0	0	0	291	312	11	3	0	0	0	0	326
Whiteriver	Whiteriver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wickenburg	Wickenburg Municipal	37	5	1	1	1	1	0	46	40	6	1	1	1	1	0	50	43	6	1	1	1	1	0	55	53	7	2	1	1	1	0	65
Willcox	Cochise County	23	0	0	1	0	0	0	24	24	0	0	1	0	0	0	25	26	0	0	1	0	0	0	27	29	0	0	1	0	0	0	30
Williams	H.A. Clark Memorial Field	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	3	4	0	0	0	0	0	0	4
Window Rock	Window Rock	2	4	0	1	0	0	0	7	2	4	0	1	0	0	0	7	2	5	0	1	0	0	0	8	2	5	0	1	0	0	0	8
Winslow	Winslow-Lindbergh Regional	10	1	0	1	0	0	0	12	11	1	0	1	0	0	0	13	11	1	0	1	0	0	0	13	13	1	0	1	0	0	0	15

Notes: SEP=single engine aircraft; MEP=multi-engine aircraft; R=rotorcraft/helicopter; G=glider; U=ultralight, M=military

Sources: Woolpert 2017, Airport Inventory and Data Survey 2017

GA Operations Forecasts

The first forecasting method used to project GA operations over the planning period was the OPBA method. This is an industry standard method for estimating aircraft operations at GA airports where the base year operations are divided by the total number of based aircraft at each airport, for a resulting OPBA. The OPBA is then multiplied by the total forecasted based aircraft at each airport for each year to yield annual operations forecasts. Since a reliable historical data stream of operations and based aircraft were unavailable, the OPBA was held constant throughout the forecast period. In this case, the total based aircraft forecasted using the preferred Population Growth method (**Table 15**) were used. **Table 16** shows the 2016 total operations, total based aircraft, and resulting OPBA for each airport as well as the forecasted operations for each airport using the 2016 OPBA for each airport. This methodology results in the same growth rate in operations as based aircraft since the projection of based aircraft is the basis for the growth rate.

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Table 16. Forecasted Operations Using OPBA Method (rounded to the nearest 10)

Associated City	Airport Name	2016-2036 OPBA	2016 Based Aircraft	2016 Total Operations	2021 Based Aircraft	2021 Operations	2026 Based Aircraft	2026 Operations	2036 Based Aircraft	2036 Operations	Annual Growth Rate
Ajo	Eric Marcus Municipal	40	7	280	8	320	8	320	9	360	1.26%
Bagdad	Bagdad	200	5	1,000	5	1,000	6	1,200	7	1,400	1.70%
Benson	Benson Municipal	380	44	16,720	47	17,860	49	18,620	55	20,900	1.12%
Bisbee	Bisbee Municipal	100	28	2,800	30	3,000	31	3,100	35	3,500	1.12%
Buckeye	Buckeye Municipal	760	70	53,200	77	58,520	84	63,840	99	75,240	1.75%
Casa Grande	Casa Grande Municipal	950	105	99,750	117	111,150	130	123,500	159	151,050	2.10%
Chandler	Chandler Municipal	500	440	220,000	481	240,500	524	262,000	619	309,500	1.72%
Chinle	Chinle Municipal	2,600	3	7,800	3	7,800	3	7,800	4	10,400	1.45%
Cibecue	Cibecue	0	0	0	0	0	0	0	0	0	0.00%
Clifton	Greenlee County	1,110	1	1,110	1	1,110	1	1,110	1	1,110	0.00%
Colorado City	Colorado City Municipal	370	13	4,810	14	5,180	15	5,550	17	6,290	1.35%
Coolidge	Coolidge Municipal	380	45	17,100	50	19,000	56	21,280	68	25,840	2.09%
Cottonwood	Cottonwood Municipal	430	44	18,920	48	20,640	52	22,360	60	25,800	1.56%
Douglas	Bisbee-Douglas International	5,160	5	25,800	5	25,800	6	30,960	6	30,960	0.92%
Douglas	Cochise College	3,140	15	47,100	16	50,240	17	53,380	19	59,660	1.19%
Douglas	Douglas Municipal	220	12	2,640	13	2,860	14	3,080	15	3,300	1.12%
Eloy	Eloy Municipal	1,560	21	32,760	23	35,880	26	40,560	32	49,920	2.13%
Gila Bend	Gila Bend Municipal	9,070	4	36,280	4	36,280	5	45,350	6	54,420	2.05%
Glendale	Glendale Municipal	250	286	71,500	312	78,000	341	85,250	403	100,750	1.73%
Globe	San Carlos Apache	150	13	1,950	14	2,100	14	2,100	15	2,250	0.72%
Goodyear	Phoenix Goodyear	560	222	124,320	243	136,080	265	148,400	312	174,720	1.72%
Holbrook	Holbrook Municipal	260	14	3,640	15	3,900	16	4,160	17	4,420	0.98%
Kayenta	Kayenta	1,500	1	1,500	1	1,500	1	1,500	1	1,500	0.00%
Kearny	Kearny	200	6	1,200	7	1,400	7	1,400	9	1,800	2.05%
Kingman	Kingman	180	155	27,900	165	29,700	176	31,680	198	35,640	1.23%
Lake Havasu City	Lake Havasu City	340	132	44,880	141	47,940	150	51,000	169	57,460	1.24%

Associated City	Airport Name	2016-2036 OPBA	2016 Based Aircraft	2016 Total Operations	2021 Based Aircraft	2021 Operations	2026 Based Aircraft	2026 Operations	2036 Based Aircraft	2036 Operations	Annual Growth Rate
Marana	Marana Regional	360	248	89,280	264	95,040	281	101,160	315	113,400	1.20%
Marana	Pinal Airpark	6,830	5	34,150	6	40,980	6	40,980	8	54,640	2.38%
Maricopa	Ak-Chin Regional	610	30	18,300	33	20,130	37	22,570	46	28,060	2.16%
Mesa	Falcon Field	380	697	264,860	761	289,180	831	315,780	981	372,780	1.72%
Nogales	Nogales	1,840	26	47,840	28	51,520	30	55,200	35	64,400	1.50%
Parker	Avi Suquilla	890	17	15,130	18	16,020	19	16,910	22	19,580	1.30%
Payson	Payson	630	54	34,020	57	35,910	59	37,170	64	40,320	0.85%
Phoenix	Phoenix Deer Valley	400	940	376,000	1027	410,800	1120	448,000	1323	529,200	1.72%
Polacca	Polacca	0	0	0	0	0	0	0	0	0	0.00%
Safford	Safford Regional	240	57	13,680	59	14,160	62	14,880	66	15,840	0.74%
San Luis	Rolle Airfield	0	0	0	0	0	0	0	0	0	0.00%
San Manuel	San Manuel	380	37	14,060	41	15,580	46	17,480	56	21,280	2.09%
Scottsdale	Scottsdale	360	442	159,120	483	173,880	527	189,720	622	223,920	1.72%
Sedona	Sedona	580	61	35,380	66	38,280	72	41,760	83	48,140	1.55%
Seligman	Seligman	550	2	1,100	2	1,100	2	1,100	3	1,650	2.05%
Sells	Sells	0	0	0	0	0	0	0	0	0	0.00%
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	2,660	51	135,660	54	143,640	57	151,620	63	167,580	1.06%
Springerville	Springerville Municipal	180	13	2,340	14	2,520	14	2,520	15	2,700	0.72%
St. Johns	St. Johns Industrial Air Park	1,120	15	16,800	16	17,920	16	17,920	18	20,160	0.92%
Superior	Superior	0	0	0	0	0	0	0	0	0	0.00%
Taylor	Taylor	190	15	2,850	16	3,040	17	3,230	18	3,420	0.92%
Tombstone	Tombstone Municipal	90	4	360	4	360	4	360	5	450	1.12%
Tuba City	Tuba City	0	0	0	0	0	0	0	0	0	0.00%
Tucson	Ryan Field	430	257	110,510	274	117,820	291	125,130	326	140,180	1.20%
Whiteriver	Whiteriver	0	0	0	0	0	0	0	0	0	0.00%
Wickenburg	Wickenburg Municipal	790	46	36,340	50	39,500	55	43,450	65	51,350	1.74%
Willcox	Cochise County	420	24	10,080	25	10,500	27	11,340	30	12,600	1.12%
Williams	H.A. Clark Memorial Field	2,170	3	6,510	3	6,510	3	6,510	4	8,680	1.45%
Window Rock	Window Rock	710	7	4,970	7	4,970	8	5,680	8	5,680	0.67%
Winslow	Winslow-Lindbergh Regional	1,770	12	21,240	13	23,010	13	23,010	15	26,550	1.12%

Source: Woolpert 2017, Airport Inventory and Data Survey Form 2017

The second method of forecasting GA operations is the ARC Category Growth Rate. This method classifies airports into two groups based on their existing ARC as identified in the Airport Inventory and Data Survey Form[6]:

1. Under B-II (approach speeds less than 91 knots and tail heights less than 20 feet or wingspans less than 49 feet)
2. B-II and greater (approach speeds 91 knots or more and tail heights 20 feet or greater or wingspans 49 feet or greater)

Using this method, Group 1 ARC (under B-II) airport operations increase at an average annual growth rate of 0.08 percent based on the cumulative growth rates from the *FAA Aerospace Forecast* for GA and air taxi hours flown for all piston fixed wing, turboprop fixed wing, piston rotorcraft, experimental, sport, and other aircraft (all generally have an ARC of B-I or lower). Group 2 airport operations increase at an average annual growth rate of 2.68 percent based on the cumulative growth rates from the FAA forecast for turbojet fixed wing and turbine rotorcraft aircraft (all generally have an ARC of B-II or greater) hours flown.

The annual growth rate was determined using the equation for compound annual growth rate (see below), with the "end value" being the projected number of hours flown in 2037, the "beginning value" being the number of hours flown in 2016, and the number of years between 2016 and 2037 (21 years).

$$\text{Compound Annual Growth Rate} = \left(\frac{\text{End Value}}{\text{Beginning Value}}\right)^{\left(1/_{\text{Number of Years}}\right)} - 1$$

Table 17 shows the ARC and the resulting associated growth rates, while **Table 18** shows the resulting forecasted operations for each airport using this method.

Table 17. ARC, Group, and Growth Rate

ARC	End Value	Beginning Value	Number of Years	Growth Rate
A-I, A-II, B-I, B-II*	18,136	17,819	21	0.08%
B-II* **C-I, C-II, C-III, C-IV,** **D-IV, D-V** **E-VI**	11,741	6,739	21	2.68%

Note: B-II airports classified as GA-Rural and GA-Basic were given the 0.08 percent growth rate. B-II airports classified as GA-Community through Commercial Service were given the high growth rate.

Sources: FAA Aerospace Forecast Fiscal Years 2017-2037, Woolpert 2017

[6] ARC is an airport designation that signifies the airport's highest Runway Design Code (RDC), minus the third (visibility) component of the RDC. The ARC is based on the aircraft approach category (A through E) and the airplane design group (I through VI). See FAA AC 150/5300-13A, Airport Design, for further information on the ARC codes.

Table 18. Forecasted Aircraft Operations Using ARC Method (rounded to the nearest 10)

Associated City	Airport Name	ARC	Growth Rate	2016	2021	2026	2036
Ajo	Eric Marcus Municipal	B-I	0.08%	300	300	300	300
Bagdad	Bagdad	B-I	0.08%	1,000	1,000	1,010	1,020
Benson	Benson Municipal	B-II	2.68%	16,700	19,060	21,760	28,340
Bisbee	Bisbee Municipal	B-II	0.08%	2,900	2,910	2,920	2,950
Buckeye	Buckeye Municipal	B-II	2.68%	53,000	60,490	69,050	89,950
Casa Grande	Casa Grande Municipal	B-II	2.68%	100,000	114,140	130,270	169,710
Chandler	Chandler Municipal	B-II	2.68%	220,930	252,170	287,820	374,960
Chinle	Chinle Municipal	B-I	0.08%	7,800	7,830	7,860	7,930
Cibecue	Cibecue	A-I	0.08%	10	10	10	10
Clifton	Greenlee County	B-II	0.08%	1,110	1,110	1,120	1,130
Colorado City	Colorado City Municipal	B-II	2.68%	4,800	5,480	6,250	8,150
Coolidge	Coolidge Municipal	C-IV	0.08%	17,000	17,070	17,140	17,270
Cottonwood	Cottonwood Municipal	B-I	0.08%	18,900	18,980	19,050	19,200
Douglas	Bisbee-Douglas International	C-I	0.08%	25,820	25,920	26,030	26,240
Douglas	Cochise College	B-I	0.08%	47,050	47,240	47,430	47,810
Douglas	Douglas Municipal	B-II	0.08%	2,600	2,610	2,620	2,640
Eloy	Eloy Municipal	A-II	0.08%	32,650	32,780	32,910	33,180
Gila Bend	Gila Bend Municipal	B-II	0.08%	36,290	36,440	36,580	36,880
Glendale	Glendale Municipal	B-II	2.68%	70,520	80,490	91,870	119,690
Globe	San Carlos Apache	C-II	2.68%	1,910	2,180	2,480	3,230
Goodyear	Phoenix Goodyear	D-IV	2.68%	123,330	140,770	160,670	209,310
Holbrook	Holbrook Municipal	B-I	0.08%	3,700	3,710	3,730	3,760
Kayenta	Kayenta	B-II	0.08%	1,500	1,510	1,510	1,520
Kearny	Kearny	A-I	0.08%	1,200	1,200	1,210	1,220
Kingman	Kingman	C-III	2.68%	27,120	30,950	35,330	46,030
Lake Havasu City	Lake Havasu City	C-III	2.68%	45,000	51,360	58,620	76,370
Marana	Marana Regional	C-II	2.68%	90,250	103,010	117,580	153,170
Marana	Pinal Airpark	D-V	2.68%	34,160	38,990	44,500	57,970
Maricopa	Ak-Chin Regional	B-I	0.08%	18,320	18,400	18,470	18,620
Mesa	Falcon Field	B-II	2.68%	263,120	300,320	342,780	446,550
Nogales	Nogales	C-II	2.68%	47,750	54,500	62,210	81,040
Parker	Avi Suquilla	C-II	2.68%	15,150	17,290	19,740	25,710
Payson	Payson	B-I	0.08%	33,770	33,910	34,040	34,310
Phoenix	Phoenix Deer Valley	C-II	2.68%	378,030	431,480	492,480	641,580
Polacca	Polacca	A-I	0.08%	200	200	200	200
Safford	Safford Regional	B-II	2.68%	13,750	15,690	17,910	23,340
San Luis	Rolle Airfield	B-I	0.08%	3,100	3,110	3,120	3,150
San Manuel	San Manuel	B-I	0.08%	14,160	14,220	14,280	14,390

Associated City	Airport Name	ARC	Growth Rate	2016	2021	2026	2036
Scottsdale	Scottsdale	B-II	2.68%	158,300	180,670	206,220	268,650
Sedona	Sedona	B-II	2.68%	35,300	40,290	45,990	59,910
Seligman	Seligman	B-I	0.08%	1,100	1,100	1,110	1,120
Sells	Sells	Unknown	2.68%	200	230	260	340
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	E-V	0.08%	135,870	136,410	136,960	138,060
Springerville	Springerville Municipal	B-II	2.68%	2,360	2,700	3,080	4,010
St. Johns	St. Johns Industrial Air Park	B-II	2.68%	16,800	19,180	21,890	28,510
Superior	Superior	B-II	0.08%	200	200	200	200
Taylor	Taylor	B-II	2.68%	2,840	3,240	3,700	4,820
Tombstone	Tombstone Municipal	A-I	0.08%	350	350	350	360
Tuba City	Tuba City	B-II	0.08%	250	250	250	250
Tucson	Ryan Field	B-II	2.68%	109,640	125,140	142,830	186,070
Whiteriver	Whiteriver	B-II	0.08%	3,910	3,930	3,940	3,970
Wickenburg	Wickenburg Municipal	B-II	2.68%	36,150	41,260	47,090	61,350
Willcox	Cochise County	B-II	2.68%	10,000	11,410	13,030	16,970
Williams	H.A. Clark Memorial Field	B-II	2.68%	6,500	7,420	8,470	11,030
Window Rock	Window Rock	B-II	0.08%	5,000	5,020	5,040	5,080
Winslow	Winslow-Lindbergh Regional	C-II	2.68%	21,250	24,250	27,680	36,060

Note: Some airports may show no growth due to rounding even though there is a minimal increase in their operations.

Sources: Airport Inventory and Data Survey 2017, Woolpert 2017

Preferred GA Operations Forecast

The results of the two GA operations forecast results were compared to determine the preferred forecast for GA operations. The ARC method is the preferred forecast for many of the same reasons the Population Growth Method for based aircraft is preferred (recent revisions to FAA regulations impacting GA, positive socioeconomic projections, and overall growth in GA within the U.S.). With Arizona's population projected to grow at almost twice the expected U.S. population rate, a higher rate of airport traffic will also likely follow. Additionally, Arizona was ranked number three in the country for states that were attractive for aerospace manufacturing in the *2017 Aerospace Manufacturing Attractiveness Rankings* (PWC 2017). According to this report, Arizona has an ideal climate for aircraft testing and space observation, one of the best transportation infrastructures, and a tax policy congenial to business. Also, according to the Arizona Commerce Authority, Arizona is home to more than 1,200 aerospace and defense companies and this sector is a priority in the state's growth strategy (Arizona Commerce Authority n.d.). This kind of business activity usually results in higher business aircraft usage. Additionally, air tourism in Arizona has been on the increase as the country recovers from the recession. All of these factors, point to a greater number of aircraft operations in the state. It should be noted that based on coordination with the FAA, the growth rate using the ARC methodology for 12 airports in the system were adjusted. Nine of the 12 airports are defined as B-II—which would normally result in the high growth rate—and have classifications as GA-Rural or GA-Basic. Due to these airports being classified as such, the growth rates were changed from the high growth rate (2.68 percent) to the low growth rate (0.08 percent). Additionally,

Bisbee-Douglas International (DUG), Coolidge Municipal (P08), and Sierra Vista Municipal (FHU) were adjusted to the low growth rate as their ARCs are artificially inflated due to high annual operations by the military and/or special activity that warrants a high ARC but does not reflect the majority of the activity at the airport.

Table 19 presents the preferred operations forecast and the resulting projected local and itinerant split. The local and itinerant split is based upon 2016 data and the ratio remains constant throughout the forecast period.

Table 19. Preferred Operations Forecast with Local and Itinerant Split

Associated City	Airport Name	Growth Rate	2016			2021			2026			2036		
			Local	Itinerant	Total	Local	Itinerant	Total	Local	Itinerant	Total	Local	Itinerant	Total
Ajo	Eric Marcus Municipal	0.08%	60	240	300	60	240	300	60	240	300	60	240	300
Bagdad	Bagdad	0.08%	400	600	1,000	400	600	1,000	400	610	1,010	410	610	1,020
Benson	Benson Municipal	2.68%	4,510	12,191	16,700	5,150	13,910	19,060	5,870	15,890	21,760	7,650	20,690	28,340
Bisbee	Bisbee Municipal	0.08%	1,100	1,800	2,900	1,100	1,810	2,910	1,110	1,810	2,920	1,120	1,830	2,950
Buckeye	Buckeye Municipal	2.68%	15,900	37,100	53,000	18,150	42,340	60,490	20,710	48,340	69,050	26,990	62,960	89,950
Casa Grande	Casa Grande Municipal	2.68%	30,000	70,000	100,000	34,240	79,900	114,140	39,080	91,190	130,270	50,910	118,800	169,710
Chandler	Chandler Municipal	2.68%	142,180	78,750	220,930	162,290	89,880	252,170	185,230	102,590	287,820	241,310	133,650	374,960
Chinle	Chinle Municipal	0.08%	400	7,400	7,800	400	7,430	7,830	400	7,460	7,860	410	7,520	7,930
Cibecue	Cibecue	0.08%	0	10	10	0	10	10	0	10	10	0	10	10
Clifton	Greenlee County	0.08%	200	910	1,110	200	910	1,110	200	920	1,120	200	930	1,130
Colorado City	Colorado City Municipal	2.68%	2,400	2,400	4,800	2,740	2,740	5,480	3,120	3,130	6,250	4,070	4,080	8,150
Coolidge	Coolidge Municipal	0.08%	12,750	4,250	17,000	12,800	4,270	17,070	12,860	4,280	17,140	12,950	4,320	17,270
Cottonwood	Cottonwood Municipal	0.08%	8,000	10,900	18,900	8,030	10,950	18,980	8,060	10,990	19,050	8,130	11,070	19,200
Douglas	Bisbee-Douglas International	0.08%	7,750	18,070	25,820	7,780	18,140	25,920	7,810	18,220	26,030	7,870	18,370	26,240
Douglas	Cochise College	0.08%	44,700	2,353	47,050	44,880	2,360	47,240	45,060	2,370	47,430	45,420	2,390	47,810
Douglas	Douglas Municipal	0.08%	650	1,950	2,600	650	1,960	2,610	650	1,960	2,620	660	1,980	2,640
Eloy	Eloy Municipal	0.08%	21,220	11,430	32,650	21,310	11,470	32,780	21,390	11,520	32,910	21,570	11,610	33,180
Gila Bend	Gila Bend Municipal	0.08%	30,850	5,440	36,290	30,970	5,470	36,440	31,090	5,490	36,580	31,350	5,530	36,880
Glendale	Glendale Municipal	2.68%	45,840	24,680	70,520	52,320	28,170	80,490	59,720	32,150	91,870	77,800	41,890	119,690
Globe	San Carlos Apache	2.68%	400	1,510	1,910	460	1,720	2,180	520	1,960	2,480	680	2,550	3,230
Goodyear	Phoenix Goodyear	2.68%	74,000	49,330	123,330	84,460	56,310	140,770	96,400	64,270	160,670	125,590	83,720	209,310
Holbrook	Holbrook Municipal	0.08%	700	3,000	3,700	700	3,010	3,710	710	3,020	3,730	710	3,050	3,760
Kayenta	Kayenta	0.08%	0	1,500	1,500	0	1,510	1,510	0	1,510	1,510	0	1,520	1,520
Kearny	Kearny	0.08%	100	1,100	1,200	100	1,100	1,200	100	1,110	1,210	100	1,120	1,220
Kingman	Kingman	2.68%	14,100	13,020	27,120	16,100	14,850	30,950	18,370	16,960	35,330	23,940	22,090	46,030
Lake Havasu City	Lake Havasu City	2.68%	21,150	23,850	45,000	24,140	27,220	51,360	27,550	31,070	58,620	35,890	40,480	76,370
Marana	Marana Regional	2.68%	45,130	45,120	90,250	51,510	51,500	103,010	58,790	58,790	117,580	76,580	76,590	153,170
Marana	Pinal Airpark	2.68%	25,620	8,540	34,160	29,240	9,750	38,990	33,370	11,130	44,500	43,480	14,490	57,970
Maricopa	Ak-Chin Regional	0.08%	2,890	15,430	18,320	2,900	15,500	18,400	2,910	15,560	18,470	2,930	15,690	18,620
Mesa	Falcon Field	2.68%	157,870	105,250	263,120	180,190	120,130	300,320	205,670	137,110	342,780	267,930	178,620	446,550
Nogales	Nogales	2.68%	33,430	14,320	47,750	38,150	16,350	54,500	43,550	18,660	62,210	56,730	24,310	81,040
Parker	Avi Suquilla	2.68%	2,270	12,880	15,150	2,590	14,700	17,290	2,960	16,780	19,740	3,860	21,850	25,710
Payson	Payson	0.08%	11,140	22,630	33,770	11,190	22,720	33,910	11,230	22,810	34,040	11,320	22,990	34,310
Phoenix	Phoenix Deer Valley	2.68%	241,940	136,090	378,030	276,150	155,330	431,480	315,190	177,290	492,480	410,610	230,970	641,580
Polacca	Polacca	0.08%	0	200	200	0	200	200	0	200	200	0	200	200
Safford	Safford Regional	2.68%	6,880	6,870	13,750	7,850	7,840	15,690	8,950	8,960	17,910	11,670	11,670	23,340
San Luis	Rolle Airfield	0.08%	3,010	90	3,100	3,020	90	3,110	3,030	90	3,120	3,060	90	3,150
San Manuel	San Manuel	0.08%	8,330	5,830	14,160	8,360	5,860	14,220	8,400	5,880	14,280	8,460	5,930	14,390
Scottsdale	Scottsdale	2.68%	58,570	99,730	158,300	66,850	113,820	180,670	76,300	129,920	206,220	99,400	169,250	268,650

Associated City	Airport Name	Growth Rate	2016			2021			2026			2036		
			Local	Itinerant	Total	Local	Itinerant	Total	Local	Itinerant	Total	Local	Itinerant	Total
Sedona	Sedona	2.68%	5,300	30,000	35,300	6,040	34,250	40,290	6,900	39,090	45,990	8,990	50,920	59,910
Seligman	Seligman	0.08%	500	600	1,100	500	600	1,100	510	600	1,110	510	610	1,120
Sells	Sells	2.68%	0	200	200	0	230	230	0	260	260	0	340	340
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	0.08%	67,940	67,930	135,870	68,210	68,200	136,410	68,480	68,480	136,960	69,030	69,030	138,060
Springerville	Springerville Municipal	2.68%	330	2,030	2,360	380	2,320	2,700	430	2,650	3,080	560	3,450	4,010
St. Johns	St. Johns Industrial Air Park	2.68%	3,530	13,270	16,800	4,030	15,150	19,180	4,600	17,290	21,890	5,990	22,520	28,510
Superior	Superior	0.08%	0	200	200	0	200	200	0	200	200	0	200	200
Taylor	Taylor	2.68%	2,000	840	2,840	2,280	960	3,240	2,610	1,090	3,700	3,390	1,430	4,820
Tombstone	Tombstone Municipal	0.08%	50	300	350	50	300	350	50	300	350	50	310	360
Tuba City	Tuba City	0.08%	0	250	250	0	250	250	0	250	250	0	250	250
Tucson	Ryan Field	2.68%	60,300	49,340	109,640	68,830	56,310	125,140	78,560	64,270	142,830	102,340	83,730	186,070
Whiteriver	Whiteriver	0.08%	860	3,050	3,910	870	3,060	3,930	870	3,070	3,940	870	3,100	3,970
Wickenburg	Wickenburg Municipal	2.68%	11,570	24,580	36,150	13,200	28,060	41,260	15,070	32,020	47,090	19,630	41,720	61,350
Willcox	Cochise County	2.68%	2,500	7,500	10,000	2,850	8,560	11,410	3,260	9,770	13,030	4,240	12,730	16,970
Williams	H.A. Clark Memorial Field	2.68%	1,500	5,000	6,500	1,710	5,710	7,420	1,950	6,520	8,470	2,550	8,480	11,030
Window Rock	Window Rock	0.08%	3,500	1,500	5,000	3,510	1,510	5,020	3,530	1,510	5,040	3,560	1,520	5,080
Winslow	Winslow-Lindbergh Regional	2.68%	4,040	17,210	21,250	4,610	19,640	24,250	5,260	22,420	27,680	6,850	29,210	36,060

Sources: Airport Inventory and Data Survey 2017, Woolpert 2017

Comparison to the TAF

When an airport forecast is undertaken by an airport sponsor, usually as a part of an airport master plan, it is reviewed for consistency with the TAF projections for that airport. Although the forecasts included in this SASP Update cannot be used in the same manner that master plan forecasts can be used (project justification, etc.), they are still reviewed for consistency with the TAF.

For a forecast of aircraft or operations to be considered consistent with the TAF it must differ by less than ten percent in the five-year forecast period, and 15 percent in the 10-year forecast period. If the forecast is not consistent with the TAF, the inconsistencies must be resolved if the forecast is to be used for environmental purposes (e.g. purpose and need, air quality, noise, land use), noise compatibility planning (14 CFR Part 150), approval of development on an airport layout plan, and initial financial decisions including issuance of a "letter-of-intent" for funding or completing a benefit-cost analysis.[7]

Table 20 shows a comparison of the TAF and the forecasts for based aircraft using the preferred methodology, and **Table 21** shows a comparison of the TAF and the GA operation forecasts using the preferred methodology. Values that are above the 10 or 15 percent thresholds are **bolded**. Using a threshold of 10 percent for 2016, the TAF shows a 10 percent or higher difference for current based aircraft at 34 percent of the airports. If the TAF is incorrect by ten percent in the base year (2016), the difference will be magnified at the five-year and ten-year marks. These airports' forecasts have practically no possibility of being within the thresholds if the TAF does not reflect actual conditions in the first year (2016)**.** The magnitude of this discrepancy carries through in the five-year and ten-year forecasting periods. This issue is further magnified by a general lack of growth projected by the TAF for non-towered GA airports. By the five-year mark, 57 percent of the forecasts for based aircraft exceed the TAF threshold for consistency, and by the ten-year mark, 64 percent exceed it. For operations, 74 percent of the forecasts exceed the TAF threshold for consistency at the five-year mark, and 75 percent exceed it at the 10-year mark.

[7] "Review and Approval of Aviation Forecasts," Federal Aviation Administration, June 2008.

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Table 20. TAF Comparison of Based Aircraft Forecasts

		2016			2021			2026			2036		
Associated City	**Airport Name**	**Actual Based Aircraft**	**TAF Based Aircraft**	**Difference (%)**	**Forecast 5-Yr**	**TAF 5-Yr**	**Difference (%)**	**Forecast 10-Yr**	**TAF 10-Yr**	**Difference (%)**	**Forecast 20-Yr**	**TAF 20-Yr**	**Difference (%)**
Ajo	Eric Marcus Municipal	7	4	**-43%**	8	4	**-50%**	8	4	**-50%**	9	4	-77%
Bagdad	Bagdad	5	4	**-20%**	5	4	**-20%**	6	4	**-33%**	7	4	-55%
Benson	Benson Municipal	44	43	-2%	47	43	-9%	49	43	**-12%**	55	43	-24%
Bisbee	Bisbee Municipal	28	8	**-71%**	30	8	**-73%**	31	8	**-74%**	35	8	-126%
Buckeye	Buckeye Municipal	70	65	-7%	77	65	**-16%**	84	65	**-23%**	99	65	-41%
Casa Grande	Casa Grande Municipal	105	0	**-100%**	117	0	**-100%**	130	0	**-100%**	159	91	-54%
Chandler	Chandler Municipal	440	308	**-30%**	481	354	**-26%**	524	403	**-23%**	619	528	-16%
Chinle	Chinle Municipal	3	3	0%	3	3	0%	3	3	0%	4	3	-29%
Cibecue	Cibecue	0	0	0%	0	0	0%	0	0	0%	0	0	0.0%
Clifton	Greenlee County	1	1	0%	1	1	0%	1	1	0%	1	1	0%
Colorado City	Colorado City Municipal	13	16	**23%**	14	16	**14%**	15	16	**7%**	17	16	-6%
Coolidge	Coolidge Municipal	45	32	**-29%**	50	32	**-36%**	56	32	**-43%**	68	48	-34%
Cottonwood	Cottonwood Municipal	44	14	**-68%**	48	14	**-71%**	52	14	**-73%**	60	14	-124%
Douglas	Bisbee-Douglas International	5	5	0%	5	5	0%	6	5	**-17%**	6	5	-18%
Douglas	Cochise College	15	N/A	N/A	16	N/A	N/A	17	N/A	N/A	19	N/A	N/A
Douglas	Douglas Municipal	12	N/A	N/A	13	N/A	N/A	14	N/A	N/A	15	N/A	N/A
Eloy	Eloy Municipal	21	21	0%	23	21	-9%	26	21	**-19%**	32	21	-42%
Gila Bend	Gila Bend Municipal	4	4	0%	4	4	0%	5	4	**-20%**	6	4	-40%
Glendale	Glendale Municipal	286	271	-5%	312	290	-7%	341	307	**-10%**	403	337	-18%
Globe	San Carlos Apache	13	3	**-77%**	14	3	**-79%**	14	3	**-79%**	15	3	-133%
Goodyear	Phoenix Goodyear	222	204	-8%	243	219	**-10%**	265	238	**-10%**	312	278	-12%
Holbrook	Holbrook Municipal	14	9	**-36%**	15	9	**-40%**	16	9	**-44%**	17	9	-62%
Kayenta	Kayenta	1	0	**-100%**	1	0	**-100%**	1	0	**-100%**	1	0	-200%
Kearny	Kearny	6	N/A	N/A	7	N/A	N/A	7	N/A	N/A	9	N/A	N/A
Kingman	Kingman	155	160	3%	165	182	**10%**	176	204	**16%**	198	248	22%
Lake Havasu City	Lake Havasu City	132	88	**-33%**	141	88	**-38%**	150	88	**-41%**	169	88	-63%
Marana	Marana Regional	248	206	**-17%**	264	231	**-13%**	281	256	-9%	315	309	-2%
Marana	Pinal Airpark	5	0	**-100%**	6	0	**-100%**	6	0	**-100%**	8	0	-200%
Maricopa	Ak-Chin Regional	30	24	**-20%**	33	24	**-27%**	37	24	**-35%**	46	40	-14%
Mesa	Falcon Field	697	675	-3%	761	745	-2%	831	819	-1%	981	973	-1%
Nogales	Nogales	26	22	**-15%**	28	22	**-21%**	30	22	**-27%**	35	22	-46%
Parker	Avi Suquilla	17	19	**12%**	18	19	6%	19	19	0%	22	19	-15%
Payson	Payson	54	59	9%	57	59	4%	59	59	0%	64	59	-8%
Phoenix	Phoenix Deer Valley	940	972	3%	1027	1080	5%	1120	1205	8%	1,323	1,495	12%
Polacca	Polacca	0	0	0%	0	0	0%	0	0	0%	0	0	0.0%
Safford	Safford Regional	57	49	**-14%**	59	49	**-17%**	62	49	**-21%**	66	49	-30%
San Luis	Rolle Airfield	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A
San Manuel	San Manuel	37	19	**-49%**	41	19	**-54%**	46	19	**-59%**	56	19	-99%
Scottsdale	Scottsdale	442	337	**-24%**	483	357	**-26%**	527	379	**-28%**	622	420	-39%

Associated City	Airport Name	Actual Based Aircraft	TAF Based Aircraft	Difference (%)	Forecast 5-Yr	TAF 5-Yr	Difference (%)	Forecast 10-Yr	TAF 10-Yr	Difference (%)	Forecast 20-Yr	TAF 20-Yr	Difference (%)
Sedona	Sedona	61	62	2%	66	62	-6%	72	62	**-14%**	83	62	-29%
Seligman	Seligman	2	N/A	N/A	2	N/A	N/A	2	N/A	N/A	3	N/A	N/A
Sells	Sells	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	51	45	**-12%**	54	45	**-17%**	57	45	**-21%**	63	45	-33%
Springerville	Springerville Municipal	13	15	**15%**	14	15	7%	14	15	7%	15	15	0%
St. Johns	St. Johns Industrial Air Park	15	5	**-67%**	16	5	**-69%**	16	5	**-69%**	18	5	-113%
Superior	Superior	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A	0	N/A	N/A
Taylor	Taylor	15	11	**-27%**	16	11	**-31%**	17	11	**-35%**	18	16	-12%
Tombstone	Tombstone Municipal	4	N/A	N/A	4	N/A	N/A	4	N/A	N/A	5	N/A	N/A
Tuba City	Tuba City	0	0	0%	0	0	0%	0	0	0%	0	0	0.0%
Tucson	Ryan Field	257	187	**-27%**	274	211	**-23%**	291	239	**-18%**	326	302	-8%
Whiteriver	Whiteriver	0	0	0%	0	0	0%	0	0	0%	0	0	0.0%
Wickenburg	Wickenburg Municipal	46	36	**-22%**	50	36	**-28%**	55	36	**-35%**	65	36	-57%
Willcox	Cochise County	24	21	**-13%**	25	21	**-16%**	27	21	**-22%**	30	21	-35%
Williams	H.A. Clark Memorial Field	3	3	0%	3	3	0%	3	3	0%	4	3	-29%
Window Rock	Window Rock	7	0	**-100%**	7	0	**-100%**	8	0	**-100%**	8	0	-200%
Winslow	Winslow-Lindbergh Regional	12	12	0%	13	12	-8%	13	12	-8%	15	12	-22%

Note: Values that are above the 10 or 15 percent of the respected TAF thresholds are bolded.

Sources: Airport Inventory and Data Survey 2017, FAA TAF 2017, Woolpert 2017

Table 21. TAF Comparison of GA Operations Forecast

		2016			2021			2026			2036		
Associated City	Airport Name	Actual GA Operations	TAF GA Operations	Difference (%)	Forecast 5-Yr	TAF 5-Yr	Difference (%)	Forecast 10-Yr	TAF 10-Yr	Difference (%)	Forecast 20-Yr	TAF 20-Yr	Difference (%)
Ajo	Eric Marcus Municipal	300	300	0%	300	300	0%	300	300	0%	300	300	0%
Bagdad	Bagdad	1,000	1,000	0%	1,000	1,000	0%	1,010	1,000	-1%	1,020	1,000	-2%
Benson	Benson Municipal	16,700	16,700	0%	19,060	16,700	**-12%**	21,760	16,700	**-23%**	28,340	16,500	-53%
Bisbee	Bisbee Municipal	2,900	2,900	0%	3,310	2,900	**-12%**	3,780	2,900	**-23%**	4,920	2,900	-52%
Buckeye	Buckeye Municipal	53,000	53,000	0%	60,490	53,000	**-12%**	69,050	53,000	**-23%**	89,950	52,900	-52%
Casa Grande	Casa Grande Municipal	100,000	0	**-100%**	114,140	0	**-100%**	130,270	0	**-100%**	169,710	119,280	-35%
Chandler	Chandler Municipal	220,930	215,373	-3%	252,170	220,013	**-13%**	287,820	222,540	**-23%**	374,960	227,4767	-49%
Chinle	Chinle Municipal	7,800	7,800	0%	7,830	7,800	0%	7,860	7,800	-1%	7,930	7,800	-2%
Cibecue	Cibecue	10	10	0%	10	10	0%	10	10	0%	10	10	0%
Clifton	Greenlee County	1,110	1,110	0%	1,270	1,110	**-13%**	1,450	1,110	**-23%**	1,880	1,110	-52%
Colorado City	Colorado City Municipal	4,800	4,000	**-17%**	5,480	4,000	**-27%**	6,250	4,000	**-36%**	8,150	3,970	-69%
Coolidge	Coolidge Municipal	17,000	4,250	**-75%**	19,400	4,250	**-78%**	22,150	4,250	**-81%**	28,850	8,170	-112%
Cottonwood	Cottonwood Municipal	18,900	18,900	0%	18,980	18,900	0%	19,050	18,900	-1%	19,200	18,800	-2%
Douglas	Bisbee-Douglas International	25,820	19,700	**-24%**	29,470	19,700	**-33%**	33,640	19,700	**-41%**	43,820	14,000	-103%
Douglas	Cochise College	47,050	N/A	N/A	47,240	N/A	N/A	47,430	N/A	N/A	47,810	N/A	N/A
Douglas	Douglas Municipal	2,600	N/A	N/A	2,970	N/A	N/A	3,390	N/A	N/A	4,410	N/A	N/A
Eloy	Eloy Municipal	32,650	23,450	**-28%**	32,780	23,450	**-28%**	32,910	23,450	**-29%**	33,180	23,400	-35%
Gila Bend	Gila Bend Municipal	36,290	36,290	0%	41,420	36,290	**-12%**	47,280	36,290	**-23%**	61,590	36,240	-52%
Glendale	Glendale Municipal	70,520	72,051	2%	80,490	69,985	**-13%**	91,870	70,330	**-23%**	119,690	70,916	-51%
Globe	San Carlos Apache	1,910	1,900	0%	2,180	1,900	**-13%**	2,480	1,900	**-23%**	3,230	1,900	-52%
Goodyear	Phoenix Goodyear	123,330	114,360	-7%	140,770	120,424	**-14%**	160,670	122,251	**-24%**	209,310	121,818	-53%
Holbrook	Holbrook Municipal	3,700	3,700	0%	3,710	3,700	0%	3,730	3,700	-1%	3,760	3,700	-2%
Kayenta	Kayenta	1,500	2,000	**33%**	1,710	2,000	**17%**	1,950	2,000	3%	2,550	2,000	-24%
Kearny	Kearny	1,200	N/A	N/A	1,200	N/A	N/A	1,210	N/A	N/A	1,220	N/A	N/A
Kingman	Kingman	27,120	28,478	5%	30,950	28,478	-8%	35,330	28,478	**-19%**	46,030	28,458	-47%
Lake Havasu City	Lake Havasu City	45,000	50,000	**11%**	51,360	50,000	-3%	58,620	50,000	**-15%**	76,370	49,650	-42%
Marana	Marana Regional	90,250	91,469	1%	103,010	99,295	-4%	117,580	107,980	-8%	153,170	118,296	-26%
Marana	Pinal Airpark	34,160	56,857	**66%**	38,990	56,857	**46%**	44,500	56,857	**28%**	57,970	8,057	-151%
Maricopa	Ak-Chin Regional	18,320	18,310	0%	18,400	18,310	0%	18,470	18,310	-1%	18,620	38,340	69%
Mesa	Falcon Field	263,120	270,072	3%	300,320	278,949	-7%	342,780	281,562	**-18%**	446,550	284,242	-44%
Nogales	Nogales	47,750	27,000	**-43%**	54,500	27,000	**-50%**	62,210	27,000	**-57%**	81,040	24,150	-108%
Parker	Avi Suquilla	15,150	15,000	-1%	17,290	15,000	**-13%**	19,740	15,000	**-24%**	25,710	15,000	-53%
Payson	Payson	33,770	34,250	1%	33,910	34,250	1%	34,040	34,250	1%	34,310	33,750	-2%
Phoenix	Phoenix Deer Valley	378,030	365,920	-3%	431,480	371,864	**-14%**	492,480	375,560	**-24%**	641,580	383,000	-50%
Polacca	Polacca	200	200	0%	200	200	0%	200	200	0%	200	200	0%
Safford	Safford Regional	13,750	13,750	0%	15,690	13,750	**-12%**	17,910	13,750	**-23%**	23,340	12,750	-59%
San Luis	Rolle Airfield	3,100	N/A	N/A	3,110	N/A	N/A	3,120	N/A	N/A	3,150	N/A	N/A
San Manuel	San Manuel	14,160	14,010	-1%	14,220	14,010	-1%	14,280	14,010	-2%	14,390	14,000	-3%
Scottsdale	Scottsdale	158,300	155,493	-2%	180,670	161,644	**-11%**	206,220	163,800	**-21%**	268,650	167,785	-46%

Associated City	Airport Name	2016			2021			2026			2036		
		Actual GA Operations	TAF GA Operations	Difference (%)	Forecast 5-Yr	TAF 5-Yr	Difference (%)	Forecast 10-Yr	TAF 10-Yr	Difference (%)	Forecast 20-Yr	TAF 20-Yr	Difference (%)
Sedona	Sedona	35,300	35,000	-1%	40,290	35,000	**-13%**	45,990	35,000	**-24%**	59,910	33,600	-56%
Seligman	Seligman	1,100	N/A	N/A	1,100	N/A	N/A	1,110	N/A	N/A	1,120	N/A	N/A
Sells	Sells	200	N/A	N/A	230	N/A	N/A	260	N/A	N/A	340	N/A	N/A
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	135,870	119,274	**-12%**	155,080	119,274	**-23%**	177,000	119,274	**-33%**	230,590	22,805	-164%
Springerville	Springerville Municipal	2,360	3,176	**34%**	2,700	3,176	**18%**	3,080	3,176	3%	4,010	3,063	-27%
St. Johns	St. Johns Industrial Air Park	16,800	16,800	0%	19,180	16,800	**-12%**	21,890	16,800	**-23%**	28,510	16,500	-53%
Superior	Superior	200	N/A	N/A	230	N/A	N/A	260	N/A	N/A	340	N/A	N/A
Taylor	Taylor	2,840	3,530	**24%**	3,240	3,530	9%	3,700	3,530	-5%	4,820	20,030	122%
Tombstone	Tombstone Municipal	350	N/A	N/A	350	N/A	N/A	350	N/A	N/A	360	N/A	N/A
Tuba City	Tuba City	250	250	0%	290	250	**-14%**	330	250	**-24%**	420	250	-51%
Tucson	Ryan Field	109,640	110,834	1%	125,140	109,521	**-12%**	142,830	109,706	**-23%**	186,070	93,580	-66%
Whiteriver	Whiteriver	3,910	3,910	0%	4,460	3,910	**-12%**	5,090	3,910	**-23%**	6,640	3,850	-53%
Wickenburg	Wickenburg Municipal	36,150	36,150	0%	41,260	36,150	**-12%**	47,090	36,150	**-23%**	61,350	36,100	-52%
Willcox	Cochise County	10,000	8,500	**-15%**	11,410	8,500	**-26%**	13,030	8,500	**-35%**	16,970	8,000	-72%
Williams	H.A. Clark Memorial Field	6,500	6,100	-6%	7,420	6,100	**-18%**	8,470	6,100	**-28%**	11,030	6,100	-58%
Window Rock	Window Rock	5,000	5,000	0%	5,710	5,000	**-12%**	6,510	5,000	**-23%**	8,490	5,000	-52%
Winslow	Winslow-Lindbergh Regional	21,250	21,250	0%	24,250	21,250	**-12%**	27,680	21,250	**-23%**	36,060	26,000	-32%

Notes: Values that are above the 10 or 15 percent of the respected TAF thresholds are bolded. The FAA TAF does not forecast non-NPIAS airports and as such, non-NPIAS airports are listed as N/A.

Sources: Airport Inventory and Data Survey 2017, FAA TAF 2017, Woolpert 2017

SUMMARY

The FAA projects very modest growth for GA across the country over the next 20 years. While piston aircraft are expected to decline, this is offset by increases in the turbine aircraft market. In Arizona, socioeconomic projections are positive, with the state's population growth rate expected to nearly double the nation's expected growth rate. Arizona's economy is growing and this trend is projected to continue with employment exceeding five million by 2036. While the forecasts presented in the 2018 Update are optimistic, Arizona boasts healthy economic growth and GA in the state is expected to grow at a rate greater than the national average. Many other factors unique to Arizona support this prediction, including the state's attractive climate for aviation manufacturing, great flying weather, and healthy air tourism industry. The selected forecasts for based aircraft and GA operations at Arizona's GA system airports project increases of 1.59 percent in based aircraft and 2.53 percent in GA operations over the forecast period (2016-2036).

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CHAPTER FIVE: AIRPORT CLASSIFICATION ANALYSIS

INTRODUCTION

Determining how airports function within a state system is a foundation of the system planning process. If planned and developed within the context of the state system, individual airports can effectively support a sub-set of aviation activities without impacting service levels within specific regions or communities. Airport planning from the system-wide perspective identifies duplication, gaps, and deficiencies of aviation services in localized areas. This approach supports informed decision-making and resource allocation.

Arizona's classification structure is designed to establish a network of facilities that supports the state's transportation, economic, and access needs. This structure was developed to support an interconnected system of airports that provides the facilities and services required by citizens, visitors, and businesses. All airports contribute to the system; however, the level and type of contribution varies among airports due to numerous factors. Some of these factors are inherent to the airport itself (e.g., available services and facilities), while others are driven by external conditions such as proximity to markets, other airports, and population centers. Because each airport within a system plays a different role, the availability of facilities and services must align with what an airport is and how it functions.

Following a review of federal methodologies, other state classification structures, and an evaluation of the Arizona's existing system, this chapter classifies each airport in the Arizona system. These baseline classifications will be further reviewed in subsequent analyses to identify strategies and recommendations for the optimization of the system under current and future conditions. In addition, objectives for the development of facilities and services that are appropriate for the various classifications are identified.

The information in this chapter is presented as follows:

1. Federal Classifications
2. Other State Classifications
3. Arizona Department of Transportation (ADOT) Functional Roles
4. 2018 State Aviation System Plan (SASP) Update Classifications
5. Facility and Service Objectives
6. Primary Components of Arizona's Aviation Industry

FEDERAL CLASSIFICATIONS

Arizona's airports are classified at the state and federal levels to reflect the diverse roles that airports play in each of these spheres. These various role methodologies complement one another to provide the opportunity to evaluate Arizona's airport system within its full context.

National Plan of Integrated Airport Systems

The *Report to Congress, National Plan of Integrated Airport Systems 2017-2021* (referred to as the NPIAS or 2017-2021 NPIAS) is the latest publication from the Federal Aviation Administration (FAA) and identifies 3,332 existing airports (eight proposed) that are significant to the national air system planning and thus included in the NPIAS. Within the NPIAS, the FAA categorizes airports by type and level of activity, including commercial service,

primary, cargo service, reliever, and general aviation (GA) airports. The FAA's definitions of airport categories are as follows:

1. **Primary.** Public airports that have more than 10,000 enplanements each calendar year and receive scheduled passenger service. Hub categories for primary airports (i.e., large, medium, small, or non) are determined by the number of annual enplanements handled by each airport and are defined as a percentage of total annual enplanements within the U.S. as follows:
   - **Large hub.** One percent or more of U.S. enplanements
   - **Medium hub.** At least 0.25 but less than 1.0 percent of U.S. enplanements
   - **Small hub.** At least 0.05 but less than 0.25 percent of U.S. enplanements
   - **Nonhub.** Less than 0.05 percent of U.S. enplanements but more than 10,000

2. **Non-primary.** Public or primary airports mainly used by GA aircraft. Categories within the non-primary classification include:
   - **Commercial Service.** Public airports receiving scheduled passenger service and at least 2,500 but no more than 10,000 enplaned passengers per year
   - **Reliever.** Public or private airports designated by the FAA to relieve GA traffic congestion at nearby commercial service airports and provide improved GA access to the overall community
   - **GA.** Public-use airports that do not have scheduled air carrier service or have less than 2,500 enplanements

There are 59 airports in Arizona in the 2017-2021 NPIAS.[1] The total number of NPIAS airports within each classification is presented in **Table 1**, along with an example of an Arizona airport or airports in that classification.

Table 1. NPIAS Airports (U.S. and Arizona)

Classification		No. of Airports		Arizona Example
		U.S.	Arizona	
Primary	Large hub	30	1	Phoenix Sky Harbor International
	Medium hub	31	0	N/A
	Small hub	72	2	Phoenix-Mesa Gateway, Tucson International
	Nonhub	249	6	Flagstaff Pulliam, Yuma MCAS/Yuma International
	Sub-Total	**382**	**9**	**N/A**
Non-primary	Commercial service	127	1	Ernest A. Love Field
	Reliever	259	8	Ryan Field, Glendale Municipal
	GA	2,564	41	Casa Grande Municipal, San Carlos Apache
	Sub-Total	**2,950**	**50**	**N/A**
Total		**3,332**	**59**	**N/A**

Source: 2017-2021 NPIAS

[1] Please note that the NPIAS includes a subsection of the 67 airports in the Arizona airport system. Arizona system airports excluded from the NPIAS include Cochise College (P03), Douglas Municipal (DGL), Kearny (E67), Rolle Airfield (44A), Seligman (P23), Sells (E78), Superior (E81), and Tombstone Municipal (P29). While not identified by the federal classification system (i.e., the NPIAS), theses airports play an important role within the state system and serve aviation demand at local, regional, and/or statewide levels.

Table 2 presents the latest classifications of all NPIAS airports in Arizona.

Table 2. Arizona's NPIAS Airports

Associated City	Airport Name	FAA ID	Classification
	Primary		
Bullhead City	Laughlin/Bullhead City International	IFP	Nonhub
Flagstaff	Flagstaff Pulliam	FLG	Nonhub
Grand Canyon	Grand Canyon National Park	GCN	Nonhub
Page	Page Municipal	PGA	Nonhub
Peach Springs	Grand Canyon West	1G4	Nonhub
Phoenix	Phoenix Sky Harbor International	PHX	Large
Phoenix	Phoenix-Mesa Gateway	IWA	Small
Tucson	Tucson International	TUS	Small
Yuma	Yuma International	NYL	Nonhub
	Non-primary		
Ajo	Eric Marcus Municipal	P01	GA
Bagdad	Bagdad	E51	GA
Benson	Benson Municipal	E95	GA
Bisbee	Bisbee Municipal	P04	GA
Buckeye	Buckeye Municipal	BXK	GA
Casa Grande	Casa Grande Municipal	CGZ	GA
Chandler	Chandler Municipal	CHD	Reliever
Chinle	Chinle Municipal	E91	GA
Cibecue	Cibecue	Z95	GA
Clifton	Greenlee County	CFT	GA
Colorado City	Colorado City Municipal	AZC	GA
Coolidge	Coolidge Municipal	P08	GA
Cottonwood	Cottonwood Municipal	P52	GA
Douglas	Bisbee-Douglas International	DUG	GA
Eloy	Eloy Municipal	E60	GA
Gila Bend	Gila Bend Municipal	E63	GA
Glendale	Glendale Municipal	GEU	Reliever
Globe	San Carlos Apache	P13	GA
Goodyear	Phoenix Goodyear	GYR	Reliever
Holbrook	Holbrook Municipal	P14	GA
Kayenta	Kayenta	0V7	GA
Kingman	Kingman	IGM	GA
Lake Havasu City	Lake Havasu City	HII	GA
Marana	Marana Regional	AVQ	Reliever
Marana	Pinal Airpark	MZJ	GA
Maricopa	Ak-Chin Regional	A39	GA
Mesa	Falcon Field	FFZ	Reliever
Nogales	Nogales	OLS	GA
Parker	Avi Suquilla	P20	GA
Payson	Payson	PAN	GA
Phoenix	Phoenix Deer Valley	DVT	Reliever
Polacca	Polacca	P10	GA
Prescott	Ernest A. Love Field	PRC	Commercial Service

Associated City	Airport Name	FAA ID	Classification
Safford	Safford Regional	SAD	GA
San Manuel	San Manuel	E77	GA
Scottsdale	Scottsdale	SDL	Reliever
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	GA
Sedona	Sedona	SEZ	GA
Show Low	Show Low Regional	SOW	GA
Springerville	Springerville Municipal	JTC	GA
St. Johns	St. Johns Industrial Air Park	SJN	GA
Taylor	Taylor	TYL	GA
Tuba City	Tuba City	T03	GA
Tucson	Ryan Field	RYN	Reliever
Whiteriver	Whiteriver	E24	GA
Wickenburg	Wickenburg Municipal	E25	GA
Willcox	Cochise County	P33	GA
Williams	H.A. Clark Memorial Field	CMR	GA
Window Rock	Window Rock	RQE	GA
Winslow	Winslow-Lindbergh Regional	INW	GA

Source: 2017-2021 NPIAS

FAA ASSET Study

Approximately 88 percent of NPIAS airports in the U.S. are GA. To capture the diverse functions and economic contributions of GA airports, the FAA conducted two reviews of the network of GA facilities in the NPIAS. In 2012, the results were compiled into *General Aviation Airports: A National Asset* (referred to as ASSET 1 or the ASSET Study). This report acknowledges the following five key aeronautical functions provided by the GA airport system:

1. Emergency preparedness and response
2. Critical community access for remote areas
3. Commercial, industrial, and economic activity functions
4. Access to tourism and special events
5. Other aviation-specific functions, including corporate flights and flight instruction

The ASSET Study introduced four new categories to provide policymakers with a better understanding of the vast and diverse nature of the GA system. The ASSET categories are designed to capture the value of GA airports, which may play a critical role in a local community or region, while filling the gap left by the NPIAS in describing the activities and relative roles of airports in the national GA system.

The evaluation criteria of the ASSET categories incorporate aeronautical functions that are economically and effectively supported by GA operations (FAA 2012). As a result, airports are classified, in part, based on their roles in serving the public interest. The categories are primarily based on existing activity levels, number and type of based aircraft, and volume and types of flights. The ASSET categories also recognize NPIAS airports that are unclassified, as they do not meet other criteria and have limited activity and number of based aircraft. **Table 3** defines the ASSET categories for GA airports, including unclassified.

Table 3. GA Airport ASSET Categories

Role	Description
National	Supports the national and state system by providing communities with access to national and international markets in multiple states and throughout the U.S.
Regional	Supports regional economies by connecting communities to statewide and interstate markets
Local	Supplements communities by providing access to primarily intrastate and some interstate markets
Basic	Links the community with the national airport system and supports GA activities (e.g., emergency services, charter or critical passenger service, cargo operations, flight training and personal flying)
Unclassified	Provides access to the aviation system

Source: ASSET 1 2012

The ASSET Study noted that the FAA would be asking airport sponsors to provide updated information on the aeronautical functional supported at each airport and the sophistication of flying taking place there (Ibid. p. 3). Based in part on this subsequent investigation, the FAA released *ASSET 2: In-Depth Review of 497 Unclassified Airports* in 2014. This report further evaluated the unclassified airports from ASSET 1 to review if additional data were available to categorize these airports. In ASSET 1, Arizona had five unclassified airports:

1. Greenlee County (CFT)
2. Colorado City Municipal (AZC)
3. Pinal Airpark (MZJ)
4. St. Johns Industrial Air Park (SJN)
5. Window Rock (RQE)

During ASSET 2, three of the five Arizona airports were re-classified as Basic and two remained unclassified (Greenlee County and Pinal Airpark). The ASSET classifications were again updated as part of the 2017-2021 NPIAS to add Bisbee Municipal (P04) and San Manuel (E77) for a current total of four unclassified airports in Arizona. All ASSET categories, including unclassified airports, are reviewed during biennial NPIAS updates. **Table 4** presents the current ASSET categories of Arizona's GA airports reflected in the 2017-2021 NPIAS.

Table 4. ASSET Categories of Arizona's GA Airports

Associated City	Airport Name	FAA ID	ASSET Category
Ajo	Eric Marcus Municipal	P01	Basic
Bagdad	Bagdad	E51	Basic
Benson	Benson Municipal	E95	Local
Bisbee	Bisbee Municipal	P04	Unclassified
Buckeye	Buckeye Municipal	BXK	Local
Casa Grande	Casa Grande Municipal	CGZ	Local
Chandler	Chandler Municipal	CHD	Regional
Chinle	Chinle Municipal	E91	Basic
Cibecue	Cibecue	Z95	Basic
Clifton	Greenlee County	CFT	Unclassified
Colorado City	Colorado City Municipal	AZC	Local
Coolidge	Coolidge Municipal	P08	Local
Cottonwood	Cottonwood Municipal	P52	Basic
Douglas	Bisbee-Douglas International	DUG	Basic
Eloy	Eloy Municipal	E60	Local

Associated City	Airport Name	FAA ID	ASSET Category
Gila Bend	Gila Bend Municipal	E63	Basic
Glendale	Glendale Municipal	GEU	Regional
Globe	San Carlos Apache	P13	Basic
Goodyear	Phoenix Goodyear	GYR	Regional
Holbrook	Holbrook Municipal	P14	Basic
Kayenta	Kayenta	0V7	Basic
Kingman	Kingman	IGM	Regional
Lake Havasu City	Lake Havasu City	HII	Regional
Marana	Marana Regional	AVQ	Regional
Marana	Pinal Airpark	MZJ	Unclassified
Maricopa	Ak-Chin Regional	A39	Basic
Mesa	Falcon Field	FFZ	Regional
Nogales	Nogales	OLS	Local
Parker	Avi Suquilla	P20	Local
Payson	Payson	PAN	Local
Phoenix	Phoenix Deer Valley	DVT	National
Polacca	Polacca	P10	Basic
Safford	Safford Regional	SAD	Local
San Manuel	San Manuel	E77	Unclassified
Scottsdale	Scottsdale	SDL	National
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	Local
Sedona	Sedona	SEZ	Regional
Springerville	Springerville Municipal	JTC	Local
St. Johns	St. Johns Industrial Air Park	SJN	Basic
Taylor	Taylor	TYL	Basic
Tuba City	Tuba City	T03	Basic
Tucson	Ryan Field	RYN	Regional
Whiteriver	Whiteriver	E24	Basic
Wickenburg	Wickenburg Municipal	E25	Local
Willcox	Cochise County	P33	Local
Williams	H.A. Clark Memorial Field	CMR	Basic
Window Rock	Window Rock	RQE	Basic
Winslow	Winslow-Lindbergh Regional	INW	Basic

Source: 2017-2021 NPIAS

OTHER STATE CLASSIFICATIONS

States develop tailored classifications to ensure their methodologies classify their specific aviation needs based on characteristics important to each state. These tailored methodologies help states capture the activities and services that airports provide to their states, regions, and local communities. States define roles or classifications, with the terms sometimes used interchangeably, using nomenclature that is generally comprehendible by the aviation and non-aviation public. According to the FAA, states “may use terminology such as business class, recreational, local service, general utility, or basic utility to describe individual airport roles” (AC 150-5070, Change 1, §209b).

To obtain additional insight and background into potential methodologies that could be employed for the classification of Arizona's airports, the SASP Update conducted a review of other state airport system plans. This review focused on:

1. Common types of role classification structures
2. Common criteria used to determine airport roles
3. Treatment of privately owned, public-use airports

Types of Role Classification Structures

Most state aviation system planning role classification structures employ one of just a few basic methodologies. These methodologies range from very complex systems that assign points based on airport services and facilities, to relatively straightforward flow chart methodologies. The following section provides an overview of three common role stratification methodologies identified during the system plan review.

Strict Sets of Role Criteria

Applying a strict set of role criteria to each airport role is the most straightforward approach for stratifying a state's airport system. It is also the methodology utilized by the FAA ASSET Study. The approach is simple: to be in the highest airport role, an airport must meet the most demanding set of criteria, followed by continually less-strict criteria for lower airport roles. This methodology typically uses the same type of criteria for all roles, although some system plans modify this methodology to use different criteria depending on the role level. For example, FAA ASSET uses the number of instrument flight rule (IFR) operations, number of based jet aircraft, number of international departures, annual interstate operations, annual enplanements, and air cargo landed weight as criteria for placing airports in the National airport classification. This methodology can also be adapted to allow airports to meet one of several sets of criteria to be placed within a specific role. For example, to be a Regional airport in the ASSET Study, an airport must meet the following criteria:

1. The airport is located in a metropolitan or micropolitan statistical area, has at least 10 annual domestic IFR flights over 500 miles in radius, at least 1,000 annual IFR operations, at least one based jet, or at least 100 based aircraft; or
2. The airport is located in a metropolitan or micropolitan statistical area, and the airport meets the definition of commercial service

This methodology's adaptability is its most notable advantage. By employing different criteria based on role and/or the use of "or" statements, the strict set of criteria methodology can be modified for use in small or complex airport systems, while remaining relatively easy to communicate to clients and the public. Conversely, without such modifications, the methodology is often too rigid to be adequate for all but the simplest of airport systems.

Flow Chart

A flow chart methodology uses an "if-then" series of decisions to first categorize airports by the criterion deemed most important to the state. Airports are then further categorized based on other criteria as prioritized by the state. For example, a system of airports may first be divided based on tiers of primary runway length, then by the type of available fuel or instrument approach capabilities, and followed by other criteria deemed

important to that specific state's airport system. An airport is assigned a role based on the path it takes along the flow chart. A flow chart methodology typically utilizes fewer criteria than other methodologies. Advantages of the flow chart methodology include:

1. Achieves detailed results with just a few decision criteria
2. Easy to communicate to clients and the public
3. Easy to duplicate when updating system plans

However, a flow chart can be less customizable than other structures, particularly the points system methodology described in the following section.

Points System

A points system methodology assigns points to airports based on airport characteristics such as activity and facilities as selected by the state. While the methodology can vary widely amongst states, facilities and services supporting higher levels of activity and larger aircraft are typically assigned a higher level of points. For example, an airport with a 5,500-foot long runway would gain more points for runway length than would an airport with a 3,800-foot long runway. Similarly, an airport with a population of 450,000 people in its market area would earn more points for population coverage than would an airport with a smaller population in its market area. Different criteria may also be weighted differently based on their relative importance in the system. For example, the point total for runway length may be 10, while the total points available for population coverage may be five.

To determine roles, each airport's points are summed, and roles are assigned based on ranges of total points (e.g., 50-36 for primary airports, 35-20 for secondary airports, etc.). The state may also decide to establish a set number of airports in each role and categorize airports based on their relative scores to fit within the pre-established percentage structure. The primary advantage of the points system is that it can be customized to be as complex and nuanced as the airport system requires. However, this methodology is often difficult to clearly communicate to clients and the public.

Review of Other State System Plans

As shown in Table 5, the 2018 SASP Update reviewed the classification methodologies of 10 state system plans. These system plans were all completed over the last 10 years in states across the country. All reviewed system plans used one of the three methodologies described above. Some plans used a very straightforward version of a methodology, while others modified the methodologies to varying degrees.

Table 5. Stratification Methodologies of Reviewed State System Plans

System Plan	Year	Methodology	Number of Criteria	Primary Criteria
Michigan Aviation System Plan	2017	System plan does not use set roles, but adaptable tiers; tiers determined through strict criteria	8	Accessibility; capacity; NPIAS status
Kentucky Statewide Aviation System Plan	2017	Flow chart	3	Type of fuel service
Washington Aviation System Plan	2017	Strict criteria for each role	7	Airport reference code (ARC), activity, accessibility

System Plan	Year	Methodology	Number of Criteria	Primary Criteria
Louisiana Statewide Aviation System Plan	2015	Points system	17	None; all factors weighted evenly
North Dakota State Aviation System Plan	2014	Strict criteria	22	ASSET Study criteria
Ohio Airports Focus Study	2014	Flow chart	4	Runway length
Indiana State Aviation System Plan	2012	Strict criteria	22	ASSET Study criteria
Wisconsin State Airport System Plan 2030	2011	Weighted points system	14	Aviation activities
South Dakota State Aviation System Plan 2010-2030	2010	Strict criteria for each role	6	Runway length; approach; weather reporting; services; fuel; ARC
Oregon Aviation Plan	2007	Strict criteria for each role	7	Operations; location

Sources: Mead & Hunt 2017 (Michigan), CDM Smith 2017 (Kentucky), Parsons Brinckerhoff 2017 (Washington), CDM Smith 2015 (Louisiana), Mead & Hunt 2014 (North Dakota), CDM Smith 2014 (Ohio), Woolpert 2012 (Indiana), Short Elliott Hendrickson 2011 (Wisconsin), Mead & Hunt 2010 (South Dakota), Mead & Hunt 2007 (Oregon)

North Dakota and Indiana employed the most straightforward methodologies. These two systems used ASSET Study roles where available and applied the ASSET criteria to those airports not already assigned roles. The system plans in Kentucky and Ohio utilized the flow chart methodology, while the system plans for Louisiana and Wisconsin employed points systems. The Wisconsin system plan modified a points system methodology by developing categorized criteria into three groups, which were then weighted as follows:

1. **Aviation activity:** 30 percent of the total
2. **Economics and accessibility:** 25 percent (each) of the total
3. **Airport facilities:** 20 percent of the total

The most complex methodology was that employed by the recently completed *2017 Michigan Aviation System Plan*. At its most basic, the Michigan plan used the strict criteria methodology. However, the system plan assigned roles in name only, as airports within each role may have very different sets of facility and service objectives.[2] Each airport in the Michigan system was given a unique tier based on how it performed within each criterion. For example, an airport may be in tier I for accessibility from population centers, but lower tiers for accessibility from tourist centers and number of based aircraft. The methodology is intended to show that airports in the state often fit into several different roles, and that facility and service goals should reflect these different roles. Objectives for facilities and services were then developed for each criterion by tier. As a result, it is possible that no two airports in Michigan have the same set of objectives for their facilities and services.

The reviewed system plans also used a wide range of criteria for stratifying state airport systems, with approximately 50 different criteria used across the 10 plans. Criteria included airport facilities such as runway length, air traffic control towers, and approach capabilities, as well as various characteristics of an airport's based aircraft fleet. Several system plans also stratified airports based on their accessibility to the surrounding population, business centers, and registered pilots, as well as economic factors such as gross regional product (GRP) and total jobs in the surrounding market area. The total number of criteria used also varied greatly, ranging from only three criteria in the *Kentucky Statewide Aviation System Plan*, to over 20 criteria in the system plans based on the ASSET Study's methodology (e.g., North Dakota and Indiana).

[2] Additional information about facility and service objectives is provided on page 26 of this chapter.

Table 6 summarizes the most common criteria used in the 10 state system plans. The most common criteria were primary runway length, instrument approach capabilities, and total based aircraft (seven system plans), followed by population served, airport location, and aviation activities (six system plans). Some criteria reflect very specific characteristics, while others summarize broader categories of data. For example, “airport location” can describe multiple characteristics of an airport’s location such as proximity to metropolitan areas and airport isolation, while economy/employment served can summarize retail sales, GRP, tourism, income, and other factors.

Table 6 also includes details regarding the 2008 SASP, which utilized 21 factors to classify the state’s airports. While many of these criteria fit into the categories shown, the 2008 classification structure employed factors that did not appear in any other system plan. Unique criteria included an airport’s expansion potential, military or other special tenants, height zoning, and community support and outreach. Additional details about the 21 factors of the 2008 SASP are provided in the following section starting on page 5-5-12.

Table 6. Most Common Criteria Used in System Planning Role Stratification

State	Airport Location	Aviation Activities	Based Jets	Economy/Employment Served	Instrument Approach Capabilities	Land Area Within 30 Minutes	Operations (Number or Characteristics)	Other Airside Facilities	Part 139/Commercial Service	Population Served	Runway Length	Total Based Aircraft	Type of Fuel
Michigan	✓			✓		✓				✓		✓	
Kentucky		✓			✓						✓		
Washington	✓	✓						✓	✓	✓		✓	
Louisiana	✓	✓	✓	✓	✓		✓			✓	✓	✓	
North Dakota	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Ohio					✓						✓		✓
Indiana	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Wisconsin			✓	✓	✓	✓	✓	✓		✓	✓	✓	
South Dakota					✓			✓			✓		✓
Oregon	✓	✓					✓	✓	✓			✓	
Arizona (2008)		✓	✓	✓	✓			✓	✓	✓		✓	

Sources: Mead & Hunt 2017 (Michigan), CDM Smith 2017 (Kentucky), Parsons Brinckerhoff 2017 (Washington), CDM Smith 2015 (Louisiana), Mead & Hunt 2014 (North Dakota), CDM Smith 2014 (Ohio), Woolpert 2012 (Indiana), Short Elliott Hendrickson 2011 (Wisconsin), Mead & Hunt 2010 (South Dakota), Mead & Hunt 2007 (Oregon), Wilbur Smith Associates 2008 (Arizona)

Treatment of Privately Owned, Public-Use Airports

While not eligible for federal or in numerous cases state funding, many states include some privately owned, public-use airports in their aviation systems and in their system plans. Despite private ownership, these airports still serve the needs of GA users and often play an important role in their communities and the aviation system as a whole. On the other hand, some states exclude private airports because development cannot typically be influenced through funding (as they are generally ineligible for public funds). As such, they cannot be relied upon to help manage future statewide or regional demands. Privately owned, public-use airports are generally treated in one of three ways:

1. Exclude all private airports to only focus on those facilities eligible for federal and state funding
2. Select certain airports deemed of high importance to the state's airport system
3. Include all (or nearly all) privately owned, public-use airports

Table 7 summarizes how the 10 state system plans included in this reviewed treated the inclusion of privately owned, public-use airports. The Kentucky airport system has no privately owned airports open to the public; as such, their system plan includes no such airports. Louisiana and South Dakota excluded these airports altogether. The most common treatment was to include all, or virtually all, privately owned, public-use airports.

There are only two privately owned, public-use airports in North Dakota, both of which were included in the *2014 North Dakota State Aviation System Plan*. Other states have far more such airports. The *2017 Michigan Aviation System Plan* includes 97 of these airports (total of 99 in the system). The 2017 *Washington Aviation System Plan* includes 32 of the state's 33 privately owned, public-use airports. The 2007 Oregon plan includes 14 of the state's 15 such airports. The system plans for Ohio, Indiana, and Wisconsin selected which privately owned airports to include, with none picking more than five airports. In all cases where a system plan included at least one privately owned, public-use airport, airports were stratified using the same methodology as all other airports in the system.

Table 7. Treatment of Privately Owned, Public-Use Airports in State System Plans

State	Number of Privately Owned, Public-use Airports	
	Included in the System (at time of the plan)	Located in the State (2017)
Michigan	96	99
Kentucky	0	0
Washington	32	33
Louisiana	0	1
North Dakota	2	2
Ohio	1	51
Indiana	5	33
Wisconsin	4	36
South Dakota	0	1
Oregon	14	15

Sources: Mead & Hunt 2017 (Michigan), CDM Smith 2017 (Kentucky), Parsons Brinckerhoff 2017 (Washington), CDM Smith 2015 (Louisiana), Mead & Hunt 2014 (North Dakota), CDM Smith 2014 (Ohio), Woolpert 2012 (Indiana), Short Elliott Hendrickson 2011 (Wisconsin), Mead & Hunt 2010 (South Dakota), Mead & Hunt 2007 (Oregon)

ADOT FUNCTIONAL ROLES

Until the implementation 2008 SASP, ADOT had classified airports as "primary" and "secondary" based on size and level of activity occurring at each airport. These two classifications were sub-classified based on airport ownership and activity. The 2008 SASP conducted an extensive evaluation to identify possible enhancement to and the continued efficacy of this primary/secondary classification system. Based on a review of the 2000 Arizona State Aviation Needs Study (SANS), NPIAS designations, and other state systems, the 2008 SASP determined that the primary/secondary ADOT classification scheme insufficiently described the unique types of airports in the state.

2008 SASP Roles Evaluation

The 2008 SASP recognized that state-specific classifications can be developed based on an evaluation of many different factors that influence an airport's role in a defined system. Factors such as geography, demographic characteristics, and the current and anticipated future demand for aviation services can be assessed to understand the needs an airport fills in its community. For example, GA airports in rural areas may be essential for access and emergency response (e.g., wildland firefighting and aeromedical flights), while GA airports in an urban region may primarily support law enforcement activities and recreational flying. The total number of individuals served by the facility may be similar; however, these individuals are likely dispersed over a larger geographic space in rural areas than found in urban locations. Other key factors, such as airside and landside facilities and infrastructure, are also significantly important to consider when defining state functional classifications using this type of methodology.

To better define the functional roles of Arizona's airports within the state system, the 2008 SASP employed this functional methodology to establish the existing Arizona classification scheme. Twenty-one factors that influence an airport's role in the system were identified, each of which was then divided into the four goal categories utilized in the 2008 SASP:

Development

1. Total based aircraft
2. Based turbine aircraft
3. Registered pilots served
4. Airside facilities/infrastructure
5. Landside facilities/infrastructure
6. Airport approach type
7. Expansion potential
8. Commercial service
9. Design aircraft

Economic Support

10. Aviation services provided
11. Military or other special tenant organizations
12. Businesses served
13. Population served

14. Industry groups served/economic development
15. Retail sales
16. Accommodations within a 30-minute drive

Safety and Security

17. Emergency use
18. Runway protection zone (RPZ) development controls
19. Height zoning

Environmental Sensitivity and Stewardship

20. Community support
21. Community outreach efforts

In general terms, each factor was scored separately. Each measurable factor had a maximum score of 10, with scores stratified based on specific parameters defined for each individual factor. Factors with a more limited number of choices were analyzed individually to determine the appropriate scoring process. The scores for each factor were summed to determine each airport's initial score. Goal categories were then weighted. The sum of the four category scores, including the weight, produced the results of the roles analysis. Airports were then separated into five groups based on the number of standard deviations above or below their respective scores relative to the average score.

Airport Role Definitions

Based on a review of the previous SANS, other state aviation and FAA classifications, and the specific needs of Arizona, five airport roles were developed to define Arizona's airports. The five airport roles developed by the 2008 SASP are as follows:

1. **Commercial Service.** Publicly owned airports that enplane 2,500 or more passengers annually and receive scheduled passenger air service
2. **Reliever.** FAA-designated airports that relieve congestion at a commercial service airport
3. **GA-Community.** Serve regional economies, connect to state and national economies, and serve all types of GA aircraft [3]
4. **GA-Rural.** Serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying[4]
5. **GA-Basic.** Serve a limited role in the local economy, primarily serving recreational and personal flying

Table 8 provides the outcome of the 2008 SASP airport classifications by airport. **Figure 1** graphically depicts Arizona's airport system as classified by ADOT's functional roles from the 2008 SASP.

[3] A regional economy as the economic activity of an area that encompasses multiple communities or political jurisdictions.
[4] A local economy is defined as the economic activity of a single community or a largely rural area.

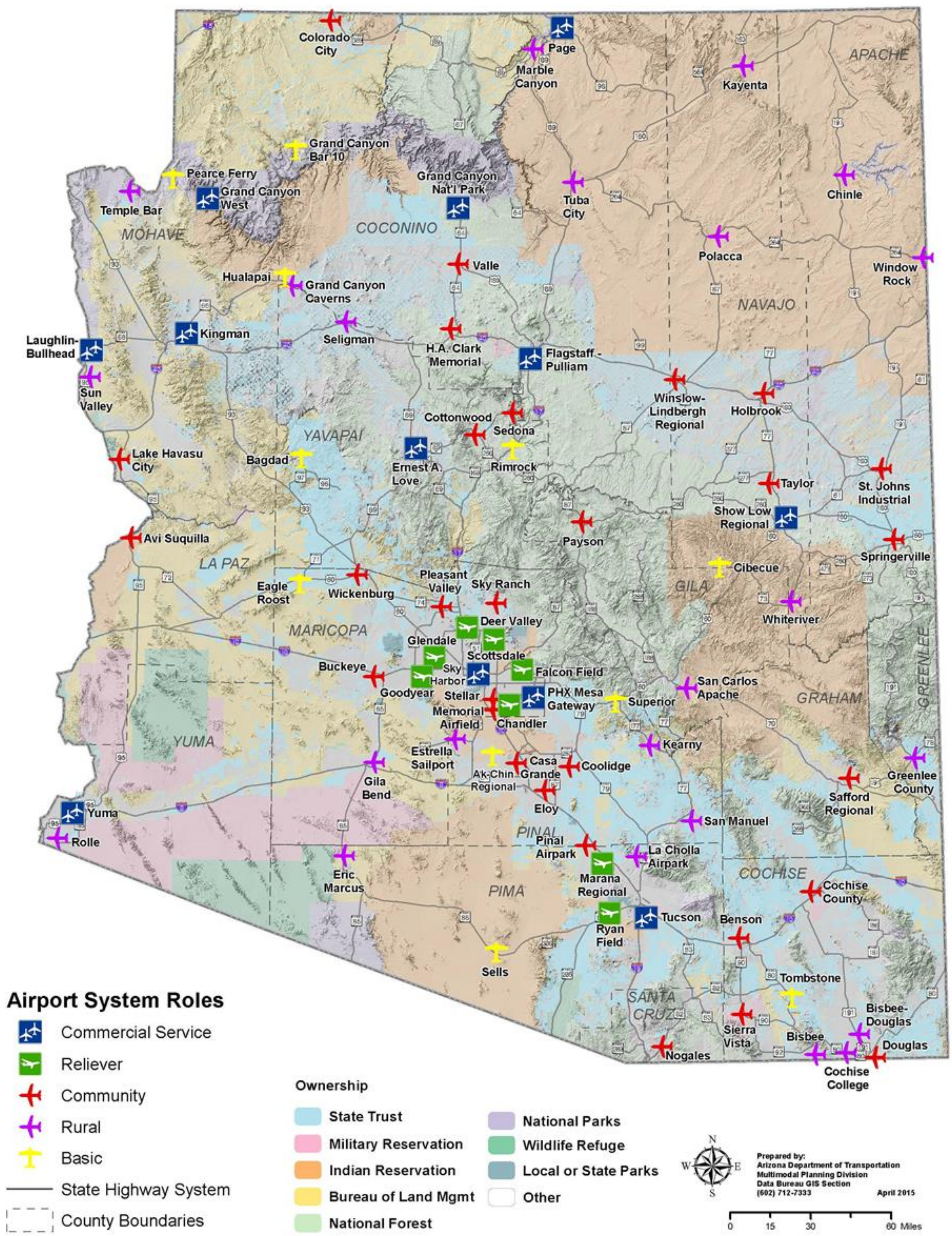
Table 8. 2008 SASP Airport Roles[5]

Associated City	Airport Name	FAA Identifier	2008 SASP Role
Ajo	Eric Marcus Municipal	P01	GA-Rural
Bagdad	Bagdad	E51	GA-Basic
Benson	Benson Municipal	E95	GA-Community
Bisbee	Bisbee Municipal	P04	GA-Rural
Buckeye	Buckeye Municipal	BXK	GA-Community
Bullhead City	Laughlin/Bullhead City International	IFP	Commercial Service
Casa Grande	Casa Grande Municipal	CGZ	GA-Community
Chandler	Chandler Municipal	CHD	Reliever
Chinle	Chinle Municipal	E91	GA-Rural
Cibecue	Cibecue	Z95	GA-Basic
Clifton	Greenlee County	CFT	GA-Rural
Colorado City	Colorado City Municipal	AZC	GA-Community
Coolidge	Coolidge Municipal	P08	GA-Community
Cottonwood	Cottonwood Municipal	P52	GA-Community
Douglas	Bisbee-Douglas International	DUG	GA-Rural
Douglas	Cochise College	P03	GA-Rural
Douglas	Douglas Municipal	DGL	GA-Community
Eloy	Eloy Municipal	E60	GA-Community
Flagstaff	Flagstaff Pulliam	FLG	Commercial Service
Gila Bend	Gila Bend Municipal	E63	GA-Rural
Glendale	Glendale Municipal	GEU	Reliever
Globe	San Carlos Apache	P13	GA-Rural
Goodyear	Phoenix Goodyear	GYR	Reliever
Grand Canyon	Grand Canyon National Park	GCN	Commercial Service
Holbrook	Holbrook Municipal	P14	GA-Community
Kayenta	Kayenta	0V7	GA-Rural
Kearny	Kearny	E67	GA-Rural
Kingman	Kingman	IGM	Commercial Service
Lake Havasu City	Lake Havasu City	HII	GA-Community
Marana	Marana Regional	AVQ	Reliever
Marana	Pinal Airpark	MZJ	GA-Community
Maricopa	Ak-Chin Regional	A39	GA-Rural
Mesa	Falcon Field	FFZ	Reliever
Nogales	Nogales	OLS	GA-Community
Page	Page Municipal	PGA	Commercial Service
Parker	Avi Suquilla	P20	GA-Community
Payson	Payson	PAN	GA-Community
Peach Springs	Grand Canyon West	1G4	GA-Rural
Phoenix	Phoenix Deer Valley	DVT	Reliever
Phoenix	Phoenix Sky Harbor	PHX	Commercial Service
Phoenix	Phoenix-Mesa Gateway	IWA	Commercial Service
Polacca	Polacca	P10	GA-Rural
Prescott	Ernest A. Love Field	PRC	Commercial Service

[5] The 2008 SASP included 83 airports in the Arizona system, while only 67 of these facilities are included in the 2017 analysis and thus reflected in Table 10.

Associated City	Airport Name	FAA Identifier	2008 SASP Role
Safford	Safford Regional	SAD	GA-Community
San Luis	Rolle Airfield	44A	GA-Rural
San Manuel	San Manuel	E77	GA-Rural
Scottsdale	Scottsdale	SDL	Reliever
Sedona	Sedona	SEZ	GA-Community
Seligman	Seligman	P23	GA-Rural
Sells	Sells	E78	GA-Basic
Show Low	Show Low Regional	SOW	Commercial Service
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	GA-Community
Springerville	Springerville Municipal	JTC	GA-Community
St. Johns	St. Johns Industrial Air Park	SJN	GA-Community
Superior	Superior	E81	GA-Basic
Taylor	Taylor	TYL	GA-Community
Tombstone	Tombstone Municipal	P29	GA-Basic
Tuba City	Tuba City	T03	GA-Rural
Tucson	Ryan Field	RYN	Reliever
Tucson	Tucson International	TUS	Commercial Service
Whiteriver	Whiteriver	E24	GA-Rural
Wickenburg	Wickenburg Municipal	E25	GA-Community
Willcox	Cochise County	P33	GA-Community
Williams	H.A. Clark Memorial Field	CMR	GA-Community
Window Rock	Window Rock	RQE	GA-Rural
Winslow	Winslow-Lindbergh Regional	INW	GA-Community
Yuma	Yuma International	NYL	Commercial Service

Source: Wilbur Smith Associates 2008



Source: ADOT Multimodal Planning Division 2015

Figure 1. ADOT Airport Role Functional Classifications

2018 SASP UPDATE CLASSIFICATIONS

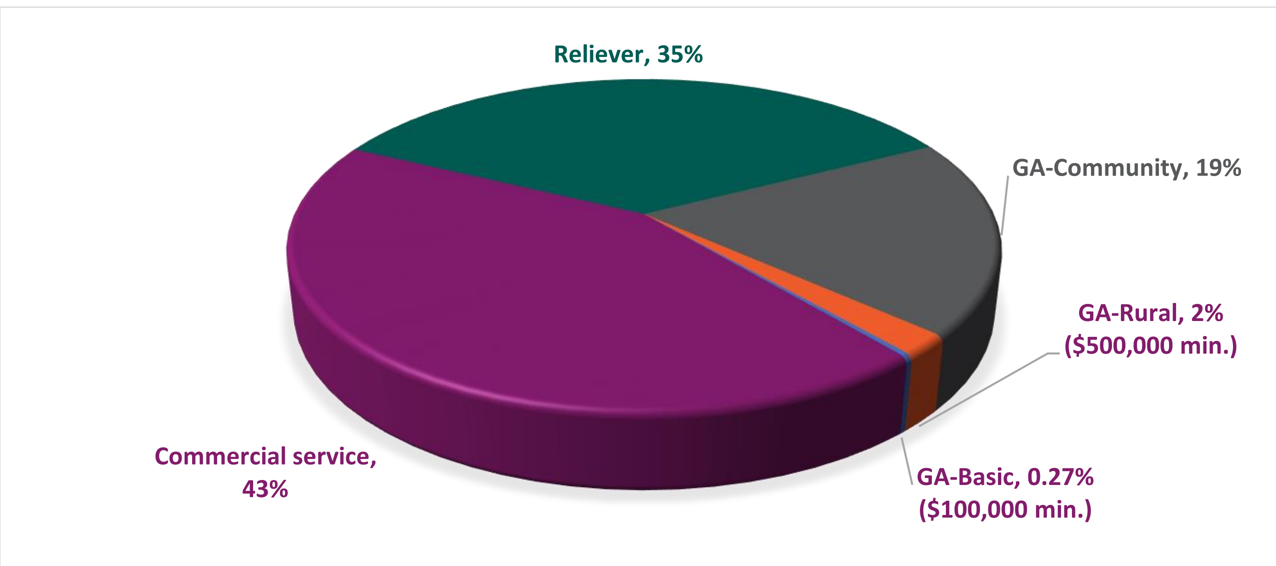
Classification Considerations

As discussed above, state roles are developed to reflect the existing and future needs of the state. The 2008 SASP role methodology employed 21 evaluation factors associated with the four system plan goal categories (i.e., development, economic support, safety and security, and environmental sensitivity and stewardship). These factors incorporated aviation and non-aviation factors to "achieve balance in evaluating airport needs throughout the state." A detailed analysis was conducted to assign weighted values to each airport based on data gathered during the inventory process and other third-party sources. The results of this analysis were then used to classify airports based on current types and levels of activity occurring at the facility and in the community. The airport roles established during this process were subsequently adopted by the State Transportation Board (STB) as part of its official policy in 2009 (ADOT 2016).

The 2018 SASP Update re-evaluated this methodology to determine its continued ability to classify Arizona's airports in a manner that accurately identifies each airport's role in the system while meeting the needs of the ADOT Aeronautics Group. State roles are particularly important because they are used for the allocation of funds from the State Aviation Fund. According to the STB's Resource Allocation Policy,

> *In order to allocate the State Aviation Fund dollars in an equitable, efficient and effective manner, it is the policy of the Board to provide the largest amount of Airport Development Program grant dollars to those airport roles with the largest amount of aviation activity (passenger enplanements, aircraft operations, and registered based aircraft), while also ensuring that eligible airports in all roles have an opportunity to be included in the annual allocation of State Aviation Funds* (ADOT 2016, p. 50).

Figure 2 presents the ADOT administrative guidelines for the allocation of the State Aviation Fund.



Source: ADOT 2016

Figure 2. State Funding Allocations by Airport Role (Existing)

Since the 2008 SASP, Arizona's economic and legislative landscapes have shifted, causing ripple effects that have significantly impacted funding availability in the State Aviation Fund. Thus, while funding allocations per role have remained consistent, the overall level of available funding has been drastically reduced. This, and other state-specific issues, underline the importance of closely re-examining the existing airport role classification scheme.[6]

Based on the current context of the ADOT Aeronautics Group, the importance of Arizona's classification scheme in state decision-making processes, and the needs of Arizona's airports, several key considerations emerged during the development of the updated methodology:

1. **Simplicity.** The inherent complexity of the 2008 plan's 21 factors makes it difficult for airports to take any proactive steps to impact their role in the system. The updated methodology should allow airports to understand why they are classified in a specific manner and have the ability to impact their classifications by increasing activity levels, service offerings, etc.
2. **Objectivity.** Arizona's airports should be classified using a quantitative, data-driven approach that is defensible and clear to all audiences.
3. **Capacity to conduct ongoing reviews.** The 2017 methodology should provide a straightforward process for assigning roles during the initial study and during interim updates conducted at the discretion of the ADOT Aeronautics Group (i.e., between full SASP updates as necessary).

2018 Update Methodology

Based on these primary goals and discussions with the ADOT Aeronautics Group and the PAC, the 2018 SASP Update developed a flow chart methodology that provides a systematic process for the classification of Arizona's airports, similar to states such as Kentucky and Ohio. The flow chart methodology applies a logical approach to categorize airports based on quantitative data that can be independently validated to evaluate the type and volume of activity occurring at an airport.

The flow chart methodology begins by categorizing commercial service airports into Commercial Service-International and Commercial Service-Domestic as follows:

1. **Commercial Service-International.** Year-round scheduled commercial service to international destinations
2. **Commercial Service-Domestic.** Scheduled commercial service to domestic destinations

[6] Chapter 3 (Identification of Airport Assets) provides additional information about state- and national-level aviation trends. A more detailed discussion about the ADOT Aeronautics Group's funding policies is provided in Chapter 2 (Review of Current Policy).

GA airports are then analyzed in more detail using a set of factors that mirror those employed by the FAA's ASSET Study.[7] The six factors to categorize GA airports in Arizona are:

1. FAA-designated reliever status
2. Number of instrument approach operations
3. Number of based aircraft
4. Number of based jets
5. Availability of JetA and/or AvGas (100LL)
6. Total operations

The relevancy of these factors as well as the source of data used in the classification analysis are described below.

FAA-Designated Reliever Status

GA airports with FAA-designated reliever status provide pilots with alternatives to using congested commercial service airports and provide GA access to the surrounding area. In addition to relieving congestion at nearby commercial service facilities, they can also help draw GA aircraft with less capacity and slower speeds from commercial service airports. This allows commercial service airports to operate more flights by larger aircraft and can help to keep the operating fleet more homogenous, potentially increasing the operational capacity of the airport. Data on FAA-designated reliever status were obtained from the *2017–2021 NPIAS Report*.

Number of Instrument Approach Operations

Instrument approach procedures (IAPs) are defined as series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport traditionally by the FAA. IAPs allow aircraft to land in inclement weather when visibility is low, allowing an airport to continue to serve the needs of the community despite poor weather conditions. This can be especially important in rural areas that depend on GA airports for emergency response; access; and economic activities such as air cargo, agricultural support, and corporate/business aviation. Data on the number of instrument approach operations were obtained from the FAA's Operational Network (OPSNET) for towered airports and Traffic Flow Management System Counts (TFMSCs) for non-towered facilities.

Based Aircraft

A based aircraft is an aircraft that is operational and air-worthy based at a specific facility for the majority of the year. Based aircraft are one of the best indicators of the level of activity occurring at an airport and reflect the role an airport is playing in meeting the air transportation and economic needs of the market it serves. Updated based aircraft data were obtained from airport management during the 2017 inventory process. If updated

[7] It is important to note that the analysis developed Arizona-specific parameters, as described in the following Roles Analysis and depicted in Table 9. Additionally, the Arizona aviation system includes 11 publicly owned, public-use non-NPIAS airports that are not classified by the ASSET study. While these non-NPIAS airports are not recognized as significant to the national airspace system, they play important roles in the state.

based aircraft data were unavailable, data were obtained from the most recent ADOT Airport System Manager (ASM) update.

Based Jets

A significant amount of business/corporate activity is conducted with jet aircraft. As a result, a based jet serves as a reliable sign of ongoing economic activity within the market that the airport serves. A based jet also indicates that an airport provides the facilities required by these larger and faster aircraft. Updated based jet data were obtained from airport management during the 2017 inventory. If updated based aircraft data were unavailable, data were obtained from the most recent ADOT ASM information.

Availability of JetA and/or AvGas

The type of fuel at an airport impacts the aircraft that a facility can support. JetA is used by turbine engines, while AvGas is used by piston-powered aircraft. Airports that offer JetA fuel have a greater ability to support the business/corporate aircraft fleet, while airports with AvGas draw a higher number of piston-powered aircraft than those facilities without fuel. Fuel sales can also provide an important source of revenue for airports. In Arizona, the majority of airports that offer JetA also provide AvGas. Data on fuel availability were obtained during the 2017 airport inventory.

Total Operations

The number of total operations at an airport reports the overall volume of flights occurring at the facility and offers key insight into airport activity. An aircraft operation represents either a take-off or a landing; for example, a touch-and-go, which includes a take-off and a landing, counts as two operations. This example is particularly relevant in Arizona, as the state experiences some of the highest levels of flight instruction in the nation. Some airports experience daily flight training activity (through touch-and-go operations), but have few based aircraft. Considering total operations in this evaluation helps capture the important role these types of airports play in this valuable economic activity.

At towered airports, annual operations were derived from FAA OPSNET. At non-towered airports, annual aircraft operations data were derived from updated airport data as estimated by the airport manager. If the airport manager did not have the means to accurately report annual operations, ASM data were used. Generally, ASM data corresponded with FAA 5010 Master Record data.

Classification Analysis

The availability of commercial service (domestic/international) and the six GA factors were used in a flow chart methodology that assigned airport roles based on specific parameters. **Table 9** describes the six roles developed in this study for the classification of Arizona's airports.[8] The 2008 SASP roles are included for comparison purposes. Details about the role parameters selected as part of this evaluation are also provided.

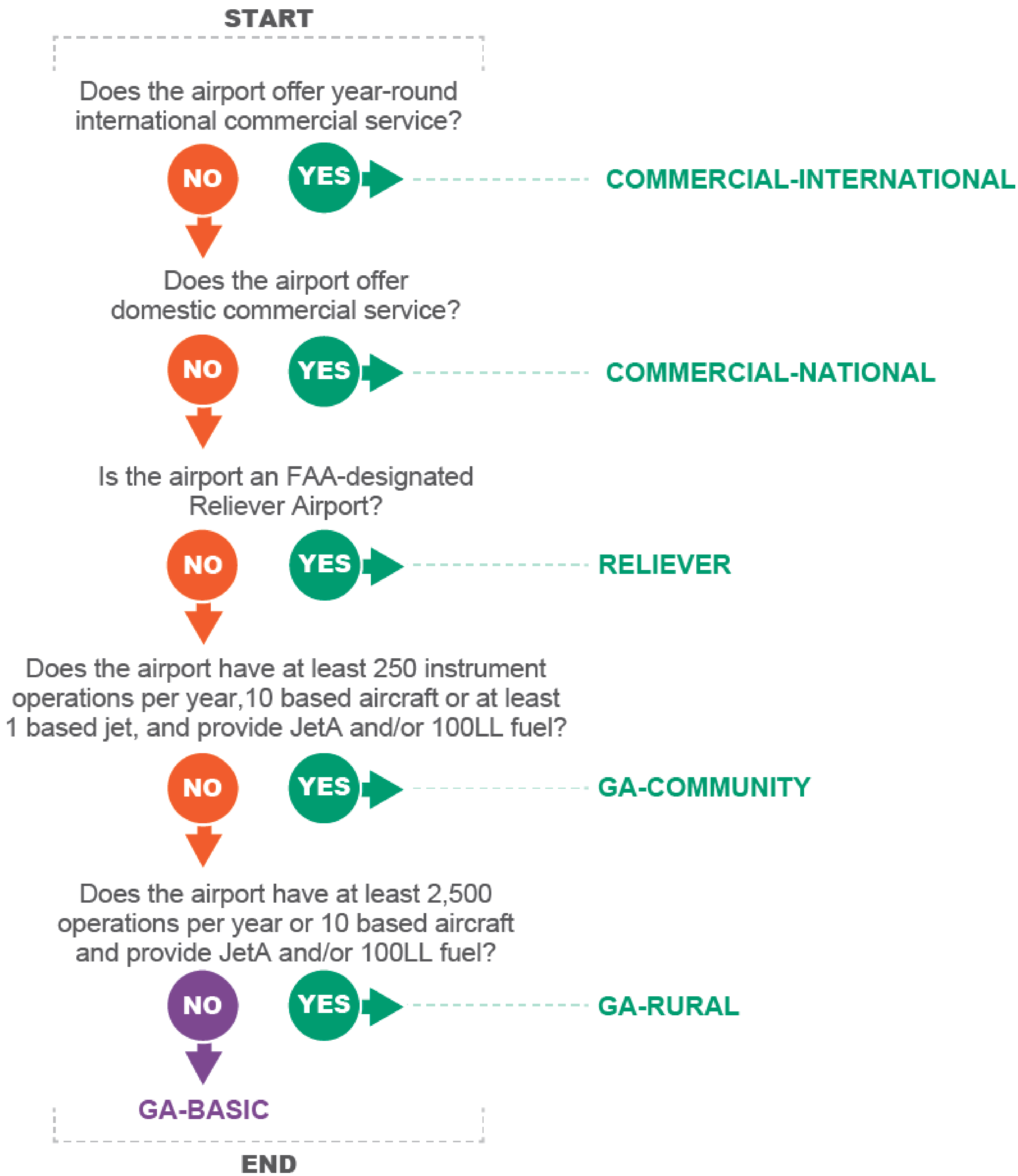
[8] The 2018 SASP Update evaluated three alternative methodologies reflecting low, medium, and high levels of activity at Arizona's GA airports. Appendix C provides the full results of this evaluation.

Table 9. Arizona Airport Classifications (2008 and 2017)

Classification/Role	2008 SASP	2018 SASP Update	
		Role Parameters	Typical Characteristics (Not Requirements)
Commercial Service-International	Publicly owned airports which enplane 2,500 or more passengers annually and receive scheduled passenger air service	International commercial service	Year-round scheduled commercial service to international destinations for people and cargo. High levels of activity with many jets and multiengine propeller aircraft.
Commercial Service-National		Domestic commercial service	Scheduled commercial service to domestic destinations for people and cargo. May provide seasonal scheduled commercial service to a limited number of international destinations. Moderate to high levels of activity with jets and multiengine propeller aircraft.
Reliever	FAA-designated airports that relieve congestion at a commercial service airport	FAA-designated airport that relieves congestion at a commercial service airport	Serves to relieve congestion at commercial service airports. Supports the national air system and provides access to markets across the U.S. Moderate to high levels of activity with jets and multiengine propeller aircraft.
GA-Community	Airports that serve regional economies, connecting to state and national economies, and serve all types of GA aircraft	250 instrument operations, 10 based aircraft or 1 based jet, and aircraft fuel	Support regional economies and provides access to markets in Arizona and nearby states. Moderate levels of activity with jets and multiengine propeller aircraft.
GA-Rural	Airports that serve a supplemental role in local economies, primarily serving smaller business, recreational, and personal flying	2,500 operations or 10 based aircraft and aircraft fuel	Supplements local economies and provides access to markets in Arizona with limited activity in nearby states. Moderate to low levels of activity with few or no jets and multiengine propeller aircraft.
GA-Basic	Airports that serve a limited role in the local economy, primarily serving recreational and personal flying	All other GA airports	Supports local communities by providing GA services such as emergency response services, charter or medical flights, wildland firefighting, or recreational flying. Low levels of activity primarily composed of single or multiengine piston aircraft.

Sources: Kimley-Horn 2017 and Wilbur Smith Associates 2008

Figure 3 provides the flow chart methodology of the 2018 SASP Update.



Source: Kimley-Horn 2017

Figure 3. 2018 SASP Update Flow Chart Methodology

Airport Role Definitions

This flow chart methodology was applied to the publicly owned, public-use airports that comprise the Arizona system. **Table 10** summarizes the results of this analysis by classification and compares the results to the 2008 SASP roles. Note that the 2008 SASP evaluated 83 airports in the Arizona system; however, the 2018 SASP Update includes 67 airports, primarily due to the exclusion of privately owned, public-use airports.

Table 10. Summary Results

Classification/Role	Number of Airports (No.)		Percent of Total Airports (%)	
	2008 SASP	2018 Update	2008 SASP	2018 Update
CS*-International	11	2	14%	3%
CS-National		9		13%
Reliever	8	8	10%	12%
GA-Community	29	18	32%	27%
GA-Rural	25	17	32%	25%
GA-Basic	10	13	12%	19%

Note: CS = Commercial Service

Sources: Kimley-Horn 2017 and Wilbur Smith Associates 2008

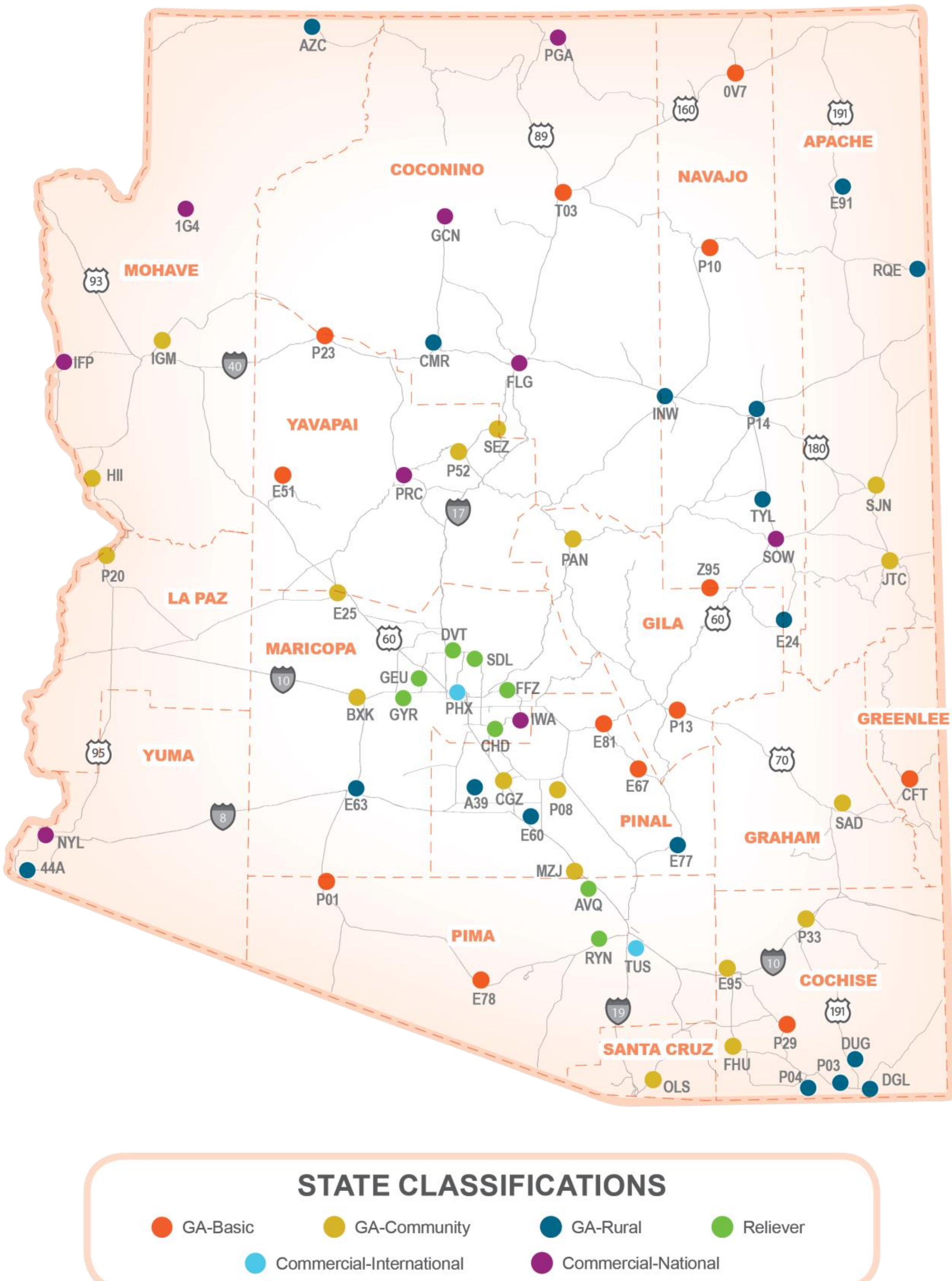
Table 11 lists Arizona's airports by associated city and identifies their updated classification developed as part of the 2018 SASP Update. **Appendix B** provides the data used in the classification analysis. These results represent the initial airport roles that are used as a baseline for further analyses of the system in subsequent chapters. **Figure 4** graphically depicts the 2018 SASP Update classification of Arizona's airports.

Table 11. 2018 SASP Update Classification Summary

Associated City	Airport Name	FAA Identifier	2018 SASP Classification
Ajo	Eric Marcus Municipal	P01	GA-Basic
Bagdad	Bagdad	E51	GA-Basic
Benson	Benson Municipal	E95	GA-Community
Bisbee	Bisbee Municipal	P04	GA-Rural
Buckeye	Buckeye Municipal	BXK	GA-Community
Bullhead City	Laughlin/Bullhead City International	IFP	CS-National
Casa Grande	Casa Grande Municipal	CGZ	GA-Community
Chandler	Chandler Municipal	CHD	Reliever
Chinle	Chinle Municipal	E91	GA-Rural
Cibecue	Cibecue	Z95	GA-Basic
Clifton	Greenlee County	CFT	GA-Basic
Colorado City	Colorado City Municipal	AZC	GA-Rural
Coolidge	Coolidge Municipal	P08	GA-Community
Cottonwood	Cottonwood Municipal	P52	GA-Community
Douglas	Bisbee-Douglas International	DUG	GA-Rural
Douglas	Cochise College	P03	GA-Rural
Douglas	Douglas Municipal	DGL	GA-Rural
Eloy	Eloy Municipal	E60	GA-Rural
Flagstaff	Flagstaff Pulliam	FLG	CS-National
Gila Bend	Gila Bend Municipal	E63	GA-Rural

Associated City	Airport Name	FAA Identifier	2018 SASP Classification
Glendale	Glendale Municipal	GEU	Reliever
Globe	San Carlos Apache	P13	GA-Basic
Goodyear	Phoenix Goodyear	GYR	Reliever
Grand Canyon	Grand Canyon National Park	GCN	CS-National
Holbrook	Holbrook Municipal	P14	GA-Rural
Kayenta	Kayenta	0V7	GA-Basic
Kearny	Kearny	E67	GA-Basic
Kingman	Kingman	IGM	GA-Community
Lake Havasu City	Lake Havasu City	HII	GA-Community
Marana	Marana Regional	AVQ	Reliever
Marana	Pinal Airpark	MZJ	GA-Community
Maricopa	Ak-Chin Regional	A39	GA-Rural
Mesa	Falcon Field	FFZ	Reliever
Nogales	Nogales	OLS	GA-Community
Page	Page Municipal	PGA	Commercial-National
Parker	Avi Suquilla	P20	GA-Community
Payson	Payson	PAN	GA-Community
Peach Springs	Grand Canyon West	1G4	CS-National
Phoenix	Phoenix Deer Valley	DVT	Reliever
Phoenix	Phoenix Sky Harbor	PHX	CS-International
Phoenix	Phoenix-Mesa Gateway	IWA	CS-National
Polacca	Polacca	P10	GA-Basic
Prescott	Ernest A. Love Field	PRC	CS-National
Safford	Safford Regional	SAD	GA-Community
San Luis	Rolle Airfield	44A	GA-Rural
San Manuel	San Manuel	E77	GA-Rural
Scottsdale	Scottsdale	SDL	Reliever
Sedona	Sedona	SEZ	GA-Community
Seligman	Seligman	P23	GA-Basic
Sells	Sells	E78	GA-Basic
Show Low	Show Low Regional	SOW	Commercial-National
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	GA-Community
Springerville	Springerville Municipal	JTC	GA-Community
St. Johns	St. Johns Industrial Air Park	SJN	GA-Community
Superior	Superior	E81	GA-Basic
Taylor	Taylor	TYL	GA-Rural
Tombstone	Tombstone Municipal	P29	GA-Basic
Tuba City	Tuba City	T03	GA-Basic
Tucson	Ryan Field	RYN	Reliever
Tucson	Tucson International	TUS	CS-International
Whiteriver	Whiteriver	E24	GA-Rural
Wickenburg	Wickenburg Municipal	E25	GA-Community
Willcox	Cochise County	P33	GA-Community
Williams	H.A. Clark Memorial Field	CMR	GA-Rural
Window Rock	Window Rock	RQE	GA-Rural
Winslow	Winslow-Lindbergh Regional	INW	GA-Rural
Yuma	Yuma International	NYL	CS-National

Source: Kimley-Horn 2017



Source: Kimley Horn 2017

Figure 4. 2018 SASP Update Airport Classifications

FACILITY AND SERVICE OBJECTIVES

To create a truly functional aviation system—one that safely, securely, and efficiently meets the needs of all users—it is important to identify the facilities and services that each classification of airport should offer to perform its role. Facility and service objectives present the recommended minimum level of development an airport should purse in accordance with its classification. They offer specific guidance on how airports can improve their abilities to serve constituents and enhance the statewide aviation system.

It is important to note that facility and service objectives are not requirements, but instead provide a baseline for consideration during planning processes. An airport that offers facilities and services above or below the objectives can still be fulfilling its role based on local needs and context; however, the inability to meet certain guidelines may impact the future functionality of the system. The reduction or removal of facilities and services was not considered during this analysis.

Defining Facility and Service Objectives

The facility and service objectives of the 2018 SASP Update represent the components of an airport with the greatest potential to significantly impact the type and amount of activity that can occur there. The study evaluated the following airport components for each of the six classifications of the Arizona aviation system:

1. **Airside Facilities**[9]
   - Airport Reference Code (ARC)
   - Runway length, width, and surface
   - Taxiway type and width
   - IAPs
   - Visual aids
   - Runway and taxiway lighting
   - Approach lighting systems (ALSs)
2. **Landside Facilities**
   - Airport fencing
   - Aprons and tie-downs
   - Hangars
   - Terminal buildings
   - Automobile parking
3. **Landside Services**[10]
   - Automated weather reporting
   - Fixed base operator (FBO)
   - Air taxi/charter
   - Aircraft rental
   - Aircraft maintenance
   - Avionics sales and service
   - Aircraft fuel: AvGas and Jet A
   - Deicing
   - Oxygen
   - Snow Removal
   - Ground transportation
   - On-site rental car
   - Internet access
   - Phone access
   - Restroom
   - U.S. Customs

[9] Chapter 3 (Identification of Airport Assets) defines the meaning and relevancy of each of the general airfield facilities within the context of a statewide aviation system plan.

[10] The 2018 SASP Update conducted an online survey of Project Advisory Committee (PAC) members in August 2017 to assist in defining the service objectives for the Arizona aviation system. The survey results have been incorporated in the criteria provided in Table 12.

Table 12 defines the facility and service objectives of the Arizona aviation system by airport classification. In subsequent analyses, the criteria presented in this table will be used to evaluate the performance of the existing aviation system. That analysis will serve as the baseline for the development of possible system enhancements and recommendations.

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Table 12. Facility and Service Objectives Criteria by Classification

Objective Criteria	Minimum Objectives by Airport Classification					
	CS-International	CS-National	Reliever	GA-Community	GA-Rural	GA-Basic
			Airside Facility Objectives			
ARC	Consistent with master plan	Consistent with master plan	C-III	B-II	B-I	A-I
Runway Length	Consistent with master plan	Consistent with master plan	Accommodate 75% of large aircraft at 90% useful load	Accommodate 75% of large aircraft at 60% useful load	Accommodate 75% of small airplanes	Maintain existing
Runway Width	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards
Runway Surface	Asphalt/paved	Asphalt/paved	Asphalt/paved	Asphalt/paved	Asphalt/paved (desired)	Gravel/dirt (minimum)
Taxiway Type and Width	Consistent with master plan	Consistent with master plan	Full parallel Width per ARC	Full or partial parallel Width per ARC	Full or partial parallel, connectors, or turnarounds Width per ARC	None
Instrument Approach Procedures	Precision (desired) Near-precision (minimum)	Precision (desired) Near-precision (minimum)	Near-precision (desired) Non-precision (minimum)	Non-precision	Non-precision or circling	None
Visual Aids	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Wind cone Segmented circle VGSIs	Wind sock
Runway and Taxiway Lighting	HIRL/HITL (desired) MIRL/MITL (minimum)	HIRL/HITL (desired) MIRL/MITL (minimum)	MIRL/MITL	MIRL/MITL	MIRL/MITL	Reflectors
Approach Lighting Systems	ALS	ALS	ALS (desired)	None	None	None
			Landside Facility Objectives			
Airport Fencing	Perimeter fencing Controlled access	Perimeter fencing Controlled access	Perimeter fencing Controlled access	Perimeter fencing	Perimeter fencing	Perimeter fencing (desired)
Aprons and Tie-Downs	N/A	N/A	Apron (25% of based fleet and 75% for transient)	Apron (40% of based fleet and 50% for transient)	Apron (50% of based fleet and 25% for transient)	Apron
Hangars	N/A	N/A	Hangars (75% of based fleet and 25% overnight)	Hangars (60% of based fleet and 25% overnight)	Hangars (50% of based fleet and 25% for transient)	
Terminal Buildings	N/A	N/A	Terminal with pilot's lounge	Terminal with appropriate facilities		

Objective Criteria	Minimum Objectives by Airport Classification					
	CS-International	CS-National	Reliever	GA-Community	GA-Rural	GA-Basic
Auto Parking	Yes	Yes	Yes	Yes	Yes	Yes
Landside Service Objectives						
Automated Weather Reporting	Yes	Yes	Yes	Yes	Yes	
FBO			Yes	Yes		
Air Taxi/Charter	Yes	Yes	Yes			
Aircraft Rental		Yes	Yes	Yes		
Aircraft Maintenance	Yes	Yes	Yes	Yes		
Avionics Sales and Service	Yes	Yes	Yes			
Aircraft Fuel	AvGas and JetA	AvGas and JetA	AvGas and JetA	AvGas and JetA	AvGas	
Deicing	Yes	Yes				
Oxygen	Yes	Yes	Yes	Yes		
Snow Removal	As needed	As needed				
Ground Transportation	Yes	Yes	Yes	Yes	Yes	Yes
On-Site Rental Car	Yes	Yes				
Internet Access	Yes	Yes	Yes	Yes		
Phone Access	Yes	Yes	Yes	Yes	Yes	Yes
Restroom	Yes	Yes	Yes	Yes	Yes	
U.S. Customs	Yes	Yes	Yes			

Acronyms: *ALS = Approach lighting system* · *HIRL = High-intensity runway lights* · *MITL = Medium-intensity taxiway lights*
ARC = Airport reference code · *HITL = High-intensity taxiway lights* · *REILs = Runway-end indicator lights*
FBO = Fixed-base operator · *MIRL = Medium-intensity runway lights* · *VGSIs = Visual glide slope indicators*

Source: Kimley-Horn 2017

PRIMARY COMPONENTS OF THE ARIZONA AVIATION INDUSTRY

State airport role and classification methodologies often group airports based on available services, infrastructure, and volume of aviation activity. These same types of criteria can likewise drive the type of activity that occurs at an airport. As depicted in **Figure 5**, an interplay arises between an airport's role or classification, the type of activity the airport is best equipped to support, and the facilities and services it offers. This relationship can drive project implementation, as airports prioritize improvement projects during long-term planning efforts based, in part, on the specific needs of the primary users.

Figure 5. Relationship Between Roles, Aviation Activity, and Facilities and Services

The 2012 *Economic Impact of Aviation in Arizona* study (Economic Impact Study) documented the seven most significant components of Arizona's aviation industry, including commercial and GA, off-airport aviation services, aerospace manufacturing, military, aviation education, business aviation, and tourism. In total, these activities contribute $58.0 billion to the state's economy and support 408,000 jobs generating over $21 billion in payroll. Airports should consider the facilities and services required to most effectively support these activities to further enhance aviation's economic impact to the state. The economic impacts of the seven primary components of the Arizona aviation industry by percent of total are depicted in **Figure 6**. Descriptions of each primary component of Arizona's aviation industry and the associated economic impact from the 2012 study are provided below.

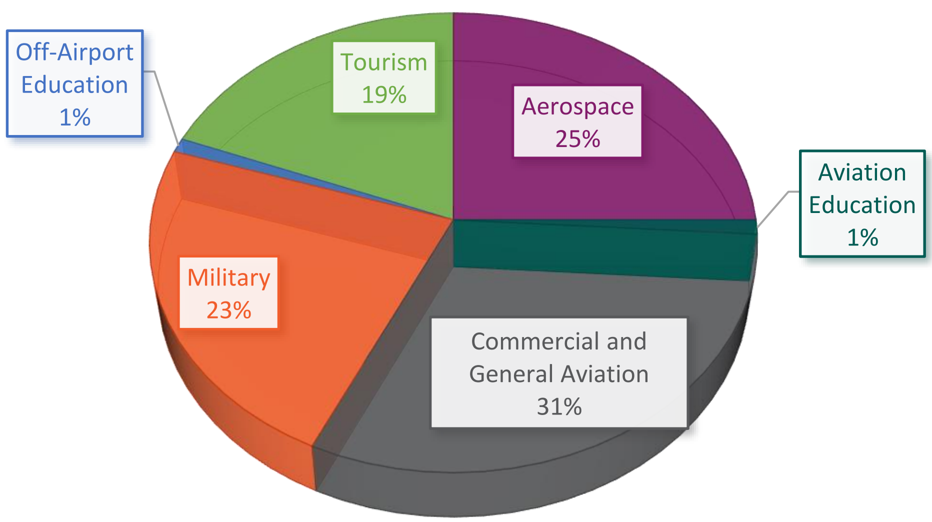

Figure 6. Economic Impact of Primary Components of Arizona's Aviation Industry by Percent of Total

Commercial Aviation

Arizona's commercial service airports provide the gateway for the majority of tourists traveling to the state and represent one of the largest economic impacts of the aviation industry. In total, the 2012 Economic Impact Study estimated that the 12 evaluated commercial service airports generate 125,000 jobs and $20.5 billion total economic impact in the state.[11] The major air carriers generate 40 percent of all jobs and 48 percent of the total economic activity, followed by air cargo and couriers with 22 percent of all jobs. Phoenix Sky Harbor International Airport (PHX) and Tucson International Airport (TUS) provide the largest share of the total impact. Between 2002 and 2011, 88 percent of all enplanements in the state occurred at PHX and eight percent occurred at TUS.

General Aviation

The 2012 Economic Impact Study reported that Arizona ranks fifth in the U.S. in the number of active aircraft and 12th in the number of aircraft per capita. Phoenix Deer Valley (DVT), Ernest A. Love Field (PRC), and Falcon Field (FFZ) are among the top ten busiest GA airports in the country. In 2011, DVT ranked as the busiest in the nation with over 300,000 operations. GA airports support recreational and flight training activity, as well as numerous services that support safety, resiliency, access, and mobility such as aerial firefighting, search and rescue operations, emergency medical transport, and law enforcement. In total, GA airports supports 6,860 jobs generating $261 million in wages with a total economic output of $609 million.

Aerospace

Aerospace is one of the state's most important industries with some of the world's largest aerospace companies conducting significant operations in the state include Boeing, General Dynamics, Honeywell, and Raytheon. Arizona's concentration of aerospace employment is 2.5 times greater than the average across the U.S. economy with salaries 52 percent higher than the state average. In total, aerospace supports 103,200 jobs with an annual payroll of $7.1 billion and total economic output of $20.4 billion.

Military

The State of Arizona is home to numerous military facilities with missions that range from regular fighter and transport aircraft operations to specialized Unmanned Aerial System (UAS) applications. Some of the larger and more specialized facilities include Davis-Monthan Air Force Base (AFB), Luke AFB, Libby Army Airfield, and Marine Corps Air State Yuma. While comprehensive information about economic activity at military installations in not available, Arizona's military presence results in an estimated total impact of 92,103 jobs, $3.8 billion in wages, and $7.6 billion in economic output.

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[11] The 2012 Economic Impact Study included 12 commercial service airports instead of the 11 included in the 2008 SASP and 2018 SASP Update. The 2012 study listed Kingman Airport (IGM) as commercial service airport; however, IGM does not currently offer scheduled commercial service and is therefore evaluated as a GA airport.

Aviation Education

Arizona has the second highest number of flight instructors per capita in the U.S., which is largely attributable to the state's excellent flying conditions. In addition to flight instruction, specialized aviation degree programs are offered at several institutions of higher education including Arizona State University, Cochise College, and Embry-Riddle Aeronautical University. In consideration of the international pilot shortage, demand for aviation professionals will continue to drive demand through the foreseeable future. In total, aviation education is reported to support 2,166 jobs generating $84.1 million in wages and $174 million in total economic activity.

Tourism

According to the 2012 Economic Impact Study, more than 9.9 million out-of-state visitors traveled to Arizona by air in 2011. Approximately 7.4 million visitors arrived via scheduled commercial service and spent an estimated $4.8 billion on lodging, dining, transportation, entertainment, and retail purchases. Another 2.5 million visitors were estimated to travel to Arizona by GA aircraft and spend an estimated $72.4 million. Together, the impact of visitors who traveled to Arizona by air resulted in 76,838 jobs, $2.6 billion in annual wages, and $8.1 billion in total economic output.

The Arizona Office of Tourism presented updated data on the economic impact of the state's travel industry in *Arizona Travel Impacts (1998-2016p).* According to the 2017 report, the travel industry had its second year of exceptionally strong growth by the end of 2016, following mostly modest growth following the recession of 2007 to 2009. The total number of domestic travelers visiting the state experienced 5.4 percent and 7 percent year-over-year growth in 2015 and 2016 (respectively). Concurrently, the foreign share of intra-U.S. travel declined almost a full percentage point from 2015 to 2016 (18.2 percent to 17.2 percent). Visitors also spent more than previous years: real travel spending annually increased 1.8 percent between 2009 and 2013. However, the number of visitors who arrived by air remained essentially flat between 2009 and 2013. In total, Arizona's travel industry resulted in a $9.2 billion gross domestic product in 2016.

Business Aviation

According to the 2012 Economic Impact Study, approximately 11 percent of all private businesses rely on aviation for business travel and 2.3 percent use aviation for air cargo shipments. These estimates equate to nearly 58,000 trips in a year and over 33,000 cargo shipments. Together, the value of the trips and shipments to the aviation industry totaled $49.2 million per year. Additionally:

1. 20 percent of businesses indicated that 50 percent or more of their business activity is dependent on the existence of an airport
2. 30 percent of businesses that utilize aviation reported that sales would decrease if a nearby airport was unavailable
3. 17 percent of airports said that would relocate if an airport was no longer available or commercial service was decreased
4. 37 percent of businesses that utilize aviation noted that they have customers, suppliers, and/or vendors that rely on aviation to do business with them. For large employers with more than 100 employees, that figure reaches 60 percent

Off-Airport Aviation

In the 2012 Economic Impact Study, the off-airport aviation industry indicator served as a category to account for air carrier-related business headquarters, call centers, and other air carrier business operations. Since that time, the U.S. Airways merged with American Airlines its headquarters was moved out of the state. As a result, this type of economic impact has been greatly reduced. At the time of the study, off-airport aviation supported 4,112 jobs generating $384.9 million in payroll with a total economic contribution of $466.8 million.

Considered together, the seven components of aviation activity in Arizona produced an estimated $3 billion in state and local taxes in 2011; that figure has likely only risen since the 2012 Economic Impact Study was completed. In short, Arizona's aviation industry produces significant economic impacts across the state and can have major impacts on local and regional economies. Arizona's airports should proactively work to provide the services and facilities that foster the success of these key aspects of aviation.

SUMMARY

This chapter provides an overview of the classification of Arizona's airports. The chapter first reviewed the FAA's classification methodology used by the NPIAS and provided an explanation of the ASSET classifications developed to capture the unique role of GA facilities in the NAS. While the federal classification methodologies are important on a national level, they are insufficient to describe the role airports play at the state level.

Following an evaluation of the existing role classification scheme developed during the 2008 SASP, the 2018 SASP Update developed a flow chart methodology tailored specifically to capture the unique functions that Arizona's airports provide on a state scale. This methodology offers a systematic process to objectively categorize Arizona's airports into six classifications primarily based on the type and volume of aviation activity that an airport supports. Facility and service objectives were identified for each classification to provide minimum development recommendations for airports. The chapter concluded by providing an overview of how airport classifications and the associated service and facilities objectives can be used to support the key components of Arizona's aviation industry.

The classifications established in this chapter will be used in later analyses to:

1. Assess the performance of the existing system
2. Evaluate the ability of Arizona's airports to function as a system
3. Identify areas of deficiency or overlap in aviation services
4. Prioritize recommendations based on areas of greatest need

CHAPTER SIX: CURRENT AVIATION SYSTEM PERFORMANCE

INTRODUCTION

As previously discussed, the 2018 State Aviation System Plan (SASP) Update system goals and performance measures were enhanced and refined compared to the 2008 SASP. For the 2018 SASP Update, three goals were established to describe a statewide system of airports that fully meets the needs of citizens, visitors, and businesses. The goals established to evaluate the system are presented in order of priority as follows:

1. **Safety and security.** Arizona should maintain a safe and secure airport system as measured by compliance with applicable safety and security standards while supporting health and safety-related services and activities.
2. **Fiscal responsibility.** Arizona should implement cost-effective investment strategies to meet current and projected demand while remaining adequately accessible to Arizona's citizens, visitors, and businesses.
3. **Economic support.** Arizona should advance a system of airports that promote Arizona's economic growth and development.

Based on these goals, performance measures and system indicators were developed that provide the framework for measuring the system's ability to achieve existing and future demands, while assessing the overall health and adequacy of the aviation system. Performance measures quantitatively evaluate specific aspects of system performance that can be directly affected by project funding, policies, and other external inputs. System indicators are a new measurement tool in the 2018 SASP Update that generally serve as reporting mechanisms on aspects of system performance that cannot be affected by project funding, policies, and inputs. However, some indicators may influence a policy decision and/or be related to a performance measure that has an action associated with enhancing the system's performance. Performance measures and system indicators provide insight in three primary areas:

1. Areas of the state where the system can sufficiently serve existing and future needs
2. Specific airport or system deficiencies within the state
3. Areas of surplus or duplication of service within the system

Another way to guide system performance is to develop objectives for airport facilities and services, based on an airport's role. **Chapter 5: Airport Classifications Analysis** described the process and results of the role classification for each airport in the system. The objectives set for each classification: Commercial Service-International; Commercial Service-National; Reliever; General Aviation (GA)-Community; GA-Rural; and GA-Basic are detailed in **Appendix E.** A summary of objectives by airport role is provided at the end of this chapter.

The following three sections of this chapter present an analysis of the performance measures and performance indicators associated with each goal, with analysis based on each airport role classification. The primary source of data for the evaluation was the 2018 SASP Update inventory effort, with several other sources including the Federal Aviation Administration (FAA), Arizona Department of transportation (ADOT) Aeronautics Group, and other third-party sources also utilized. Each data source is noted by performance measure or system indicator. All results are presented by airport role and the system as a whole. Additional details about the data collection process for the 2018 SASP Update are provided in **Chapter 3: Identification of Airport Assets**.

GOAL CATEGORY: SAFETY AND SECURITY

One of the most common phrases associated with airport planning and design is “safety first.” The safety of pilots and passengers in the sky, as well as individuals and property on the ground, must remain at the forefront of all policies, projects, procedures, and other components of aviation. Accordingly, safety and security are keystones of a properly functioning aviation system.

The FAA and the State of Arizona have established safety standards designed to mitigate risks to people and property associated with aviation. While a full assessment of an individual airport’s full compliance with standards is generally a function of the master planning process, it is important for a statewide system plan to provide an overview of the system’s ability to conform to appropriate standards.

Performance Measures

This section discusses results of the system-wide evaluation of the performance measures associated with the safety and security goal category. All of the analyses reported below utilize data from the 2018 SASP Update Airport Inventory and Data Survey Form. Performance measures evaluated include:

1. Percent of airports capable of supporting medical operations
2. Percent of airports with surrounding municipalities that have adopted controls/zoning, including “disclosure areas,” to make land use in the airport environs compatible with airport operations and development
3. Percent of airports controlling all primary runway end Runway Protection Zones (RPZs)
4. Percent of airports that have Runway Safety Areas (RSAs) on their primary runway that meet the standards for their current airport reference code (ARC)
5. Percent of airports with clear approaches

Percent of Airports Capable of Supporting Medical Operations

Medical flights offer access to patients in need of specialized or emergency medical care, as well as transport of healthcare personnel to rural areas to provide care. These services are particularly important for residents of remote and/or Tribal communities without nearby access to medical facilities. Providing a network of airports to connect medical professionals with patients is one of the most important functions an aviation system can provide. Both rotorcraft and fixed-wing aircraft are used to support medical operations, and both offer a number of distinct advantages over ground ambulances in certain situations. During emergencies, medical personnel have a certain timeframe to transport patients to an appropriate facility to maximize their chances of survival and recovery. Rotorcraft typically serve patients in true emergency situations when immediate care is literally a matter of life or death. Rotorcraft offer flexibility because they can land almost anywhere, including helipads located at some trauma centers. However, rotorcraft have limited fuel capacity and can only travel a relatively short distance without refueling.

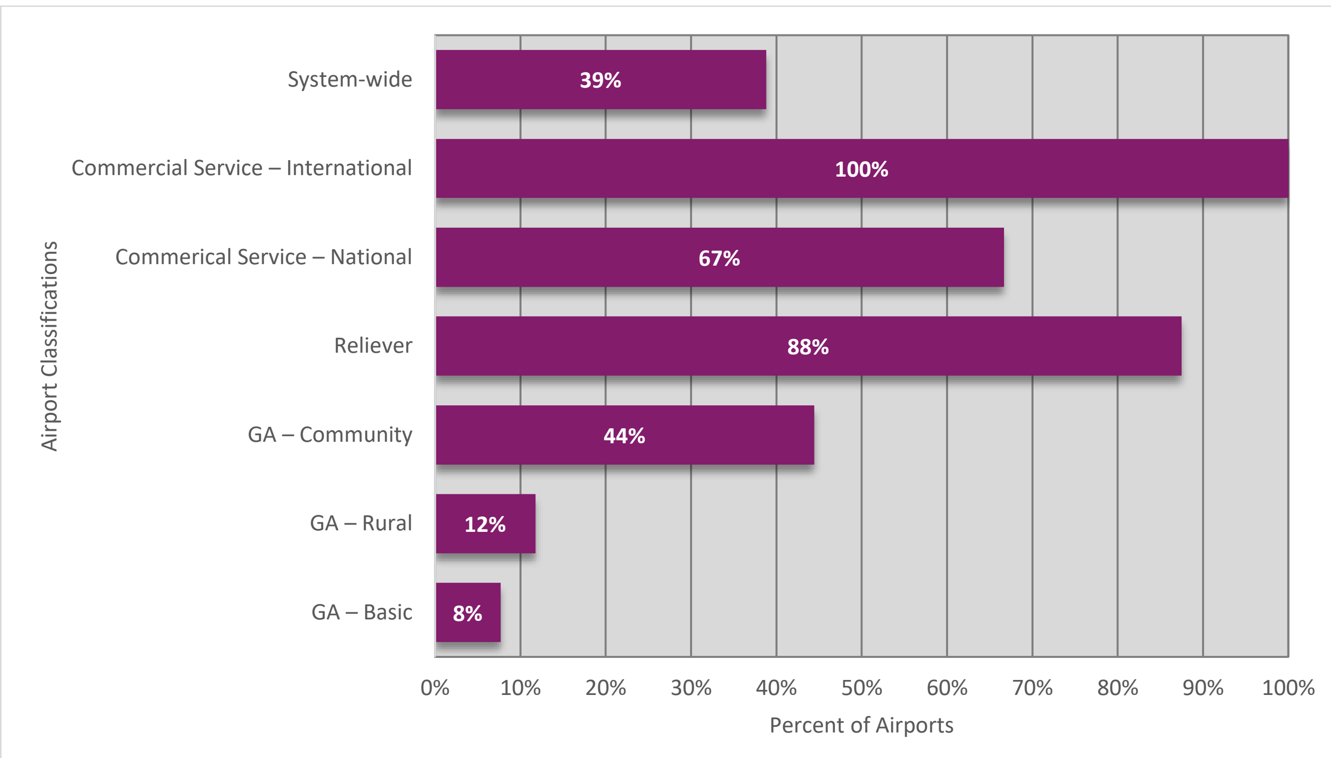
Because they need an adequate runway on which to operate, fixed-wing aircraft have far less flexibility than rotorcraft. However, they have a much longer range and can be less costly to operate. They can still offer life-supporting care for patients who are critically ill or injured. Accordingly, fixed-wing aircraft are generally used to transport patients between hospitals when injuries or illnesses occur beyond the range of most rotorcraft or

when medical conditions do not warrant the urgency that rotorcraft provide. Additionally, medical personnel traveling to remote locations to provide healthcare typically use fixed-wing aircraft as long as an adequate runway is available.

Based on industry standards and discussions with medical operators in Arizona, an airport was considered capable of supporting medical operations for fixed-wing aircraft if it met the following four criteria:

1. Primary runway length ≥ 4,000 feet
2. Fuel service provided 24 hours/7 days a week (24/7)
3. Non-precision instrument (NPI) approach capability
4. Weather reporting[1]

Figure 1 presents the percentage of SASP airports that meet the identified criteria for supporting medical operations.



Source: Airport Inventory and Data Survey 2017

Figure 1. Percent of Airports that Meet Criteria to Support Medical Operations

System-wide, 39 percent of airports were identified as having the four characteristics that generally indicate adequate support for medical operations by fixed-wing aircraft. One hundred percent of Commercial Service-International and 67 percent of Commercial Service-National achieve the four criteria.

[1] 4,000 feet of runway length was used as the baseline; however, airports at higher elevations will require a longer runway length.

Amongst the GA classifications, 88 percent of Reliever airports, 44 percent of GA-Community, 12 percent of GA-Rural, and 8 percent of GA-Basic have the facilities to support medical operations.

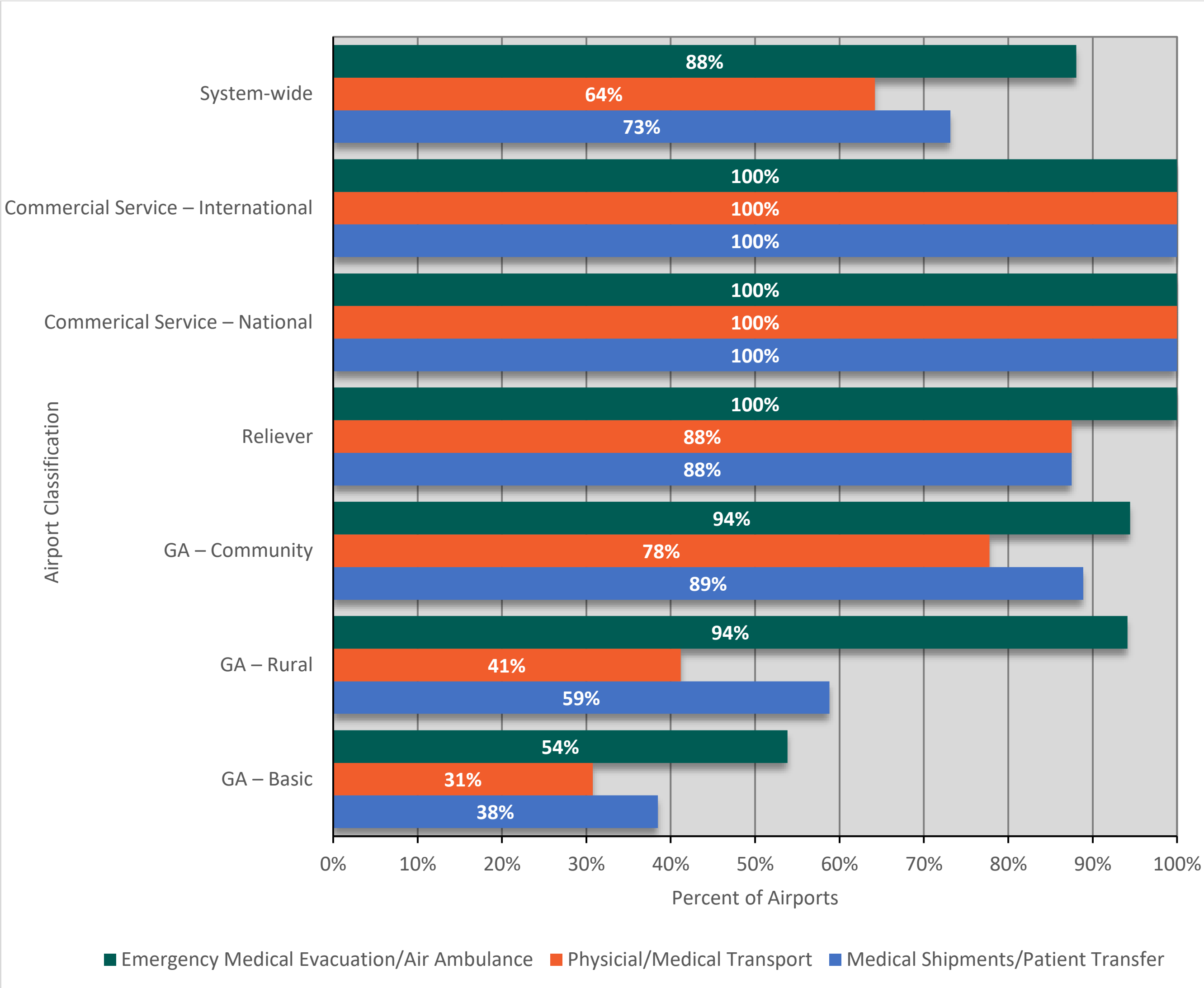
The four criteria outlined above describe those airports which can optimally support fixed-wing medical flights. Yet airports across the state regularly accommodate medical operations with more limited facilities and services. Rotorcraft, which are generally used for short, time-sensitive patient transport, do not need a 4,000-foot runway, but would benefit from 24/7 fuel, at least a NPI approach procedure, and weather reporting capabilities. Additionally, many airports can accommodate fixed-wing aircraft during visual flight rules (VFRs), thereby requiring neither an instrument approach procedure (IAP) nor weather reporting when conditions are favorable.

An example of accommodating medical operations with limited facilities and services can be seen at an airport in eastern Arizona with a 3,400-foot runway, reporting that it at least occasionally supports various types of medical flights. Despite its relatively short runway length, the airport is the only facility in the region that provides an IAP and weather reporting. These services become critical during the winter weather conditions characteristic of that area of the state. Thus, while the airport does not meet the four criteria to optimally support medical operations, it literally plays a lifesaving role for residents and visitors to the region.

To capture the full extent of medical operations occurring in Arizona, airport managers/sponsors were asked if their airport accommodates any of the following types of activities by either fixed-wing aircraft or rotorcraft:

1. Emergency medical evacuation/air ambulance
2. Physician/medical transport
3. Medical shipments/patient transfer

Figure 2 presents the results of SASP airports by role that replied they accommodate any level of medical operations, regardless of runway length, approaches, or facilities. In total, 88 percent of SASP airports indicated they accommodate emergency medical evacuation/air ambulance, 64 percent accommodate physician/medical transport, and 73 percent accommodate medical shipments/patient transfer.



Source: Airport Inventory and Data Survey 2017

Figure 2. Percent of Airports Accommodating Medical Operations

Percent of Airports with Surrounding Municipalities that have Adopted Controls/Zoning, Including "Disclosure Areas," to Make Land Use in the Airport Environs Compatible with Airport Operation and Development

Protecting the land use and airspace around an airport is critical to an airport's long-term viability. In general, the objective of airport compatible land use is to promote development that is considered compatible with airports and preclude incompatible uses such as residential areas, schools, hospitals, and churches near airports. While aircraft noise is one of the most recognized incompatibility concerns, issues such as future airport expansion potential, the safety of people and property (both in the sky and on the ground), and environmental impacts also influence the types of development and activities considered compatible with airport operation and development.

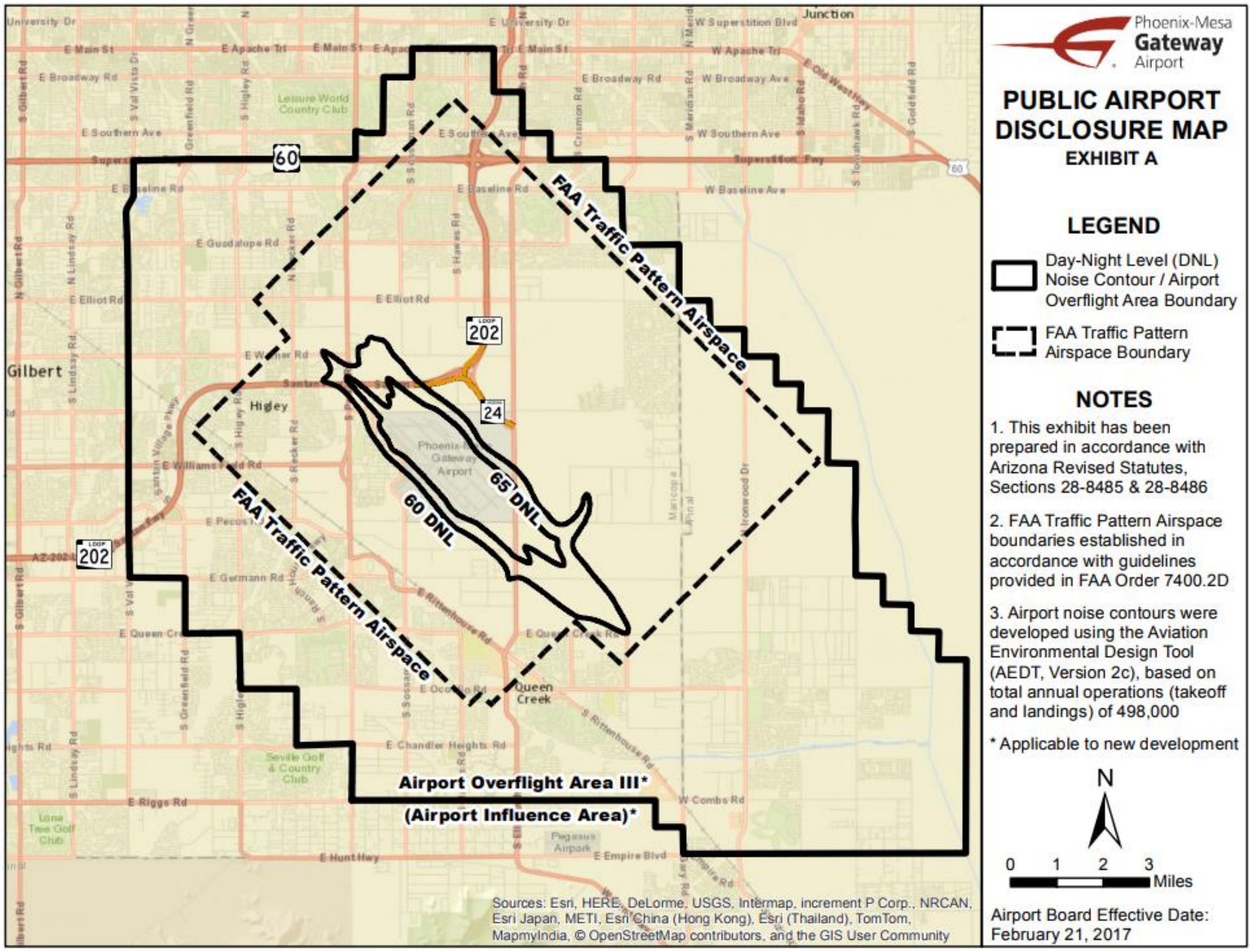
Although the FAA has developed standards and programs designed to promote airport land use compatibility, the primary responsibility for regulating development in the vicinity of an airport lies with local governments. Municipal governments are responsible for preparing comprehensive plans and reviewing and implementing zoning and land use policies that consider impacts to their local airport. Controls such as height and land use zoning aim to reduce incompatible land uses and activities in an airport's immediate environs.

In Arizona, political subdivisions of the state that operate a public airport are also responsible for complying with Arizona Revised Statute (A.R.S.) 28-8485.[2] This statute mandates that airports must identify the area surrounding its facility on an airport disclosure map to notify existing or potential property owners that the area is subject to aircraft noise and overflights. This area is defined as the property within the airport's traffic pattern airspace as defined by the FAA and experiences a day-night average sound level as follows:

1. 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 (CFR) Part 150.
2. 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.

Once identified, the airport is required to file the airport disclosure map with the Arizona Department of Real Estate. **Figure 3** shows an example of one such document, the public airport disclosure map for the Phoenix-Mesa Gateway Airport. **Chapter 2: Review of Current Policies** provides further details regarding airport disclosure maps and airport influence areas.

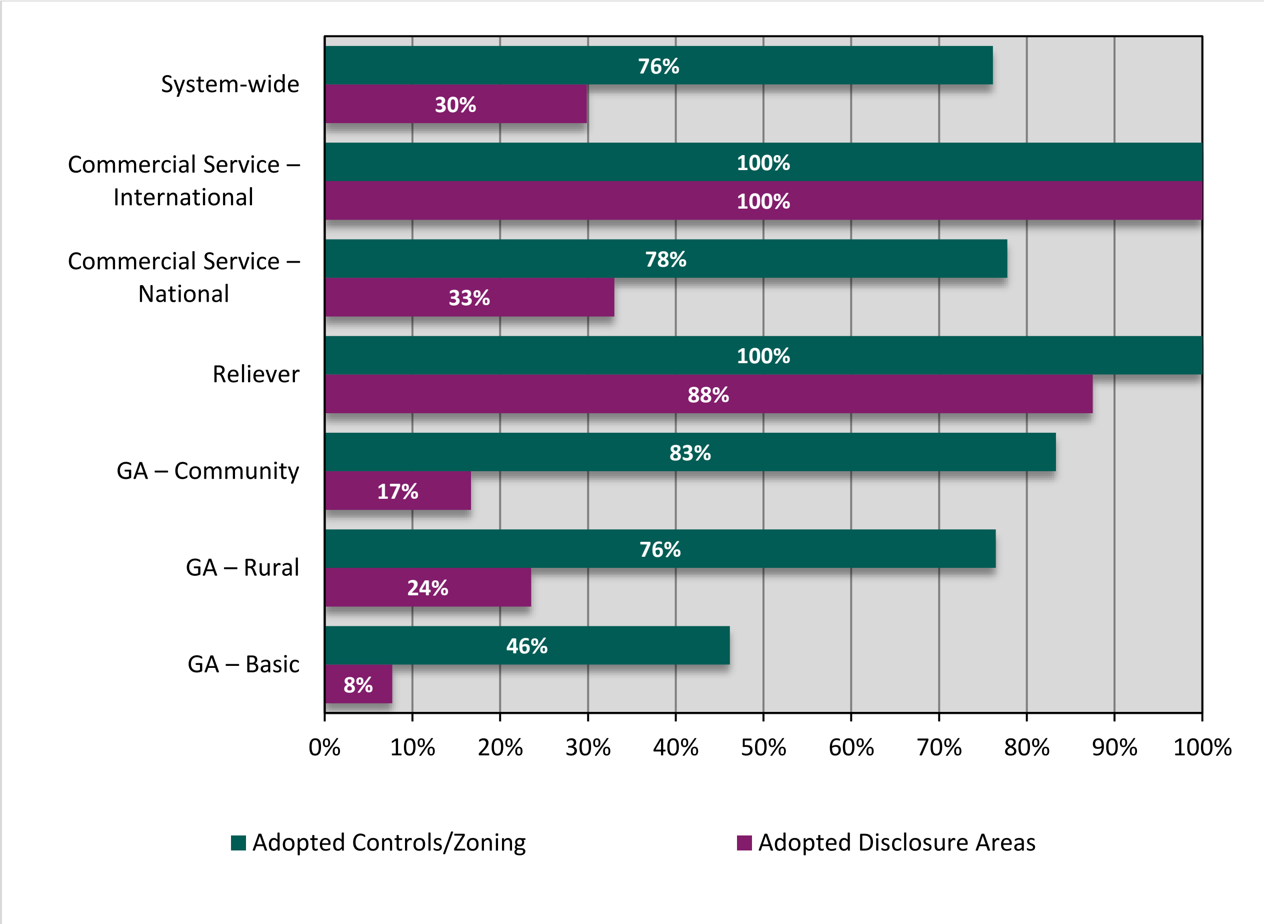
[2] Political subdivisions of the state that operate a public airport can also designate all property within the vicinity of an airport as an airport influence area after a notice and a hearing (A.R.S. 28-8485). The area must be exposed to aircraft noise and overflight with a day-night average sound level of 65 decibels or higher or be within such a geographic distance from an existing runway that it is exposed to aircraft noise and overflights. Once the area has been identified, the airport influence area must be recorded with the office of the county recorder in which the property is located. Airport disclosure maps are obligatory, while airport influence areas are established at the discretion of the airport owner.



Source: Arizona Department of Real Estate 2017

Figure 3. Example of a Public Airport Disclosure Map

In Arizona, airport compatible land use is a growing concern, especially as urban infill encroaches into previously undeveloped areas. **Figure 4** summarizes the percentage of airports by role that are within communities with airport-compatible controls or zoning, and those with an available public airport disclosure map as identified from the Airport Inventory and Data Survey. In total, 76 percent of system airports responded that they have established airport-compatible controls or zoning with their communities, while 30 percent noted they have established disclosure areas.



Source: Airport Inventory and Data Survey 2017

Figure 4. Percent of Airports by Classification with Compatible Controls/Zoning and Disclosure Areas

Percent of Airports Controlling all Primary Runway End Runway Protection Zones

The FAA has defined several key safety areas on and adjacent to runways. As shown in **Figure 5**, the RPZ is a trapezoid-shaped area off each end of the runway designed to protect people and property on the ground in the event of a runway overrun or undershoot. The dimensions of a runway end's RPZ are based on factors including the aircraft approach category (AAC) and airplane design group (ADG) of the most demanding aircraft utilizing the airport and visibility minimums to the runway. According to FAA Advisory Circular (AC) 150/5300-13 (change 1), the RPZ's ability to enhance safety "is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities" (FAA 2012, p. 71).

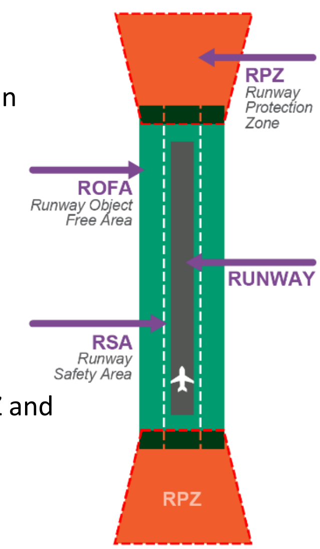
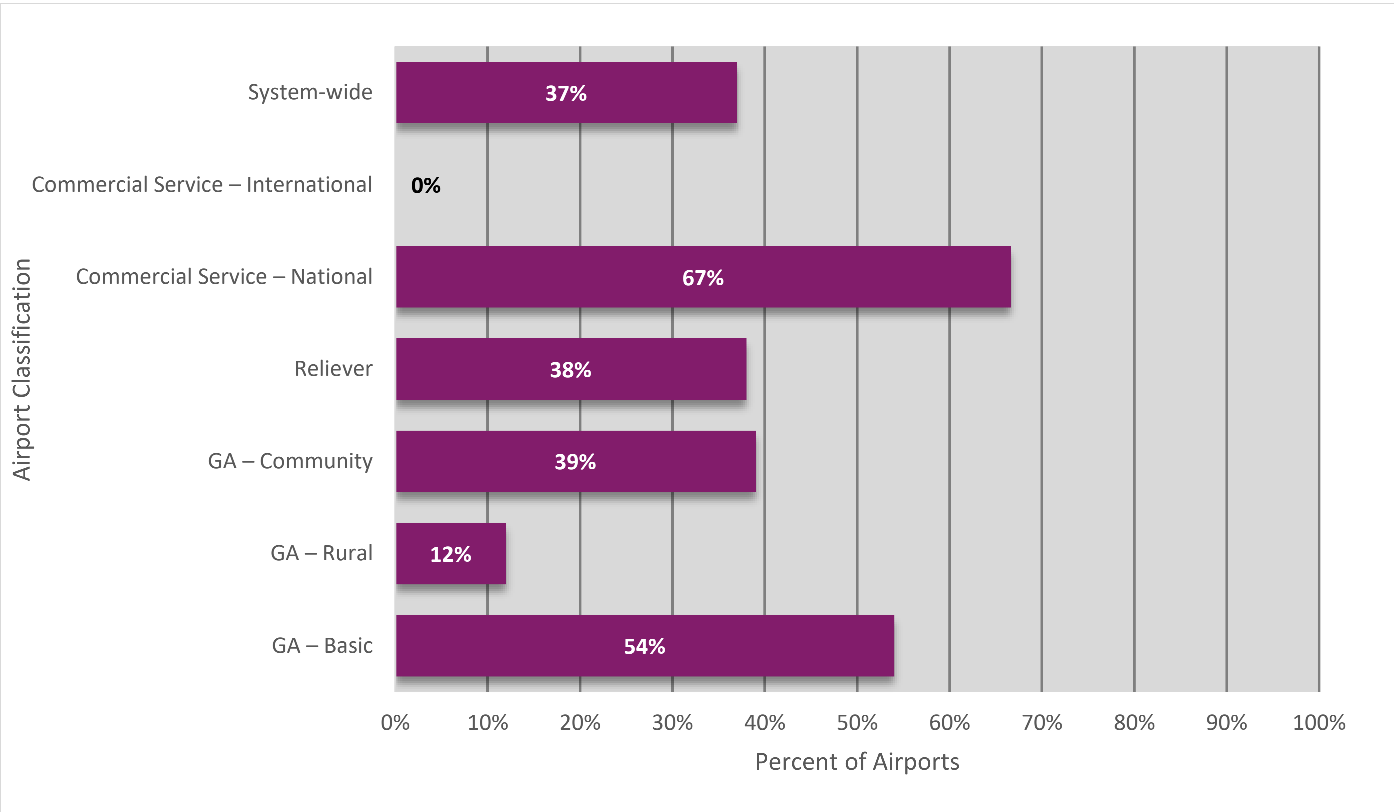


Figure 5. RPZ

Airport managers/sponsors were asked the percent of control they exercised over their runways' RPZs through either fee simple (ownership) or easement during the inventory process. **Figure 6** presents data according to the SASP airports' responses by classification regarding control (by ownership or easement) of the entire RPZ area for both ends of their primary runway. Of the 67 system airports, 37 percent reported complete control of their primary runway RPZs via fee simple, easement, or combination of both. Neither of the two Commercial Service-International airports have control over their entire primary runway RPZs.



Source: Airport Inventory and Data Survey 2017

Figure 6. Percent of Airports by Classification Controlling all Primary Runway End RPZs

Percent of Airports that have Runway Safety Areas on their Primary Runway that Meet the Standards for their Current Airport Reference Code

As shown in **Figure 5**, the Runway Safety Area (RSA) is a rectangular box surrounding a runway designed to enhance the safety of aircraft that undershoot, overrun, or veer off the runway and improve the runway accessibility for aircraft rescue and firefighting (ARFF) equipment during such incidents (FAA 2012, p. 59). The current RSA standards are based on 90 percent of overruns being contained within the RSA. RSAs are determined based on the runway design code (RDC) and the visibility minimums of the runway. For single-runway airports, the RDC is the same as the ARC, and the ARC is typically the same as the RDC for an airport's primary runway if it has multiple runways. The RSA is centered on the runway centerline and extends beyond the runway end thresholds, as described in **Table 1**.

Table 1. Runway Safety Area Dimensions

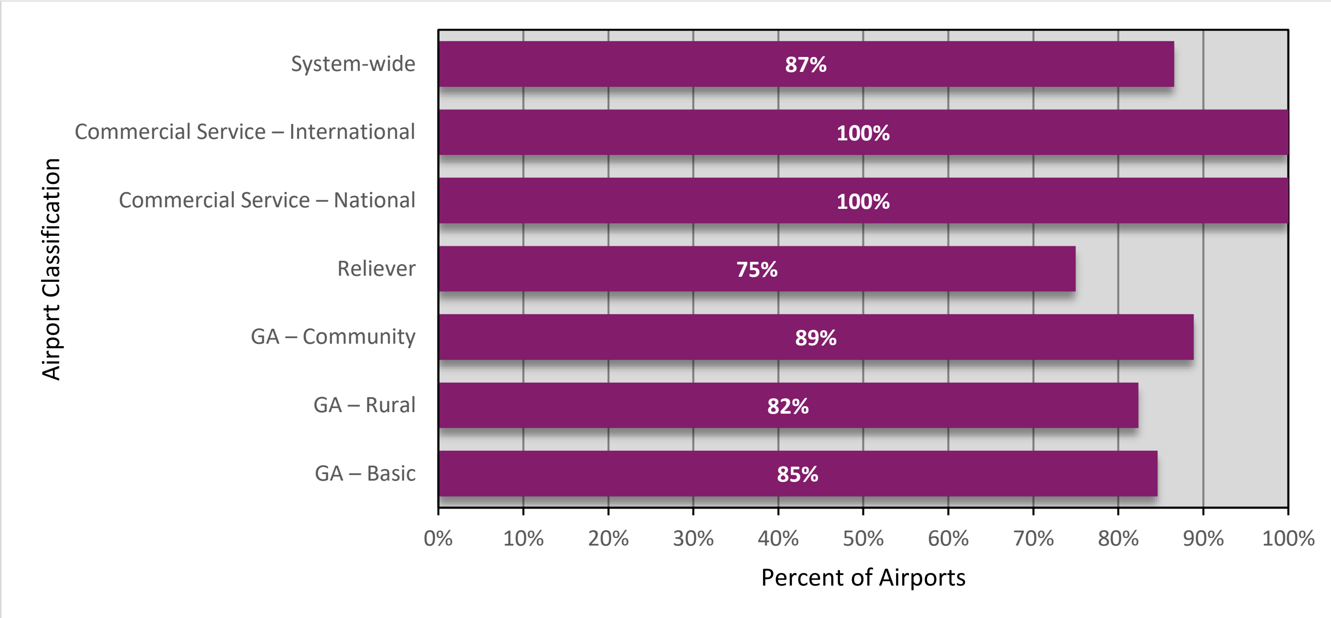
RDC/ARC	Runway Safety Area Dimensions Visibility Not Lower Than 3/4 Mile	Visibility Lower Than 3/4 Mile
A/B-I	240' beyond runway end	600' beyond runway end
	240' prior to threshold	600' prior to threshold
	120' width	300' width
A/B-II	300' beyond runway end	600' beyond runway end
	300' prior to threshold	600' prior to threshold
	150' width	300' width
A/B-III	600' beyond runway end	800' beyond runway end
	600' prior to threshold	600' prior to threshold
	300' width	400' width
A/B-IV	1,000' beyond runway end	1,000' beyond runway end
	600' prior to threshold	600' prior to threshold
	500' width	500' width
C/D/E	1,000' beyond runway end	1,000' beyond runway end
	600' prior to threshold	600' prior to threshold
	500' width	500' width

Source: Federal Aviation Administration 2012

In general, the RSA is required to be cleared, drained, and graded in a way that removes all potentially hazardous topography, prevents water accumulation, is free of objects except those that need to be located in the RSA because of their functions (such as certain navigational aids [NAVAIDs]), and capable of supporting snow removal and ARFF equipment under dry conditions. Additional items that may result in a noncompliant RSA include insufficient property ownership of the RSA area and lack of surface vehicle access. An RSA that meets these standards and has the proper dimensions is considered compliant according to the FAA.

Airport managers/sponsors were asked if their primary runway achieved RSA standards provided in FAA AC 150/5300-13 (change 1) during the airport inventory process. **Figure 7** summarizes primary runway RSA compliance by airport classification as determined through the inventory interviews. In total, 87 percent of the Arizona system meets ARC standards for their primary RSA, including 100 percent of Commercial – International airports. No classification has fewer than 75 percent of airports compliant with this standard.

It should be noted that airports not included in the FAA's National Plan of Integrated Airport Systems (NPIAS) are not required to meet RSA standards; however, ADOT recommends the FAA's standards for safety for all airports regardless of inclusion in the NPIAS.



Source: Airport Inventory and Data Survey 2017

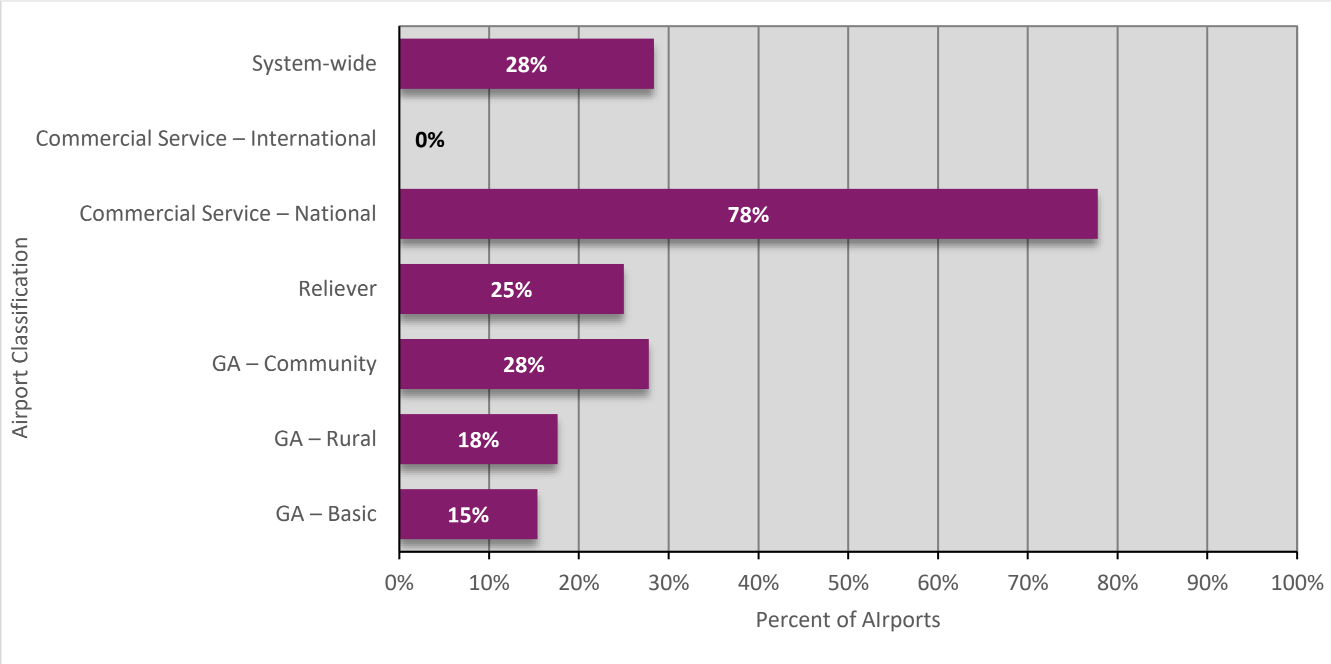
Figure 7. Percent of Airports by Classification Meeting Primary Runway RSA Standards

Percent of Airports with Clear Approaches to Both Ends of the Primary Runway

The FAA maintains records of approach slopes and obstructions in the FAA 5010 Master Record. These records provide optimal and actual glide slopes, as well details about any obstructions affecting an airport's imaginary surfaces. Obstructions can include human-made infrastructure, such as buildings, transmission lines, and cell phone towers, as well as natural features like hills, mountains, and vegetation. Airports should maintain clear approaches to all runway ends to the greatest extent feasible to optimize aircraft safety, especially during less-than-ideal weather conditions. Accordingly, many airports implement obstruction removal programs to combat, prevent, or alleviate the negative effects of obstructions, which often include (but are not limited to) a vegetation management plan.[3]

Airports' 5010 Master Records were utilized to determine the percent of airports with clear approaches to both primary runway ends. Airports were also asked if they have an adopted obstruction removal program as part of the airport inventory. As presented in **Figure 8**, only 28 percent of the system has clear approaches. Twenty-two percent of the system indicated adoption of obstruction removal programs via the Airport Inventory and Data Survey.

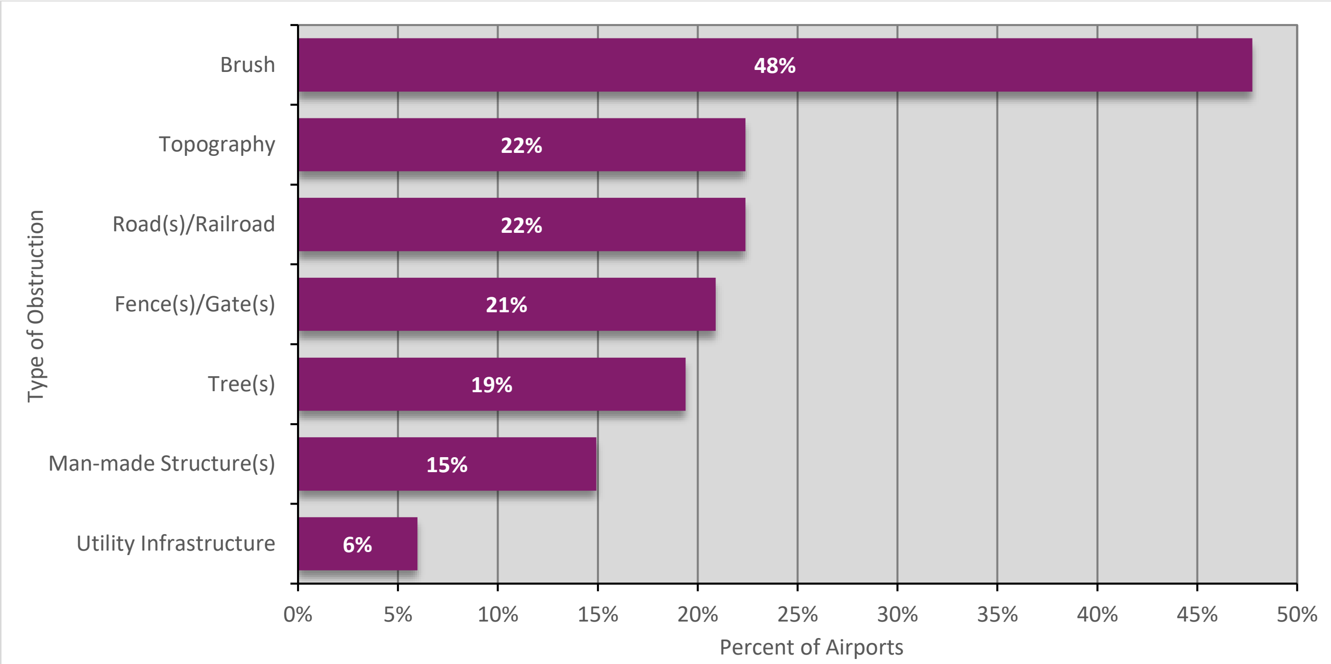
[3] Airports with vegetation management plans are a system indicator and are accordingly discussed in more detail on page 15 of this chapter.



Sources: FAA 5010 2017, Airport Inventory and Data Survey 2017

Figure 8. Percent of Airports by Classification with Clear Approaches to Both Ends of the Primary Runway

It is important to understand the type of obstructions most commonly found at Arizona's system airports to help identify the most appropriate solution to mitigate this concern. Brush and trees, for example, can be addressed by developing an adequate vegetation management plan, while certain man-made obstacles such as roads, buildings, and utility lines are often beyond an airport's jurisdiction and thus difficult to remove. Based on a review of airports' current FAA 5010 Master Records, brush is the most prevalent obstruction across the state, with approximately half of airports reporting an issue. Approximately one-fifth of all airports have issues with topographic features (such as hills and mountains), fences and gates, and roads and railroads. Other man-made structures, including buildings, are not reported as a major issue of concern, although can pose a serious safety risk in those instances where present. **Figure 9** summarizes obstructions found at Arizona's system airports.



Source: FAA 5010 Master Record 2017

Figure 9. Percent of Airports with Obstructions by Type

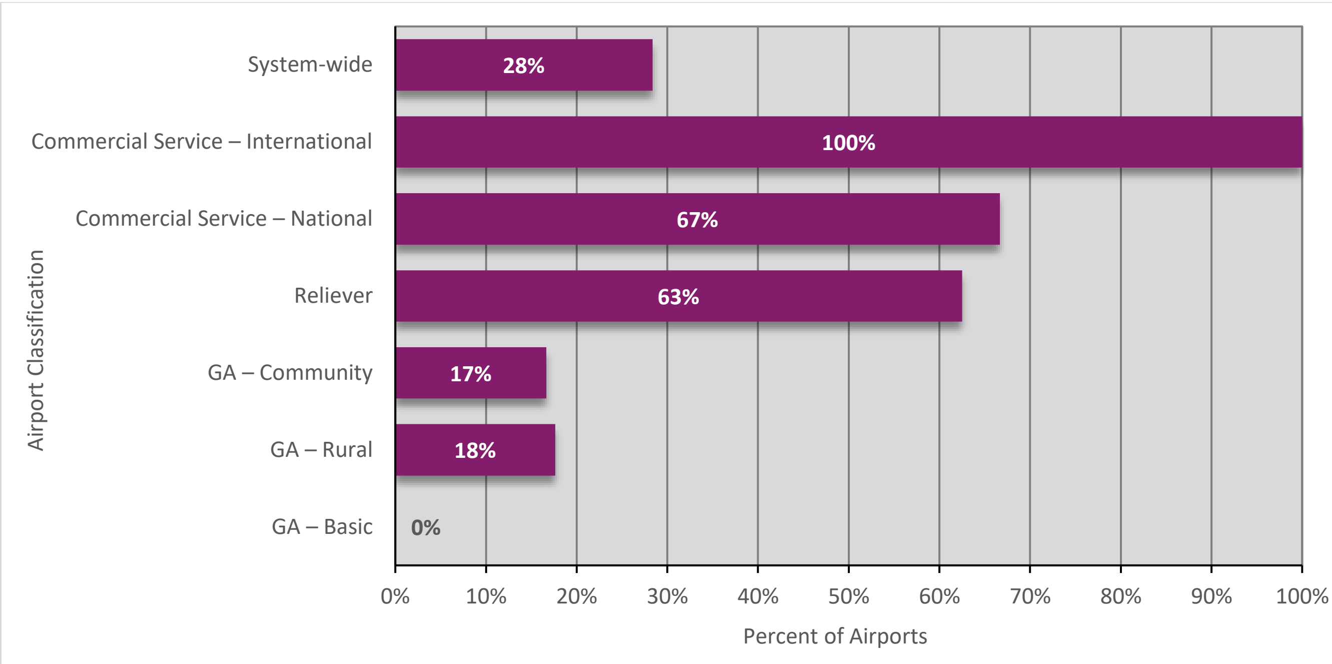
Percent of Airports with Adopted Wildlife Plans in Accordance with Appropriate FAA Regulations

Wildlife can present serious safety risks to airport operations, potentially endangering aircraft and their occupants, as well as the wildlife. While birds comprise 97 percent of all reported aircraft strikes nationwide, mammals and reptiles can also pose significant threats. Due to the rural nature of many of Arizona's airports, wildlife hazards are a frequent concern. In northern and eastern Arizona, large mammals including elk and deer can be extremely dangerous if present on an airfield. Cows in aircraft movement areas have also been reported across the state.

While airport fencing is the primary means of preventing wildlife from entering the airfield, not all wildlife can be kept out by fencing, nor does every system airport have full perimeter wildlife fencing.[4] Because animals are attracted to areas that reflect their natural habitats and provide food and water, airports can control land use and landscaping to minimize potential attractants. Airports can perform wildlife hazard site visits to understand what threats exist for their property or develop wildlife hazard assessments (WHAs) and wildlife hazard management plans (WHMPs) to develop a strategy for mitigating these threats. The FAA requires WHAs at FAA Part 139-certified airports. Airports may also be required to develop a WHMP. While such plans are only required for Part 139 airports, they are strongly encouraged for all airports.

[4] Detailed information on airport fencing can be found in Appendix E – Facility and Service Objectives.

Airports were asked if they have conducted WHAs or WHMPs in accordance with appropriate FAA regulations during the airport inventory. As shown in **Figure 10**, only 28 percent of Arizona's system airports have an adopted WHA or WHMP. This includes 100 percent of Commercial-International airports, 67 percent of Commercial-National airports, and 63 percent of Reliever airports.



Source: Airport Inventory and Data Survey 2017

Figure 10. Percent of Airports by Classification with an Adopted WHA or WHMP

System Indicators

This section discusses results of the evaluation of system indicators associated with the safety and security goal category. As previously mentioned, system indicators measure progress but may not be directly impacted by ADOT or airport actions. System indicators include:

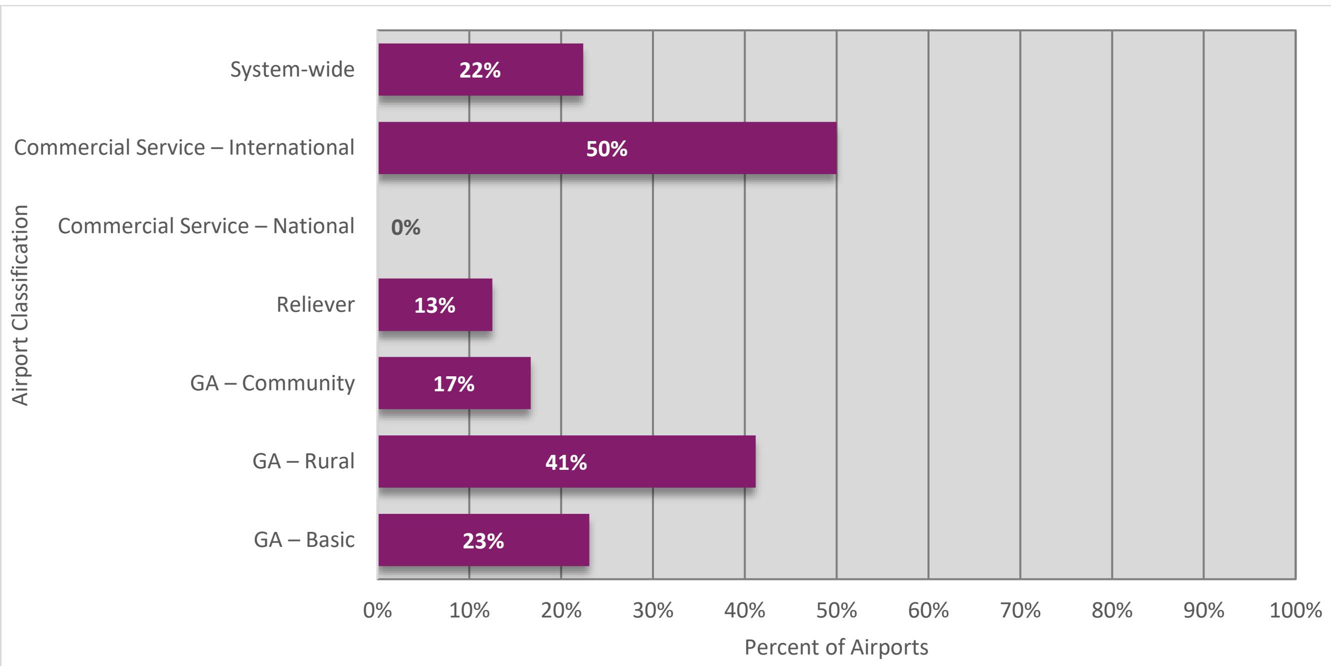
1. Percent of airports that have active vegetation management plans to clear obstructions from their approaches
2. Percent of airports that have a written emergency response plan
3. Percent of airports that support aerial firefighting operations

Percent of Airports that have Active Vegetation Management Plans to Clear Obstructions from their Approaches

Airports can enhance the safety of aircraft operations by creating programs or plans designed to remove or minimize the threat of vegetation or other obstructions within the runway approach. Airspace is defined and delineated by a set of geometric spaces known as imaginary surfaces which extend outward and upward from airport runways. The FAA has developed standards for the maximum acceptable height of objects beneath and within these imaginary surfaces (including the runway approach). While some types of obstructions are difficult or impossible to remove (such as man-made or terrain obstructions), vegetation can typically be controlled by

establishing and implementing ongoing monitoring and removal procedures. The FAA also notes that such a proactive approach to vegetation management not only mitigates the risk of potential obstruction hazards, but also allows the FAA to optimize the instrument approach minimum altitudes without compromising the minimum required obstacle clearance (FAA 2013). A formal vegetation management plan is often one characteristic of airports with clear approaches.

Airports were asked if they had adopted a formal vegetation management during the airport inventory. It was identified that 22 percent of SASP airports maintain a vegetation management plan. As presented in **Figure 11**, only one of the 11 commercial service airports and one of the eight Reliever airports maintain a vegetation management plan. While many of the SASP airports reported that they do not have a formal vegetation management plan, other airport representatives reported that their airports clear vegetation from runway ends on an as-needed basis.



Source: Airport Inventory and Data Survey 2017

Figure 11. Percent of Airports by Classification with a Formal Vegetation Management Plan

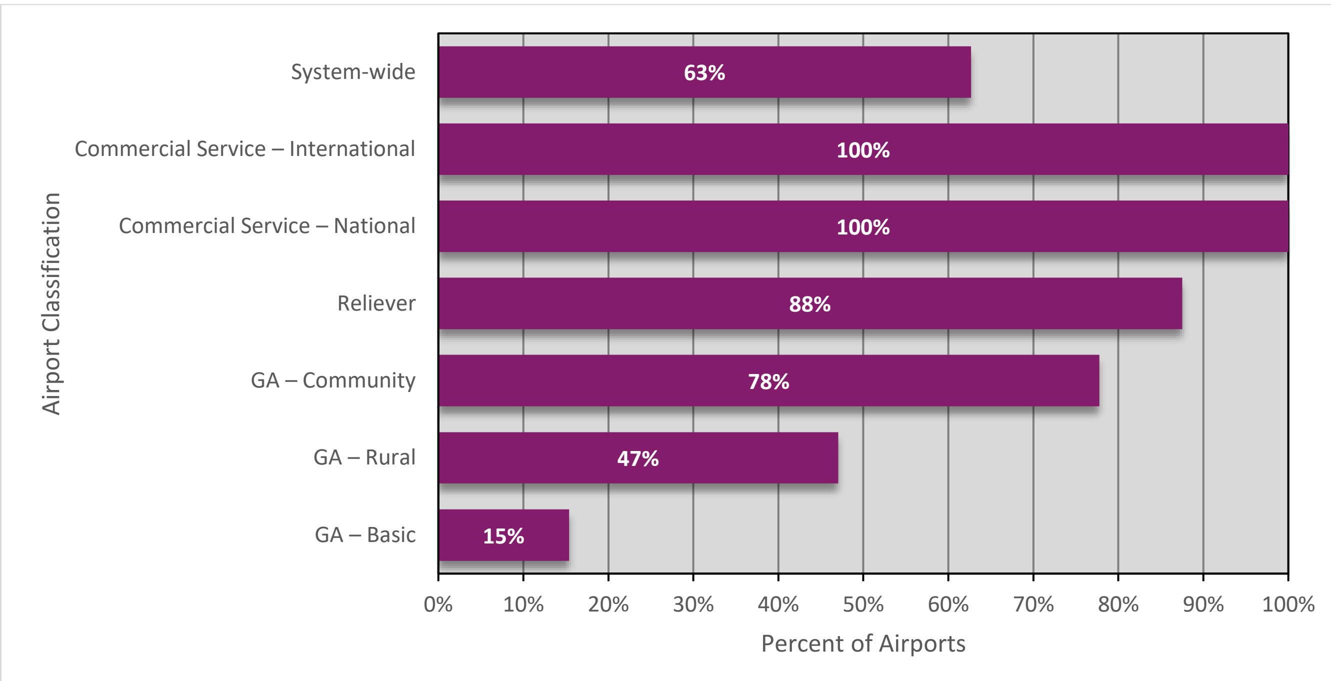
Percent of Airports that have a Written Emergency Response Plan

Federal law requires all FAA Part 139-certified airports develop and maintain an airport emergency plan in accordance with the guidance and standards in FAA AC 150/5200-31C, *Airport Emergency Plan*.[5] The use of this guidance is mandatory for Part 139-certified airports and recommended for all other airports. An emergency response plan is designed to minimize the possibility and extent of personal injury and property damage at an airport in an emergency situation. These plans are airport-specific and outline an airport's procedures during and immediately following an emergency situation and include various components depending on the airport. In general, emergency response plans include the duties and responsibilities of various parties involved in

[5] 14 CFR 139.25 provides the specific mandate for Part 139 airports regarding airport emergency plans.

disaster response, as well as communication procedures, checklists for various types of scenarios, guidance for emergency responders, and airport maps and other information.

Airports were asked if they have a written emergency response plan during the airport inventory. **Figure 12** summarizes the number of airports by classification that indicated they have adopted an emergency response plan. In total, 61 percent of all system airports have adopted an emergency response plan. One hundred percent of Commercial Service airports and nearly 90 percent of Reliever airports also have emergency response plans.



Source: Airport Inventory and Data Survey 2017

Figure 12. Percent of Airports by Classification with a Written Emergency Response Plan

Percent of Airports that Support Aerial Firefighting Operations

Forest fires are common events in Arizona, especially in the northern and eastern areas of the state where dry conditions coupled with extensive quantities of forest debris can lead to dangerous situations. To combat forest and other large fires, aircraft are used as they can quickly provide access to wide geographic areas while reducing human exposure to threats on the ground and minimizing the time it takes to extinguish the flames. Both commercial service and GA airports across the state support fire suppression response teams by providing fuel, maintenance facilities, and other critical aircraft services.

The Arizona Department of Forest and Fire Management (ADFFM) reports that nine airports are regularly used as permanent or seasonal staging areas for wildland fire suppression efforts, as summarized in **Table 2**. Four airports serve as permanent heavy air tanker bases operated by the U.S. Forest Service (USFS). Five airports serve as seasonal staging areas for single-engine air tankers (SEATs) operated by the Bureau of Land Management, ADFFM, and the Bureau of Indian Affairs (BIA). These seasonal bases are operated on a contractual basis, with a typical season lasting from May to July. The USFS, BLM, ADFFM, and BIA share

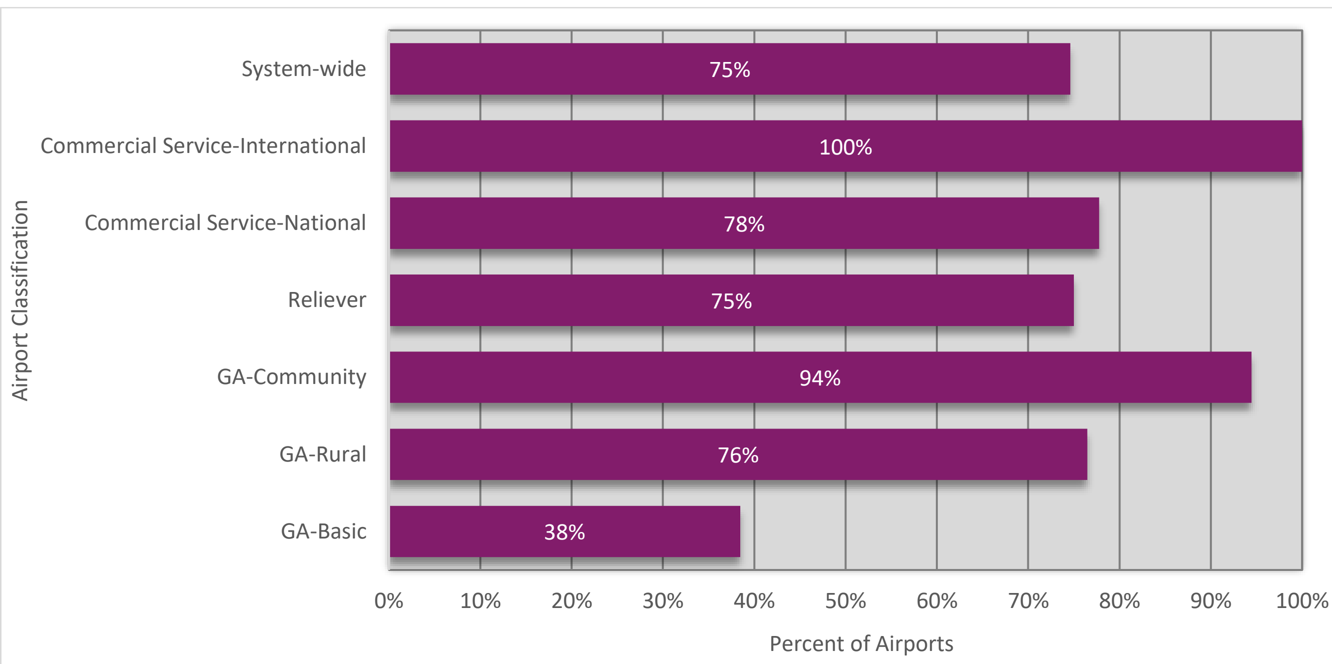
resources for fire suppression efforts and utilize one another's bases as necessary (albeit heavy air tankers are generally unable to use SEAT bases due to facility constraints).

Table 2. Airports Used as Staging Areas for Wildland Firefighting

Agency	Airport
Heavy airtanker base	
USFS	Sierra Vista Municipal-Libby Army Airfield
	Phoenix-Mesa Gateway
	Ernest A. Love Field (Prescott)
	Winslow-Lindbergh Regional
SEAT bases	
BLM	Safford Regional
	Kingman
ADFFM	Marana Regional
	Wickenburg Municipal
BIA	Show Low

Source: ADFFM 2018

Airports were asked if they support aerial firefighting operations during the airport inventory. As shown in **Figure 13**, system-wide, 75 percent of airports support aerial firefighting operations at their facilities. One hundred percent of Commercial Service-International airports serve firefighting operations, followed by 94 percent of GA-Community airports. Only 38 percent of GA-Basic airports reported support for these operations.



Source: Airport Inventory and Data Survey 2017

Figure 13. Percent of Airports by Classification Supporting Aerial Firefighting

GOAL CATEGORY: FISCAL RESPONSIBILITY

In the fiscally constrained context of the Arizona aviation system, the ADOT Aeronautics Group and airport sponsors are committed to making wise investment decisions at the state's airports. Such decisions should be founded on maximizing limited resources by proactively considering where and when improvements are required instead of reacting to facility issues as they occur. One of ADOT's top priorities is to ensure all citizens, visitors, and businesses have access to the benefits of the State's airport system. These benefits include the transportation of people and goods, as well as the many aviation functions that support safety, security, access, economic growth and development, and many other roles affecting a community's quality-of-life. Access to air service is founded on a system of airports with adequate capacity to accommodate aviation demand on the local and state levels. If users are not able to quickly and efficiently access an airport, the overall viability of the system greatly diminishes.

Performance Measures

The analysis of performance measures associated with the fiscal responsibility goal category is presented below. These performance measures include:

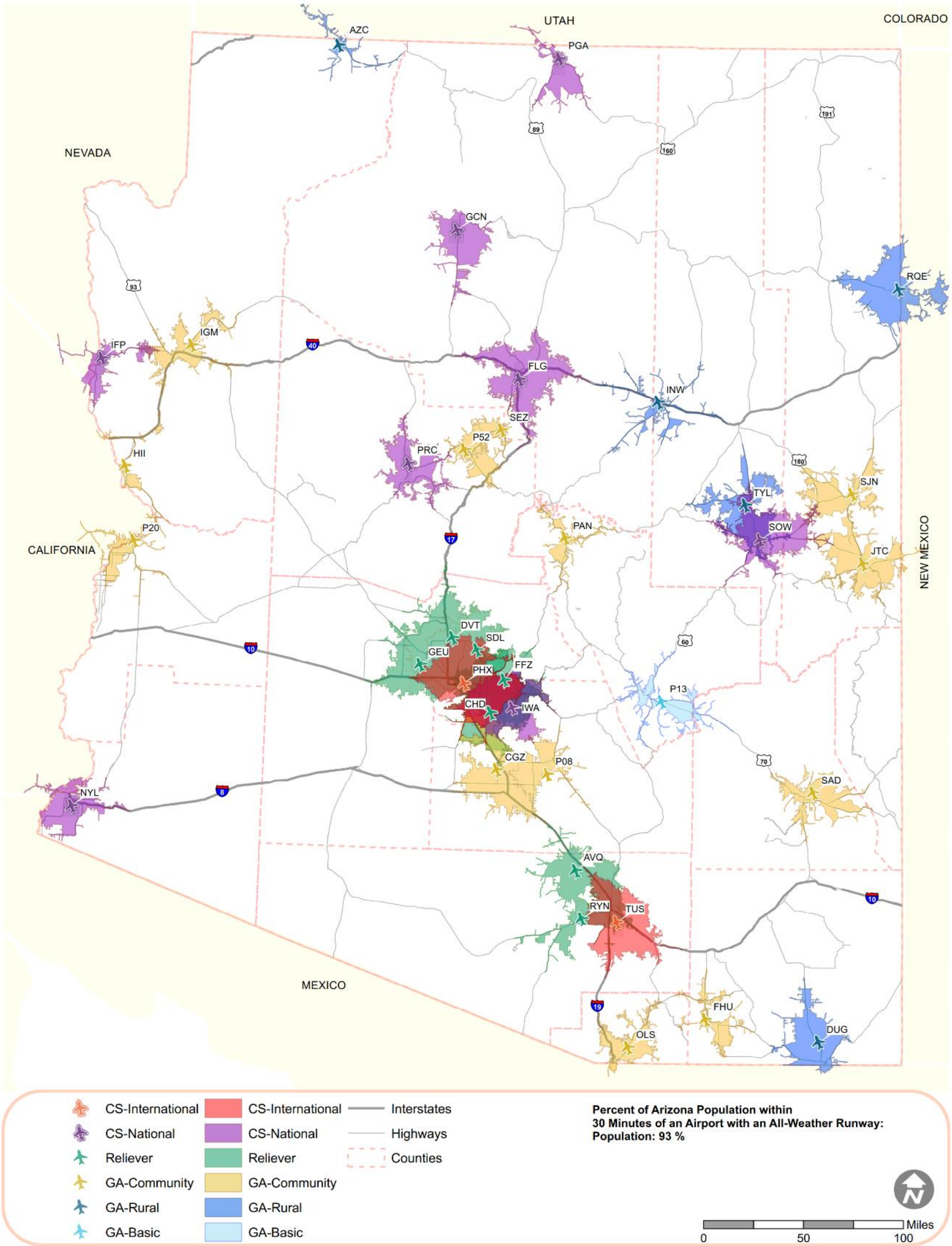
1. Percent of population within 30 minutes of an all-weather runway (paved, instrument approach, weather reporting)
2. Number of airports with a current (past five years) master plan
3. Percent of airports with a pavement condition index (PCI) of 70 or greater

Percent of Population Within 30 Minutes of an All-Weather Runway (Paved, Instrument Approach, Weather Reporting)

All-weather runways provide access to an aviation facility at all times, which can be especially important in rural areas that depend on airports for emergency response, access, and economic activities such as air cargo, agricultural support, and corporate/business aviation. They are also useful in situations where pilots have an emergency and need to land, especially during inclement weather. For purposes of the SASP Update, an all-weather runway was defined as being paved and having at least an IAP and weather reporting capability. A paved runway allows aircraft to conduct operations in wet or snowy conditions when a grass or dirt landing strip would make a take-off or landing impossible. IAPs are a series predetermined maneuvers based on the navigational aids at an airport that allow an aircraft to land in poor weather conditions when visibility is low. Surface weather conditions at airports are reported using either an Automated Weather Observing Station (AWOS) or Automated Surface Observing Station (ASOS).[6] These systems provide weather forecasts and climate information to pilots and the public, including wind speed and direction, visibility, cloud coverage, and many other outputs. Airports that are equipped with these three components allow pilots to land and take-off during times of inclement weather.

[6] While these systems have important differences, they both provide weather data and are evaluated together for the purposes of this study.

Figure 14 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. Ninety-three percent of the state's total population is within a 30-minute drive time of an airport having an all-weather runway.



Sources: Airport Inventory and Data Survey 2017, FAA 5010 Master Record, Kimley-Horn

Figure 14. 30-Minute Drive Times of System Airports with an All-Weather Runway (Paved, Instrument Approach, Weather Reporting)

Number of Airports with a Current (Past Five Years) Master Plan

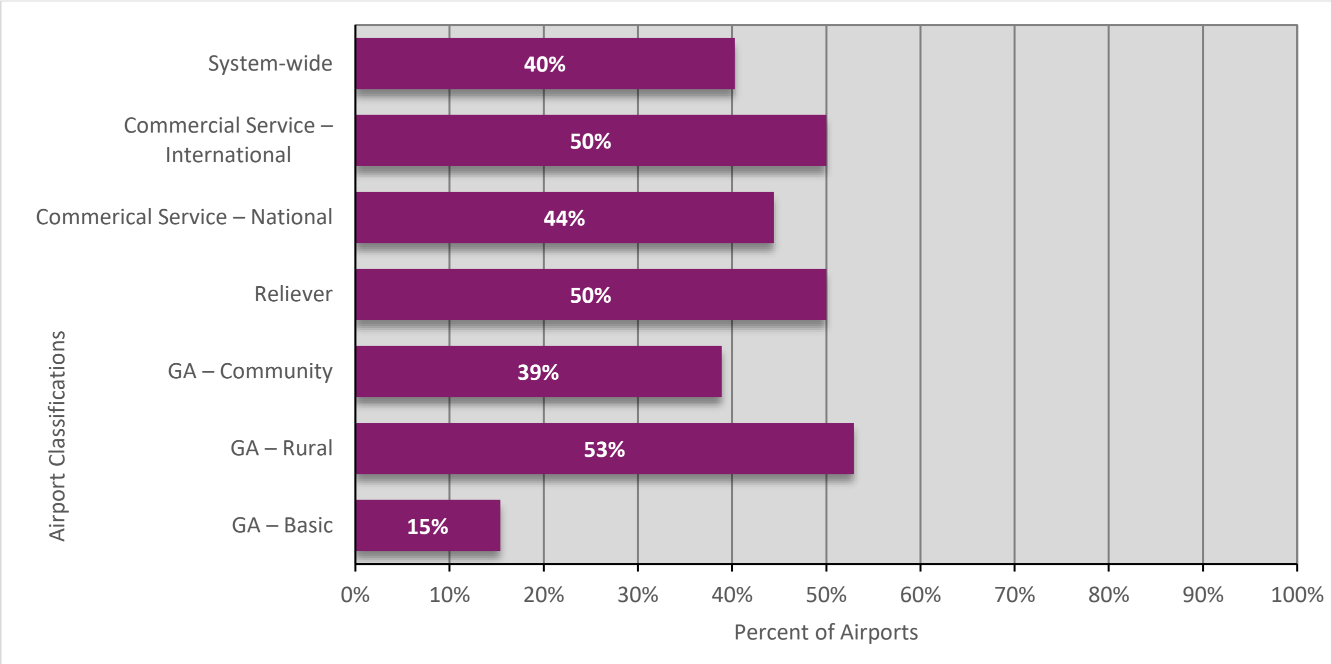
Airport master plans provide a comprehensive assessment of an airport's ability to accommodate existing and future demands and identify short-, medium-, and long-term development needs. According to FAA AC 150/5070-6B (change 2), *Airport Master Plans*, "The airport sponsor usually identifies the need for a planning study based on an existing or potential shortcoming in the existing plan or airport." Whatever these shortcomings may be—whether the result of demand exceeding capacity, new technologies entering the market, or national or local issues affecting airport activity—the completion of an airport master plan demonstrates the sponsor's commitment to responsible airport investment by ensuring resources are allocated in a manner that meets current and future needs. Additionally, inclusion in an FAA-approved master plan or airport layout plan (ALP) is typically an eligibility criterion for federal and state funding for capital improvement projects. A current master plan also indicates a community's engagement in and support for its airport.

The ADOT Aeronautics Group maintains a database of approved airport master plans at www.azdot.gov/planning/airportdevelopment/airports. Additionally, airports were asked about their most current master plan during the airport inventory. It is important to note that even if an airport has recently completed a master plan, it may not be approved by ADOT or the FAA. As noted above, this is important because a project must be in an approved master plan or ALP to receive state or federal funding. For the purpose of this analysis, a master plan is considered current if it was completed or underway in the last five years (2012 or later).

As shown in **Figure 15**, 40 percent of airports have completed an airport master plan within the last five years. The lowest percentage of GA-Basic Airports have completed these studies (15 percent), while about 40 to 50 percent of airports across all other classifications achieving this performance measure.[7] On average, airports falling outside of the five-year threshold completed their master plans in 2006-2007, although this timeframe may be misleading, as some master plans are considerably outdated.

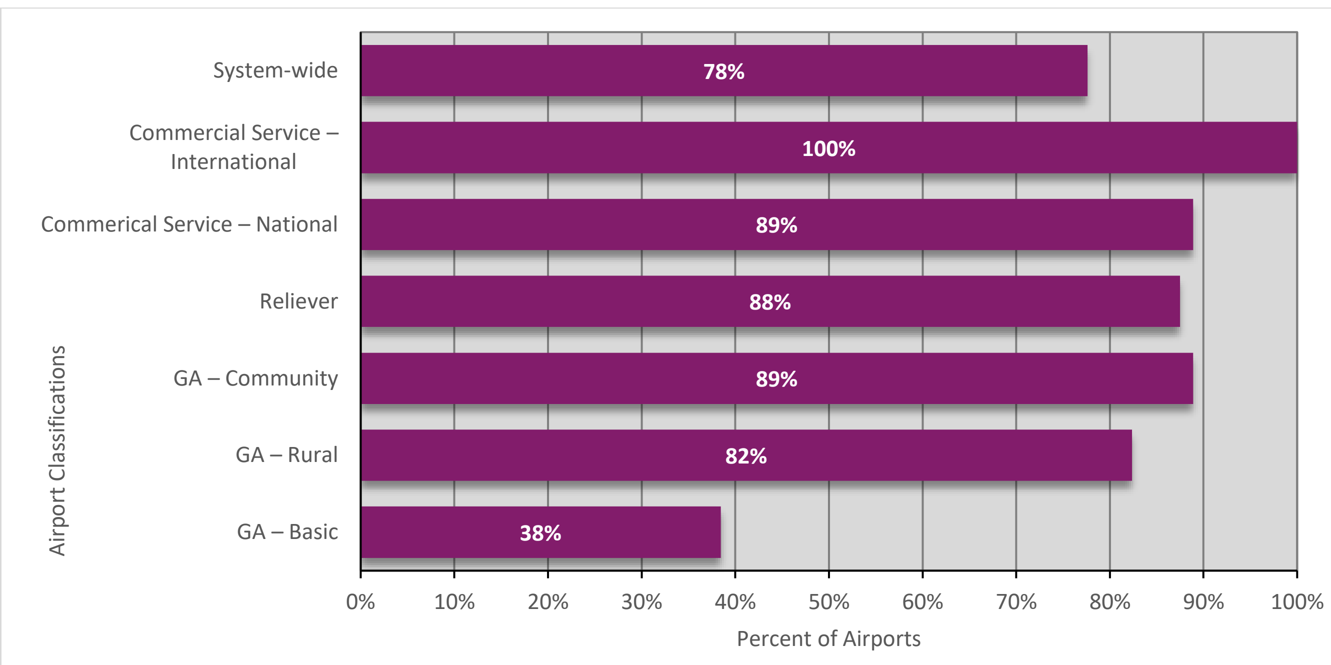
To more accurately gauge airport activity regarding master planning efforts, a 10-year threshold was also evaluated, which more accurately reflects the frequency at which many airports update their master plans (2007 or later). As summarized in **Figure 16**, the percent of all airports that have completed a master plan within the last 10 years significantly increases to 78 percent (25 more airports than the five-year threshold). This figure encompasses 100 percent of Commercial Service-International, 89 percent of Commercial Service-National airports, and 82 to 88 percent of all GA classifications except GA-Basic. While lower than the other classifications, 38 percent of GA-Basic airports have completed master plans within the past 10 years, a notable increase over the five-year rate.

[7] Note that three GA-Basic airports were unable to determine the year of their most recent master plans. It has been assumed that these airports completed planning studies outside of the five-year threshold for the purpose of this evaluation.



Source: Airport Inventory and Data Survey 2017

Figure 15. Percent of Airports by Classification Within the Past Five Years



Source: Airport Inventory and Data Survey 2017

Figure 16. Percent of Airports by Classification with a Master Plan Within the Past 10 Years

In addition to assessing the most recent completion date of airport master plans, **Table 3** reports the most recent data for ALPs as recorded by the FAA. According to the FAA, 42 of the 67 airports (63 percent) have completed ALPs since 2012. Airports were also asked for their most recent ALPs during the inventory process. Data provided by airports were used for airports for which the FAA did not have a recorded ALP, including non-NPIAS airports.

Table 3. ALPs at Arizona Airports by Year

Associated City	Airport	ALP Date
	Commercial Service-International	
Phoenix	Phoenix Sky Harbor International	2011
Tucson	Tucson International	2014
	Commercial Service-National	
Bullhead City	Laughlin/Bullhead City International	2010
Flagstaff	Flagstaff Pulliam	2008
Grand Canyon	Grand Canyon National Park	2014
Page	Page Municipal	2009
Peach Springs	Grand Canyon West	2015
Phoenix	Phoenix-Mesa Gateway	2015
Prescott	Ernest A. Love Field	2014
Show Low	Show Low Regional	2005
Yuma	Yuma International	2012
	Reliever	
Chandler	Chandler Municipal	2017
Glendale	Glendale Municipal	2017
Goodyear	Phoenix Goodyear	2017
Marana	Marana Regional	2017
Mesa	Falcon Field	2016
Phoenix	Phoenix Deer Valley	2015
Scottsdale	Scottsdale	2013
Tucson	Ryan Field	2011
	GA-Community	
Benson	Benson Municipal	2010
Buckeye	Buckeye Municipal	2012
Casa Grande	Casa Grande Municipal	2015
Coolidge	Coolidge Municipal	2013
Cottonwood	Cottonwood Municipal	2006
Kingman	Kingman	2009
Lake Havasu City	Lake Havasu City	2010
Marana	Pinal Airpark	2015
Nogales	Nogales	2015
Parker	Avi Suquilla	2016
Payson	Payson	2014
Safford	Safford Regional	2012
Sedona	Sedona	2017
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	2014
Springerville	Springerville Municipal	2010
St. Johns	St. Johns Industrial Air Park	2013
Wickenburg	Wickenburg Municipal	2014
Willcox	Cochise County	2015

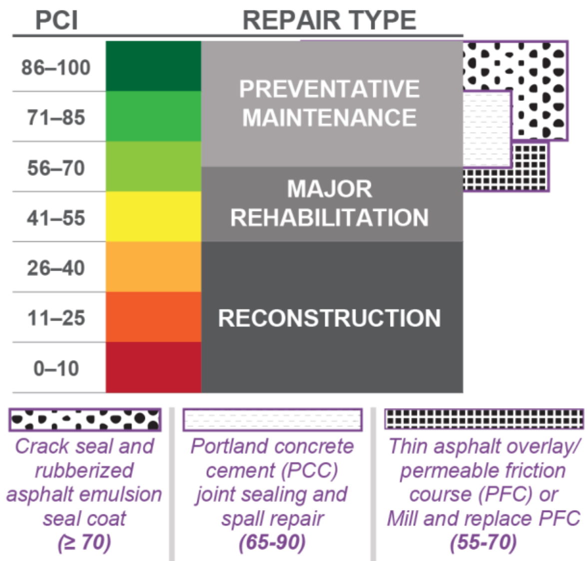
Associated City	Airport	ALP Date
	GA-Rural	
Bisbee	Bisbee Municipal	2011
Chinle	Chinle Municipal	2016
Colorado City	Colorado City Municipal	2009
Douglas	Bisbee-Douglas International	2015
Douglas	Cochise College	Unknown
Douglas	Douglas Municipal	2017
Eloy	Eloy Municipal	2013
Gila Bend	Gila Bend Municipal	2014
Holbrook	Holbrook Municipal	2015
Maricopa	Ak-Chin Regional	2016
San Luis	Rolle Airfield	2016
San Manuel	San Manuel	2015
Taylor	Taylor	2010
Whiteriver	Whiteriver	2009
Williams	H.A. Clark Memorial Field	2008
Window Rock	Window Rock	2016
Winslow	Winslow-Lindbergh Regional	2015
	GA-Basic	
Ajo	Eric Marcus Municipal	2010
Bagdad	Bagdad	2015
Cibecue	Cibecue	2006
Clifton	Greenlee County	2012
Globe	San Carlos Apache	2007
Kayenta	Kayenta	2010
Kearny	Kearny	Unknown
Polacca	Polacca	Unknown
Seligman	Seligman	2005
Sells	Sells	Unknown
Superior	Superior	2018
Tombstone	Tombstone Municipal	Unknown
Tuba City	Tuba City	2016

Source: FAA – December 2017

Percent of Airports with a Pavement Condition Index of 70 or Greater

Pavement condition is critical to the safe and efficient operation of aircraft at airports, and its upkeep is often one of the most significant capital investments an airport makes. The PCI is an industry standard for measuring and rating airport pavements so that maintenance and repair can be planned and implemented at the appropriate time during its lifecycle. PCI is expressed on a scale from 0 (failed pavement) to 100 (new pavement in perfect condition), as seen in **Figure 17**. Pavement with a PCI of 56 to 100 is eligible to receive a preventative maintenance treatment, while a PCI below this threshold requires a major rehabilitation or reconstruction. Because preventative maintenance is significantly less costly than a major rehabilitation or reconstruction, the FAA strongly encourages preventative maintenance. Pavement with a PCI of 70 or greater is considered to be in "good" condition and therefore 70 serves as the threshold for this performance measure.

As discussed in **Chapter 2: Review of Current Policy**, the ADOT Aeronautics Group assists airports in conducting PCIs through the Airport Pavement Management System (APMS) Program. This program triennially inventories the PCI of all airside pavement (runways, taxiways, aprons, etc.) at Arizona's system airports. This analysis utilized the data gathered from the 2017 Arizona APMS Update Summary Report. Overall PCIs were available for 64 SASP airports. Two airports had unpaved runways and therefore, no PCI was available. PCI data was not available for one airport. PCI ratings for all pavements (overall) and for each airport's primary runway are presented by airport and by classification in **Table 4**.



Source: ADOT 2017

Figure 17. PCI Index and ADOT's Maintenance Project Thresholds

Table 4. PCI Ratings at Individual Airports

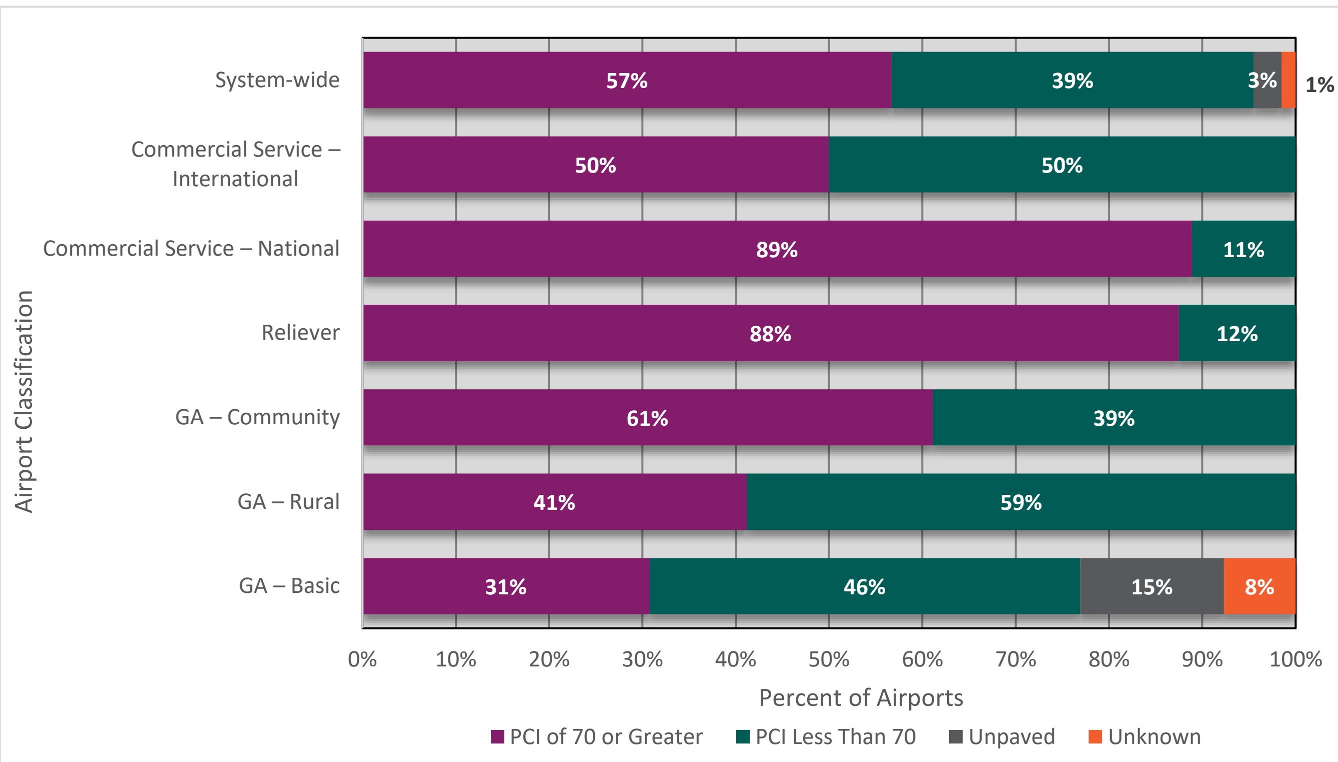
Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
		Commercial Service-International			
Phoenix	Phoenix Sky Harbor International	86	93	Yes	Yes
Tucson	Tucson International	69	73	No	Yes
		Commercial Service-National			
Bullhead City	Laughlin/Bullhead City Int'l	83	97	Yes	Yes
Flagstaff	Flagstaff Pulliam	92	100	Yes	Yes
Grand Canyon	Grand Canyon National Park	73	69	Yes	No
Page	Page Municipal	77	92	Yes	Yes
Peach Springs	Grand Canyon West	87	86	Yes	Yes
Phoenix	Phoenix-Mesa Gateway	89	89	Yes	Yes
Prescott	Ernest A. Love Field	73	73	Yes	Yes
Show Low	Show Low Regional	59	52	No	No
Yuma	Yuma International	81	Unknown	Yes	Unknown
		Reliever			
Chandler	Chandler Municipal	70	84	Yes	Yes
Glendale	Glendale Municipal	70	76	Yes	Yes
Goodyear	Phoenix Goodyear	76	91	Yes	Yes
Marana	Marana Regional	67	100	No	Yes
Mesa	Falcon Field	74	79	Yes	Yes
Phoenix	Phoenix Deer Valley	78	77	Yes	Yes
Scottsdale	Scottsdale	77	80	Yes	Yes

Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
Tucson	Ryan Field	84	79	Yes	Yes
GA-Community					
Benson	Benson Municipal	80	90	Yes	Yes
Buckeye	Buckeye Municipal	72	100	Yes	Yes
Casa Grande	Casa Grande Municipal	69	75	No	Yes
Coolidge	Coolidge Municipal	53	50	No	No
Cottonwood	Cottonwood Municipal	77	99	Yes	Yes
Kingman	Kingman	64	72	No	Yes
Lake Havasu City	Lake Havasu City	54	65	No	No
Marana	Pinal Airpark	57	94	No	Yes
Nogales	Nogales	71	63	Yes	No
Parker	Avi Suquilla	69	65	No	No
Payson	Payson	72	98	Yes	Yes
Safford	Safford Regional	79	95	Yes	Yes
Sedona	Sedona	82	100	Yes	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	85	Unknown	Yes	No
Springerville	Springerville Municipal	74	76	Yes	Yes
St. Johns	St. Johns Industrial Air Park	66	65	No	No
Wickenburg	Wickenburg Municipal	80	80	Yes	Yes
Willcox	Cochise County	75	79	Yes	Yes
GA-Rural					
Bisbee	Bisbee Municipal	59	85	No	Yes
Chinle	Chinle Municipal	34	32	No	No
Colorado City	Colorado City Municipal	88	91	Yes	Yes
Douglas	Bisbee-Douglas International	48	62	No	No
Douglas	Cochise College	59	80	No	Yes
Douglas	Douglas Municipal	37	27	No	No
Eloy	Eloy Municipal	70	76	Yes	Yes
Gila Bend	Gila Bend Municipal	76	73	Yes	Yes
Holbrook	Holbrook Municipal	58	34	No	No
Maricopa	Ak-Chin Regional	63	61	No	No
San Luis	Rolle Airfield	80	85	Yes	Yes
San Manuel	San Manuel	87	85	Yes	Yes
Taylor	Taylor	82	84	Yes	Yes
Whiteriver	Whiteriver	68	72	No	Yes
Williams	H.A. Clark Memorial Field	85	100	Yes	Yes
Window Rock	Window Rock	13	13	No	No
Winslow	Winslow-Lindbergh Regional	61	60	No	No
GA-Basic					
Ajo	Eric Marcus Municipal	47	64	No	No
Bagdad	Bagdad	68	70	No	Yes
Cibecue	Cibecue	Unpaved	Unpaved	Unpaved	Unpaved
Clifton	Greenlee County	64	68	No	No

Associated City	Airport	Overall PCI	Primary Runway PCI	Overall PCI Compliance	Primary Runway PCI Compliance
Globe	San Carlos Apache	81	100	Yes	Yes
Kayenta	Kayenta	85	100	Yes	Yes
Kearny	Kearny	50	51	No	No
Polacca	Polacca	11	6	No	No
Seligman	Seligman	76	83	Yes	Yes
Sells	Sells	Unknown	Unknown	Unknown	Unknown
Superior	Superior	Unpaved	Unpaved	Unpaved	Unpaved
Tombstone	Tombstone Municipal	69	70	No	Yes
Tuba City	Tuba City	76	81	Yes	Yes

Source: Arizona APMS Update Summary Report 2017

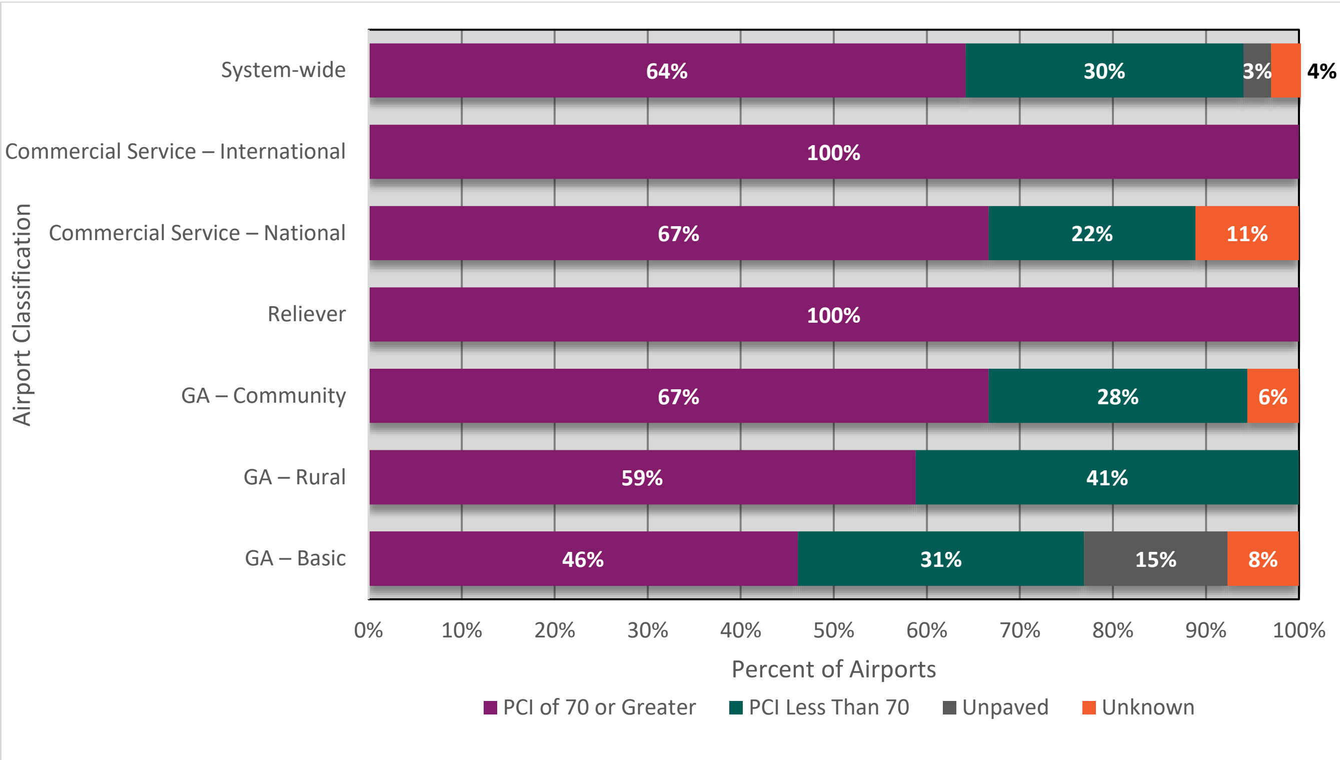
Figure 18 presents overall PCI compliance at Arizona airports. Fifty-seven percent of airports system-wide have an overall PCI of 70 or greater. Commercial Service-International and Reliever airports have the largest percentage of overall PCIs greater than or equal to 70.



Source: ADOT Arizona APMS Summary Report 2017

Figure 18. Percent of Airports by Classification Meeting Overall PCI Compliance

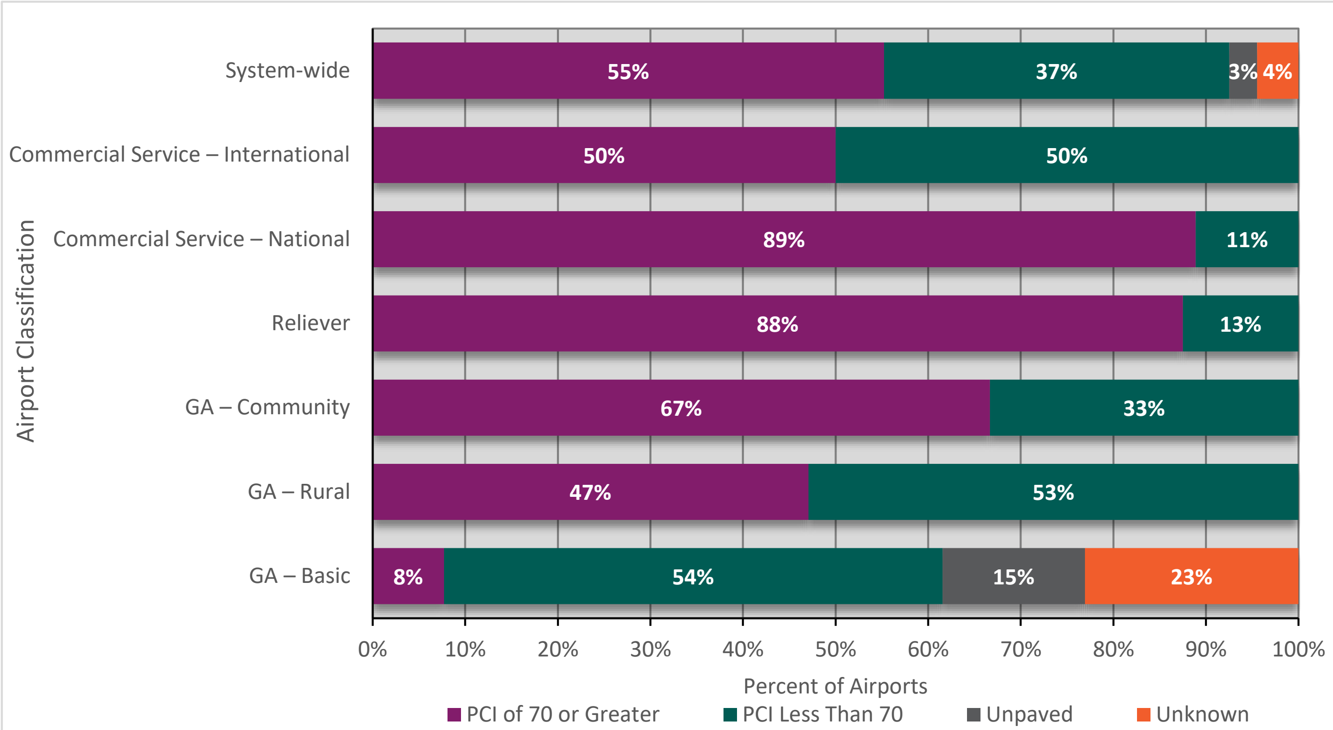
Figure 19 summarizes PCI compliance of primary runways at Arizona airports. State-wide, 64 percent of primary runways at system airports have a PCI greater than or equal to 70. All eight Reliever as well as both Commercial Service-International airports' primary runways are compliant.



Source: Arizona APMS Summary Report 2017

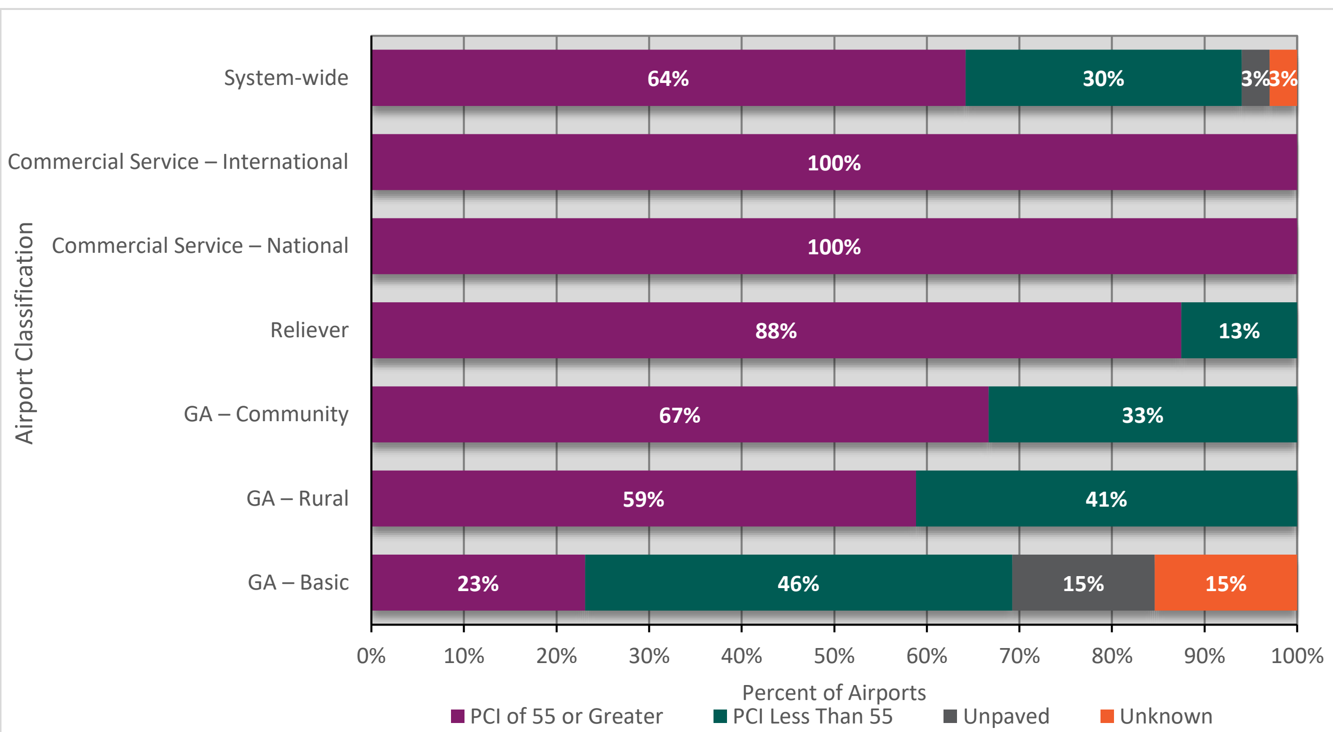
Figure 19. Percent of Airports by Classification Meeting Primary Runway PCI Compliance

In addition to evaluating airports' overall and primary runway PCIs, taxiway and ramp pavements were reviewed independently. Airports do not need to maintain the same pavement conditions for runways, taxiways, and aprons for safe aircraft operations. For example, some airports have large apron areas that are left unused with minimal upkeep, as improvements must be prioritized to those facilities with the greatest impact on safety and efficiency. Accordingly, taxiways were evaluated for PCI of greater than or equal to 70 (**Figure 20**), while aprons were reviewed for a PCI greater or equal to 55 (**Figure 21**).



Source: Arizona APMS Summary Report 2017

Figure 20. Airports Meeting Primary Taxiway PCI Compliance (≥70)



Source: Arizona APMS Summary Report 2017

Figure 21. Airports Meeting Apron PCI Compliance (≥55)

System Indicators

The following section provides an analysis of the percent of statewide population within a 30-minute drive time of each airport, by role classification; followed by an analysis of the system indicators of the fiscal responsibility goal. System indicators of the fiscal responsibility goal include:

1. Percent of statewide population within a 30-minute drive time of each airport, by role classification
2. Percent of population within 30 minutes of a NPIAS airport
3. Percent of communities in the state with a population greater than 1,000 with a 30-minute drive time of a GA airport
4. Percent of population within 30 minutes of a system airport meeting business user needs
5. Number of airports with utilities (i.e., electricity, telephone, water, sewer, and gas)

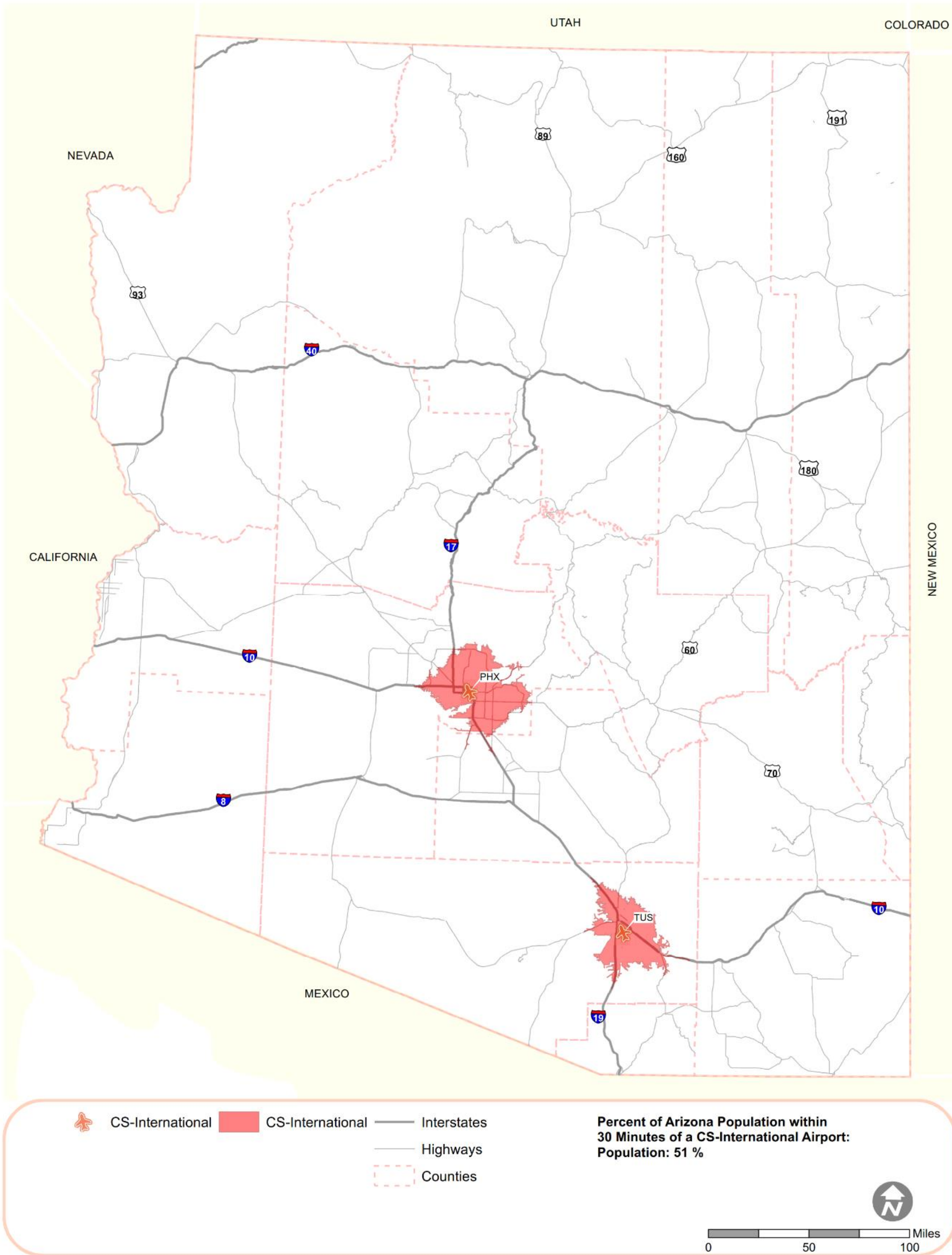
Percent of Statewide Population Within a 30-Minute Drive Time of Each Airport, by Role Classification

As described in **Chapter 5: Airport Classification Analysis**, Arizona system airports support various levels and types of aviation activity. The state's six classifications reflect the unique roles airports play in the state, as well as on regional and local levels. This analysis evaluated residents' access to each classification of commercial service and GA airports, then combined the analyses to show the population's access to any system airport.[8] The cumulative analysis reflects the capacity of larger airports to also serve the needs of users that typically use smaller airports, especially for small GA aircraft with the ability land at any size airport. This combined analysis reflects the additional population accessibility that is provided by adding airport classifications together.

Figure 22 through **Figure 27** depict 30-minute drive times for each individual role category. Fifty-one percent of the population is within a 30-minute drive time of a Commercial Service-International Airport, followed by 28 percent for Commercial Service-National, 70 percent for Reliever, 17 percent for GA-Community, four percent for GA-Rural, and one percent for GA-Basic.[9] These reflect the population associated only with that classification, not the cumulative population or duplicative population served as the coverages are combined. Where duplication exists within an individual classification, the population was only counted once.

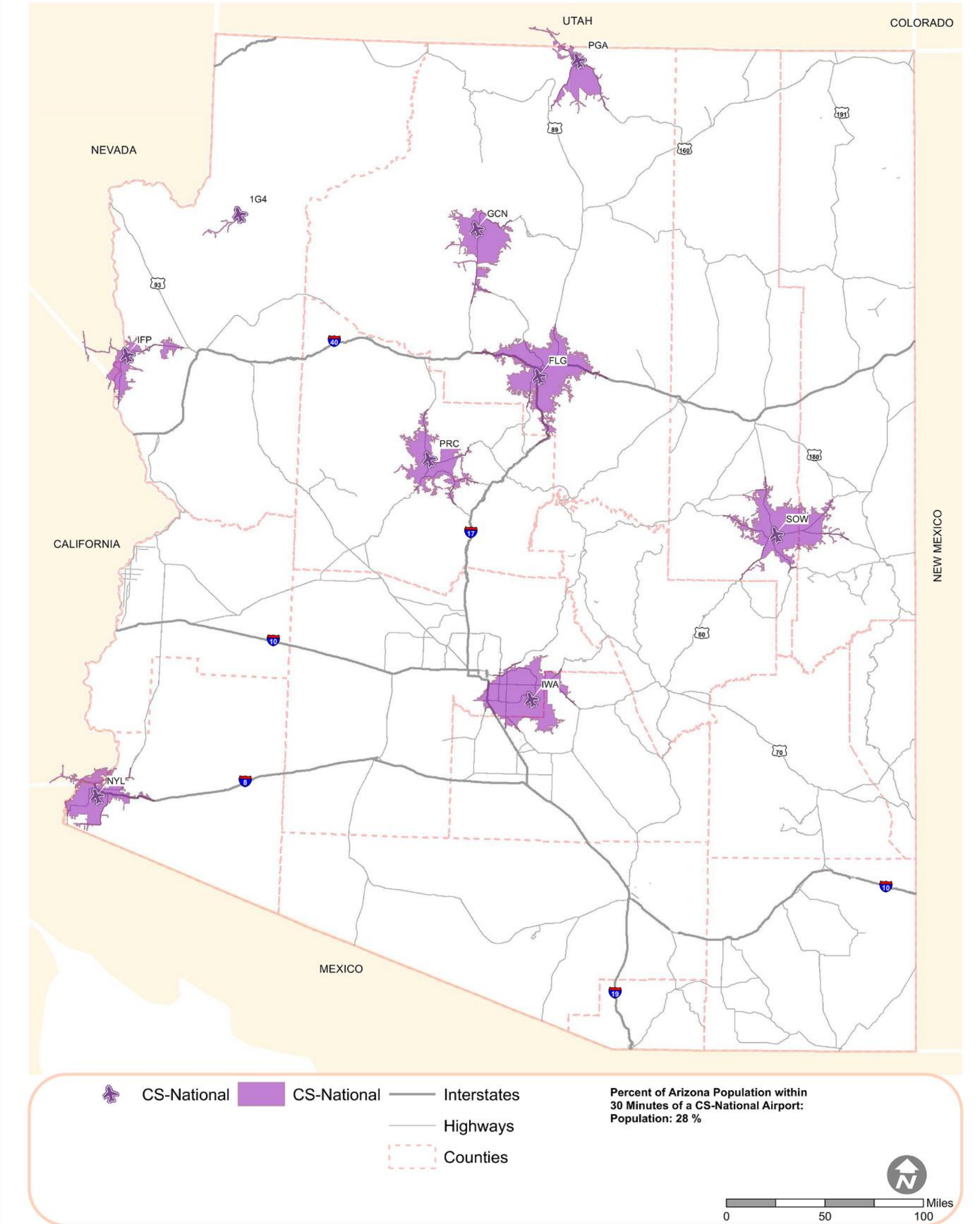
[8] Laughlin/Bullhead City International Airport (IFP) is classified as a Commercial Service-National Airport in the 2018 SASP Update. While the airport does have scheduled commercial service, these flights are operated by the casinos on the west side of the Colorado River in Laughlin, Nevada. Private individuals do not have access to these flights. A footnote has been added to those maps in which the absence of commercial service at IFP impacts population coverage.

[9] Coverage drops to 27 percent for Commercial Service-National when IFP is removed from the analysis.



Sources: Kimley-Horn 2018, Environmental Systems Research Institute (ESRI) Community Analyst 2017

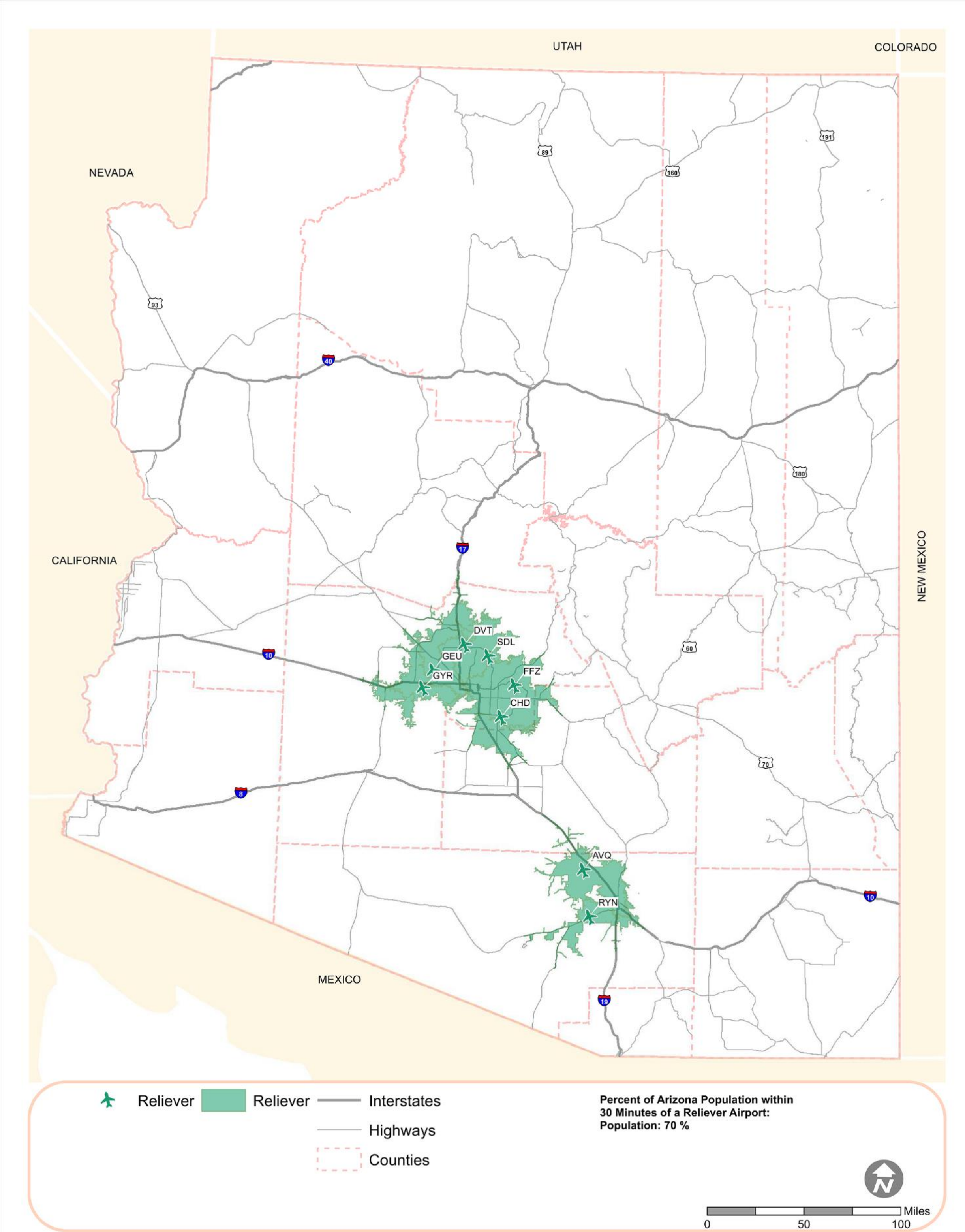
Figure 22. 30-Minute Drive Times of Commercial Service-International Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

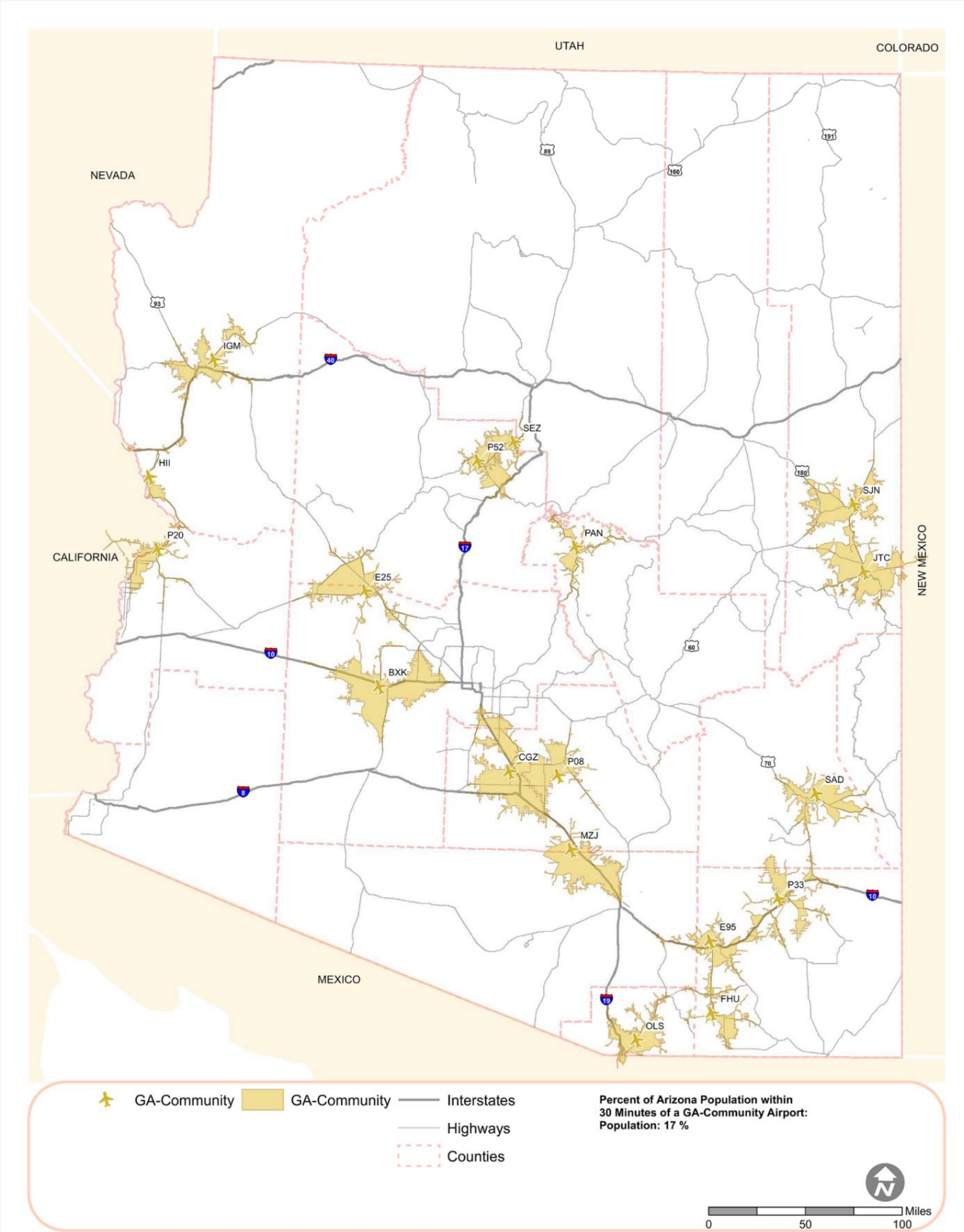
Figure 23. 30-Minute Drive Times of Commercial Service-National Airports[10]

[10] Population coverage drops to 27 percent when IFP is removed from the analysis.



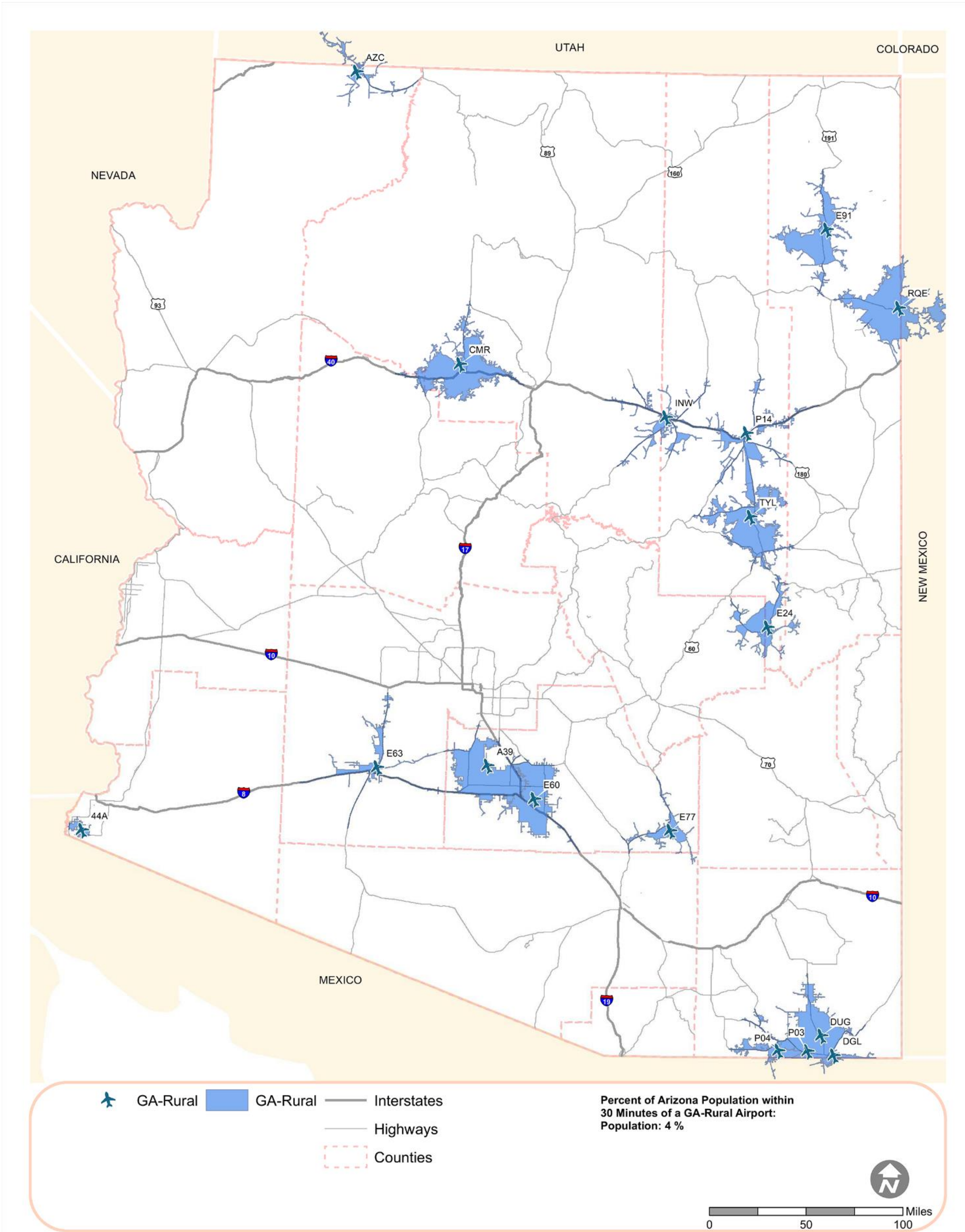
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 24. 30-Minute Drive Times of Reliever Airports



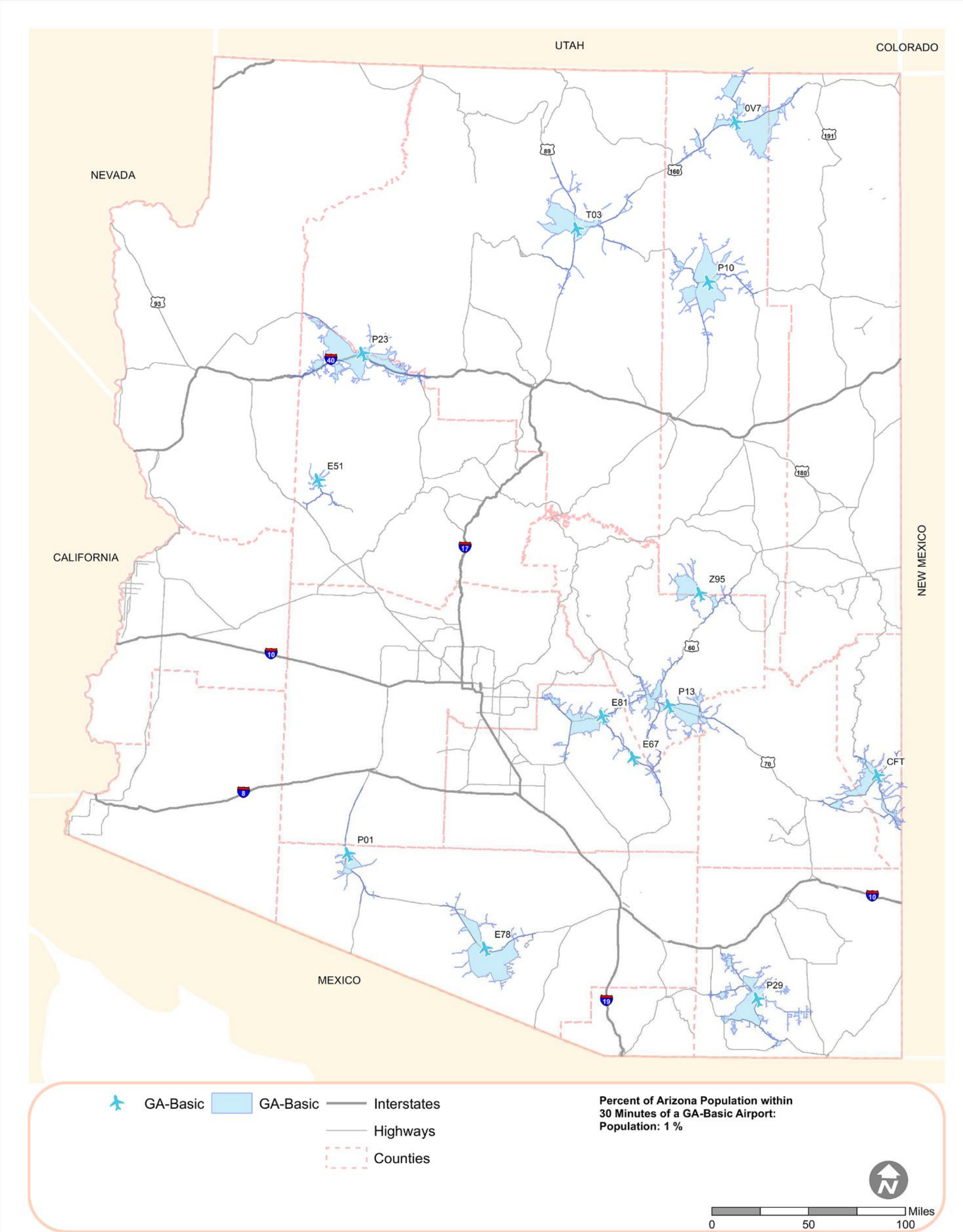
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 25. 30-Minute Drive Times of GA-Community Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 26. 30-Minute Drive Times of GA-Rural Airports



Source: Kimley-Horn 2018, ESRI Community Analyst 2017

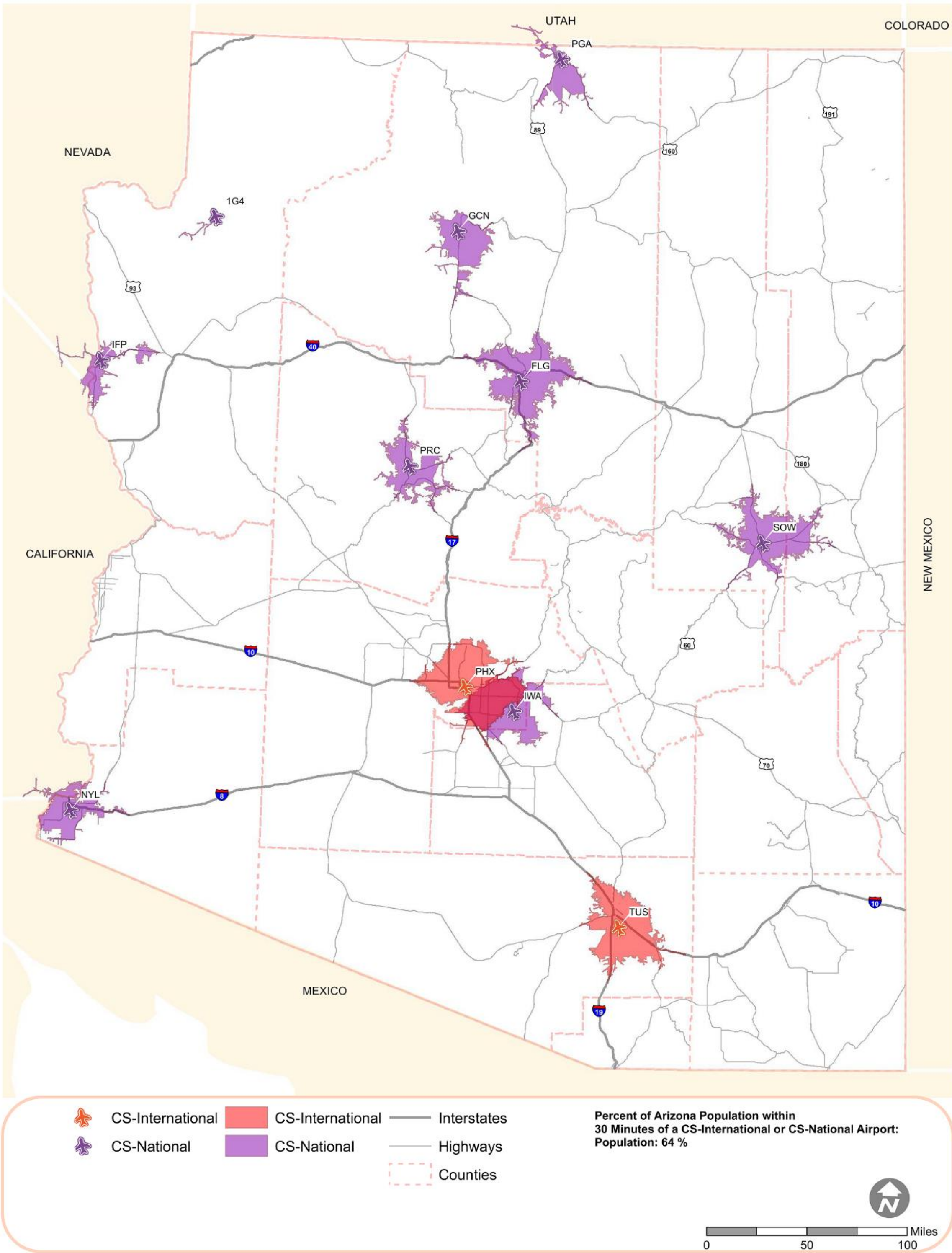
Figure 27. 30-Minute Drive Times of GA-Basic Airports

Another component of the 30-minute drive time analysis is pairing the airport classifications one-by-one to determine an all-airport 30-minute drive time coverage in Arizona. Combination population coverage of the SASP airports are as follows:

1. Commercial Service-International and Commercial Service-National airports (64 percent population coverage)[11]
2. Commercial Service-International, Commercial Service-National, and Reliever airports (83 percent population coverage)[12]
3. Commercial Service-International, Commercial Service-National, Reliever, and GA-Community airports (91 percent population coverage)
4. Commercial Service-International, Commercial Service-National, Reliever, GA-Community, and GA-Rural airports (93 percent population coverage)
5. All SASP airports (93 percent population coverage)[13]

Figure 28 through **Figure 32** depict combination population coverage at SASP airports by airport classification. It should be noted that American Airlines stopped serving IFP shortly after the Airport Inventory and Data Survey. Sun Country and Elite Airways continue to serve IFP, however, the service is not available to the public. Because of this technicality, drive time exclusions for IFP are footnoted which address commercial service at the airport in 2018. Please note that colors appear darker and more pronounced in those areas in which coverage overlaps between classifications.

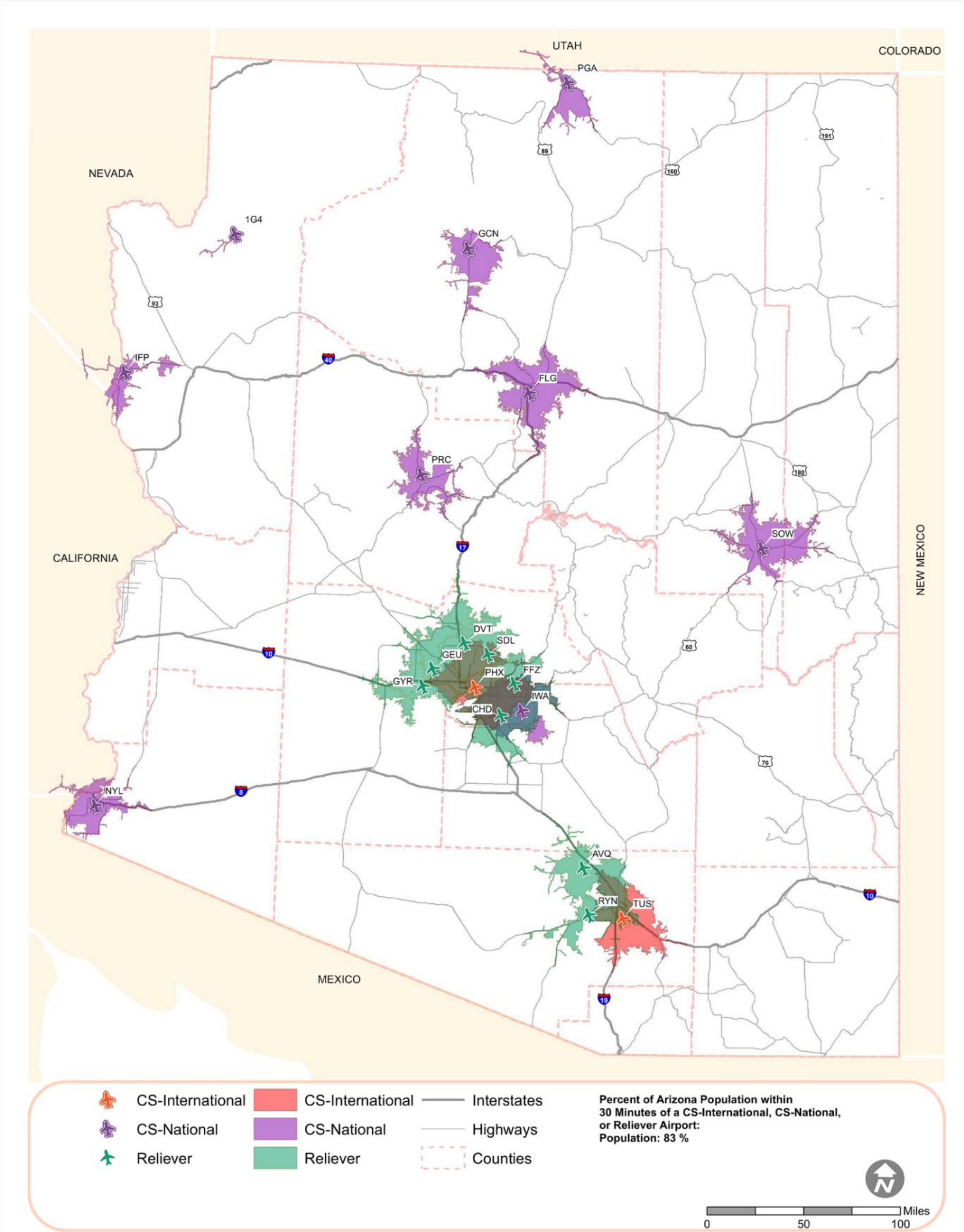
[11] Population coverage drops to 62 percent when IFP is removed from the analysis.
[12] Population coverage will remain at 83 percent in this evaluation, as IFP continues to support GA activity for the local population similar in frequency and type as a Reliever airport.
[13] Population coverage at GA-Basic airports were less than one percent.



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017.

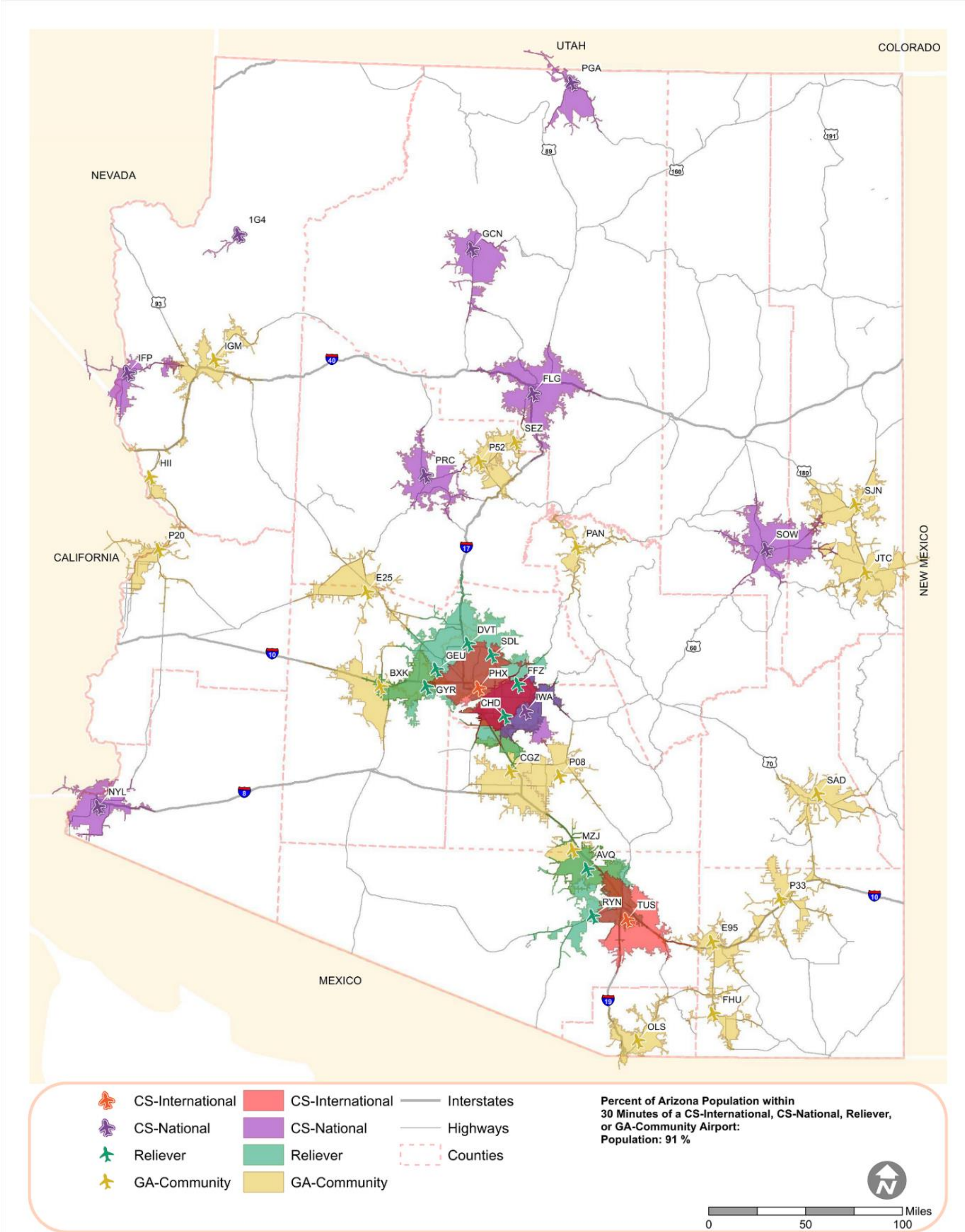
Figure 28. 30-Minute Drive Times of Commercial Service-International and Commercial Service-National Airports[14]

[14] Population coverage drops to 62 percent when IFP is excluded from the evaluation.



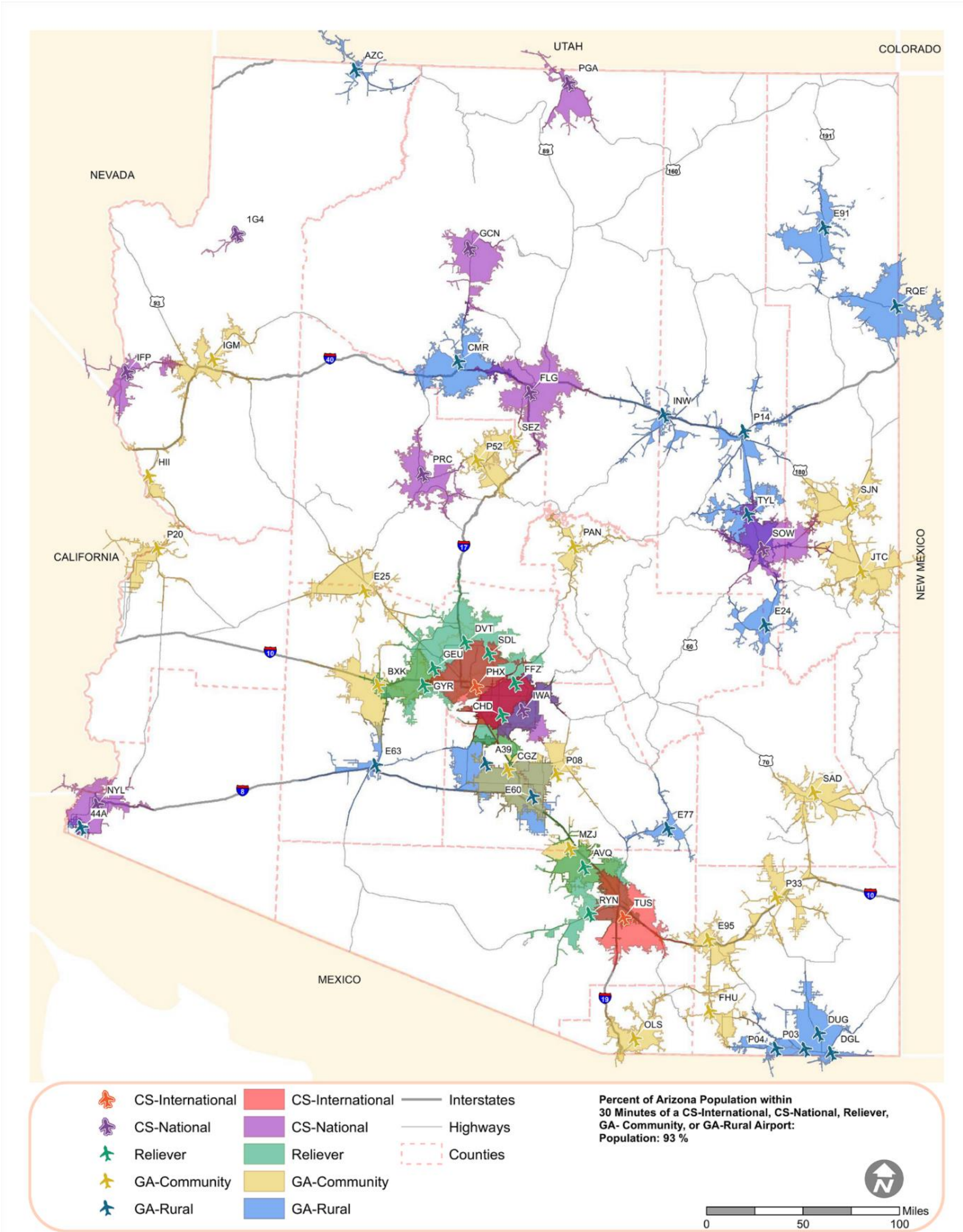
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 29. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, and Reliever Airports



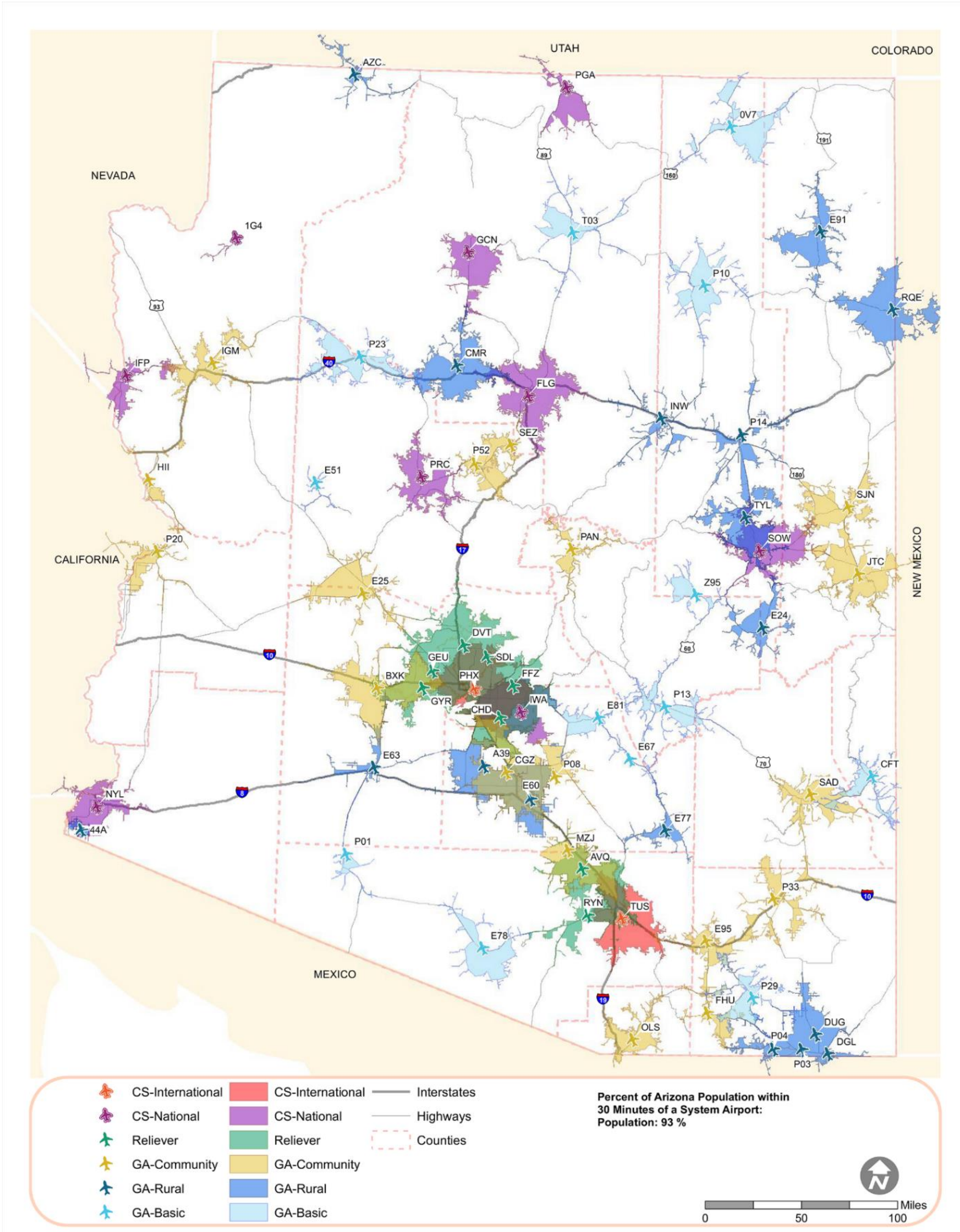
Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 30. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, Reliever, and GA-Community Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 31. 30-Minute Drive Times of Commercial Service-International, Commercial Service-National, Reliver, GA-Community, and GA-Rural Airports



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 32. 30-Minute Drive Times of all SASP Airports

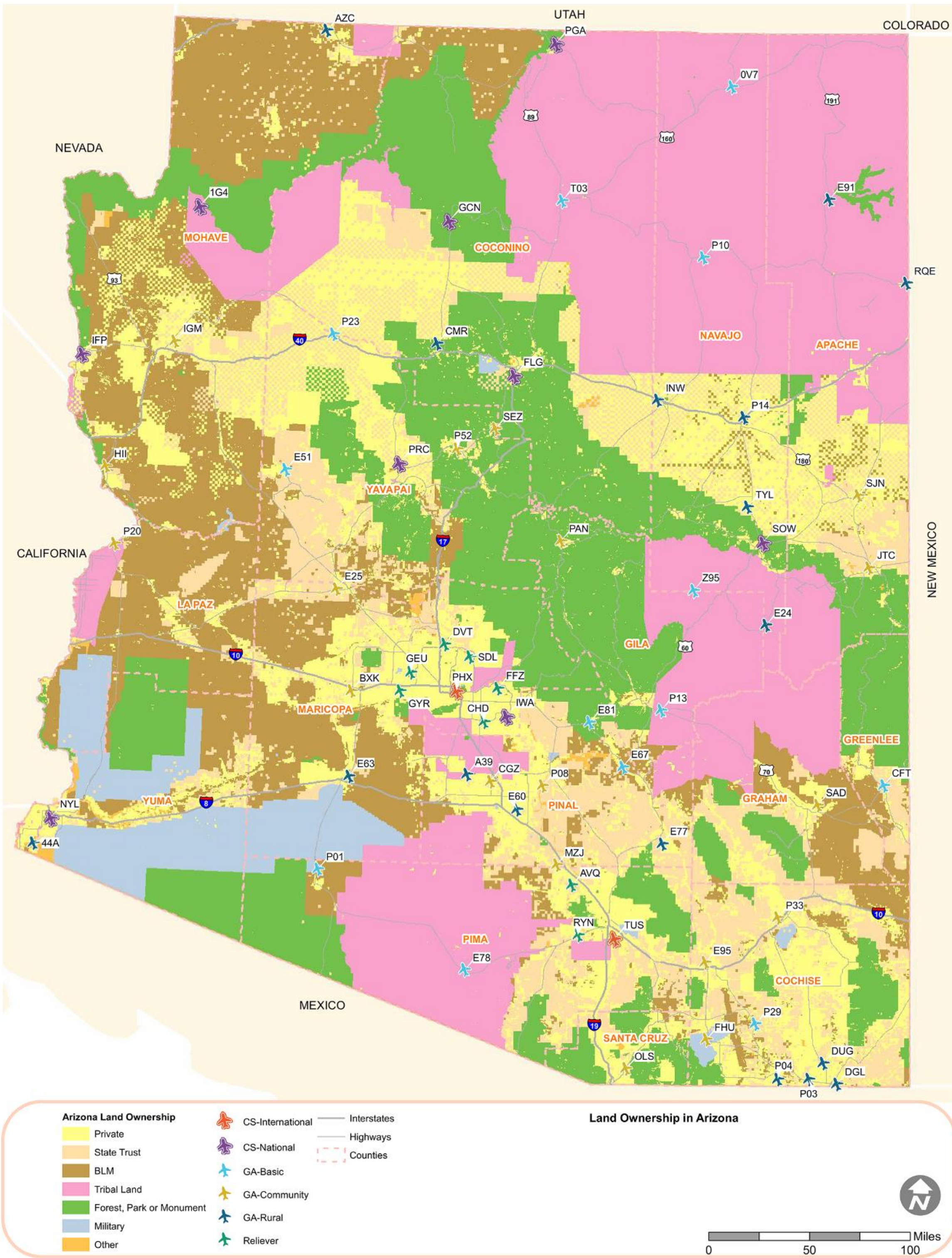
As noted previously, much of Arizona's population is within concentrated pockets throughout the state. **Table 5**, ordered by largest to smallest percentage of state ownership, presents the different types of land ownership categories with an associated percentage of state total.

Table 5. Land Ownership Types and Percentage of State Total

Land Ownership	Percent of State
Tribal Land	27.60%
Forest, Park, or Monument	21.40%
Private	17.55%
Bureau of Land Management (BLM)	16.68%
State Trust	12.68%
Military	3.77%
Other	0.32%
Total	100%

Source: Arizona Land Resource Information System (ALRIS) 2012

Figure 33 depicts the types of land ownership types in relation to the system airports.



Sources: Kimley-Horn 2018, ALRIS 2012

Figure 33. Land Ownership in Arizona

As mentioned previously, there are 11 commercial service airports in Arizona's system. Access to an airport with commercial service is critical to not only businesses and traveling Arizona residents, but visitors who impact Arizona's sizeable tourism market. The following two figures, **Figure 34** and **Figure 35**, present communities in Arizona with a population of 5,000 or greater, within a 60-minute drive time and 90-minute drive time of a commercial service airport, respectively.

Currently, 83 percent of communities (73 of 88) with a population of 5,000 or greater are within a **60-minute** drive time of a commercial service airport. The communities with a population of 5,000 or greater that are located outside these areas include:[15]

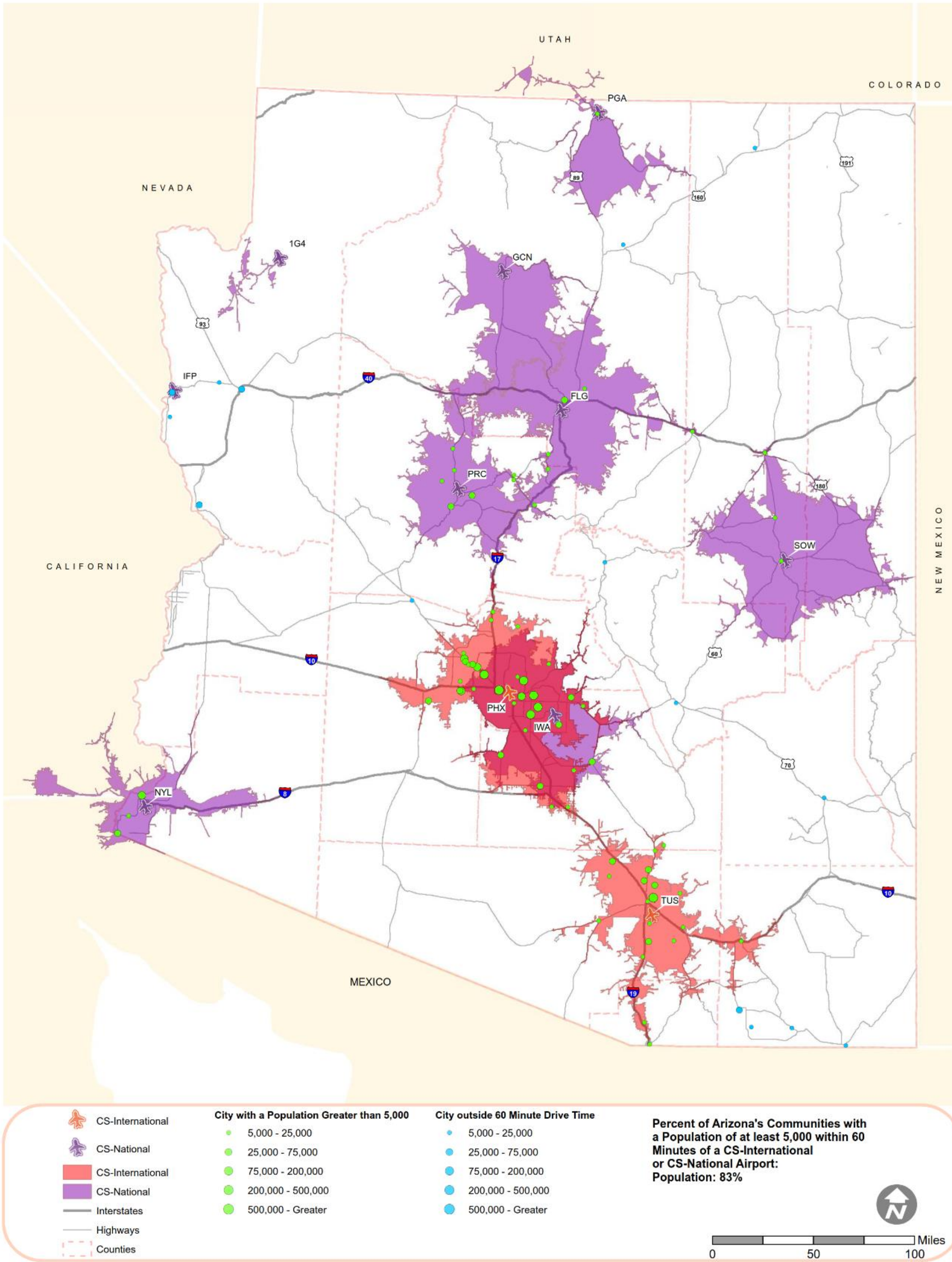
1. Bisbee
2. Bullhead City*
3. Douglas
4. Fort Mohave*
5. Globe
6. Golden Valley*
7. Kayenta
8. Kingman*
9. Lake Havasu City
10. Payson
11. Safford
12. Sierra Vista
13. Sierra Vista Southeast
14. Tuba City
15. Wickenburg

Ninety percent of communities (79 of 88) with a population of 5,000 or greater are within a **90-minute** drive time of a commercial service airport. The communities with a population of 5,000 or greater that are located outside these areas include:[16]

1. Bisbee
2. Bullhead City**
3. Douglas
4. Fort Mohave**
5. Golden Valley**
6. Kayenta
7. Kingman**
8. Lake Havasu City**
9. Safford

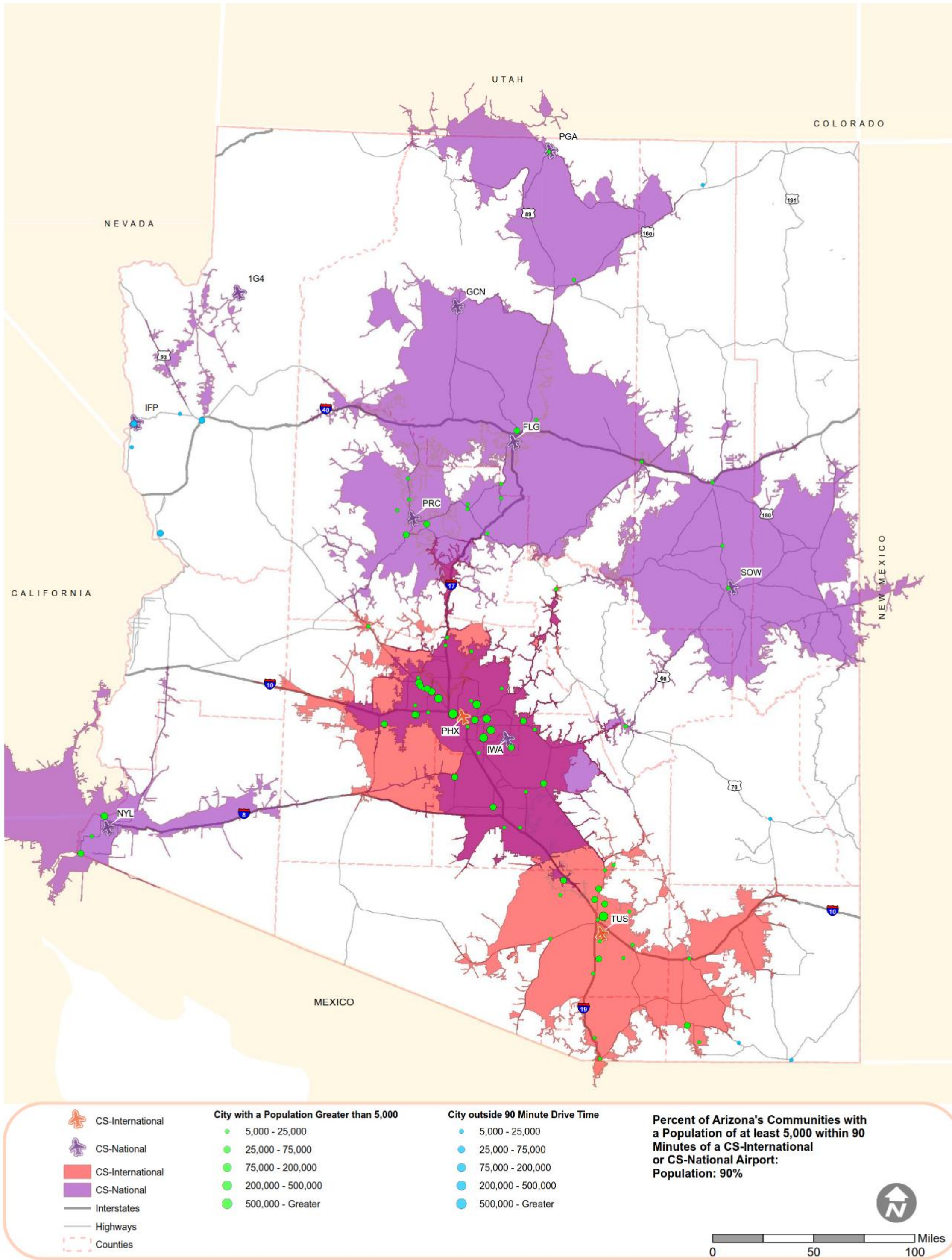
[15] *Cities with a population of at least 5,000 that would be within a 60-minute drive time of IFP if the airport was to gain publicly accessible commercial service in the future. Community coverage would increase from 83 percent to 88 percent.

[16] **Cities with a population of at least 5,000 that would be within a 90-minute drive time of IFP if the airport was to gain publicly accessible commercial service in the future. Community coverage would increase from 90 percent to 95 percent.



Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 34. 60-Minute Drive Times of a Commercial Service Airport

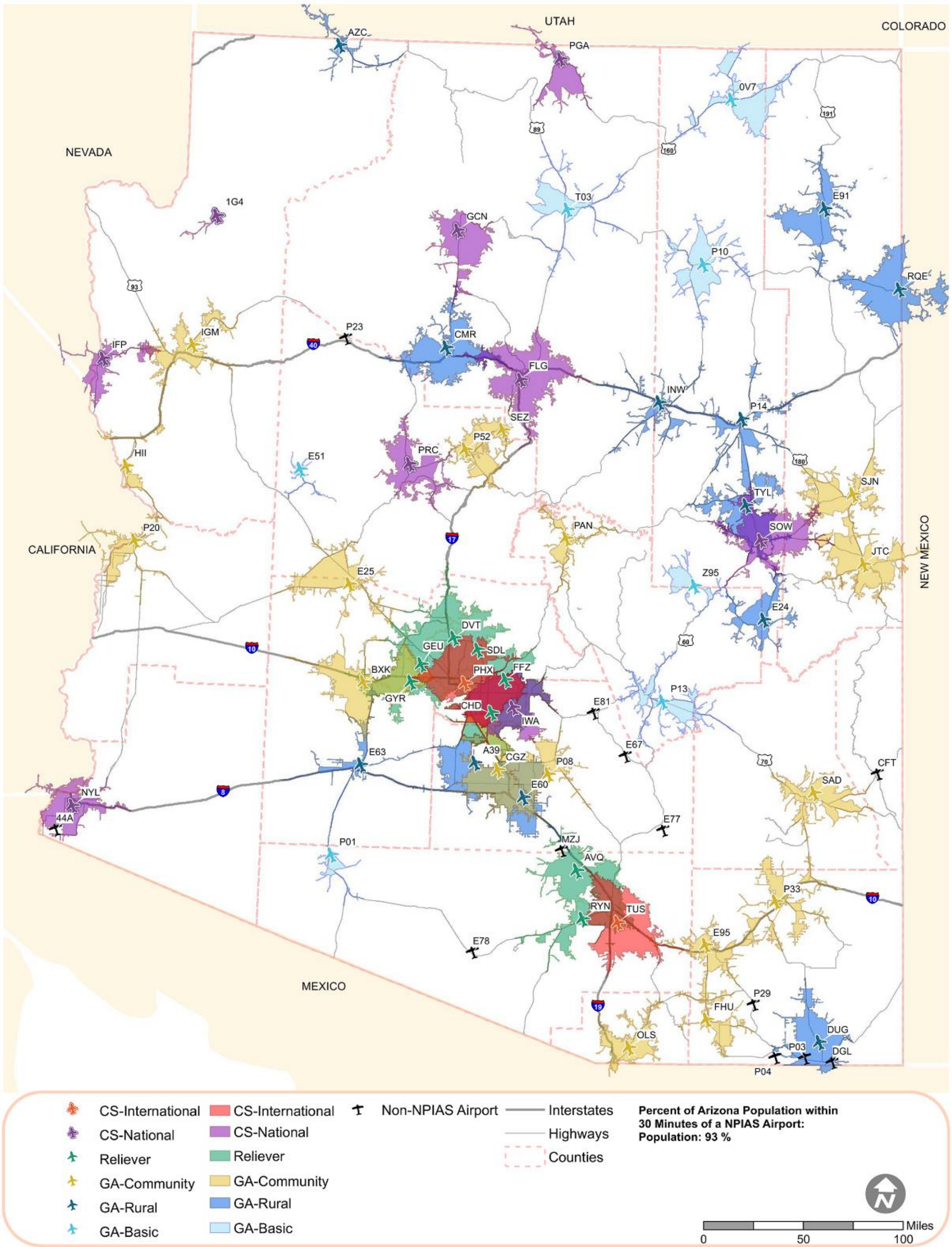


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 35. 90-Minute Drive Times of a Commercial Service Airport

Percent of Population Within 30 Minutes of a NPIAS Airport

The NPIAS is the FAA's primary planning document that categorizes and groups airports that are deemed significant to the national airspace system and thus eligible for Airport Improvement Program (AIP) funding. The NPIAS categorizes commercial service airports by their hub size and GA airports by ASSET category. Hub sizes include large, medium, small, and nonhub airports, while ASSET categories include national, regional, local, and basic. Arizona is home to 59 NPIAS airports, including one large hub commercial service airport (PHX) and two national ASSET airports (Phoenix-Deer Valley [DVT] and Scottsdale [SDL]). **Figure 36** shows a total population coverage of 93 percent within 30 minutes of the state's 59 NPIAS airports.

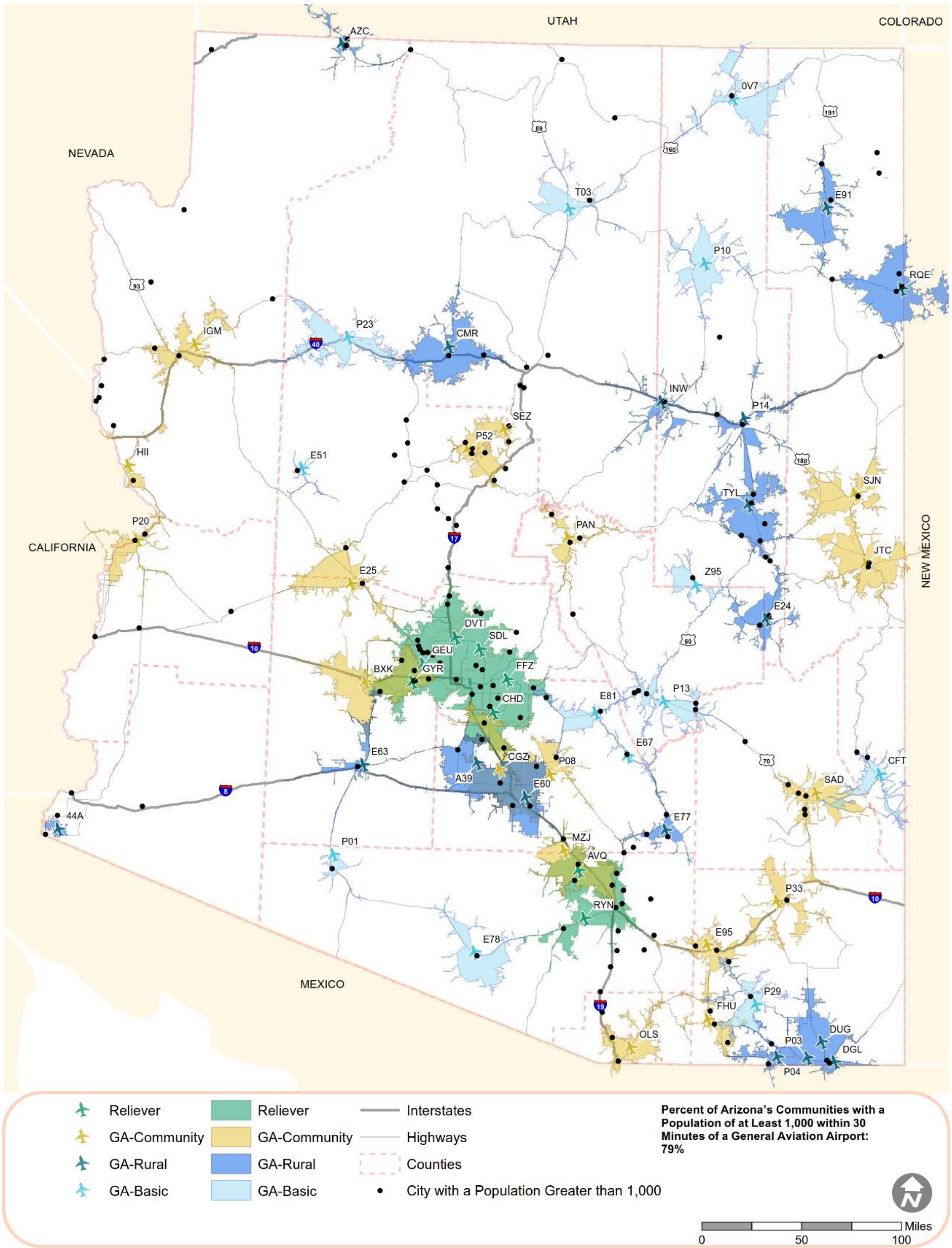


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 36. 30-Minute Drive Times of NPIAS Airports in Arizona

Percent of Communities in the State with a Population Greater than 1,000 with a 30-Minute Drive Time of a GA Airport

Reasonable access to GA airports is a fundamental feature of an adequate state aviation system. The GA portion of airports in Arizona's system indicates the magnitude of aviation activity that is occurring outside of the state's 11 commercial service airports. Providing access for communities to these GA airports helps promote their continued use and support of medical transport, cargo, and other aviation activities for communities across the state. As shown in **Figure 37**, 79 percent of these communities are located within a 30-minute drive time of a GA airport.

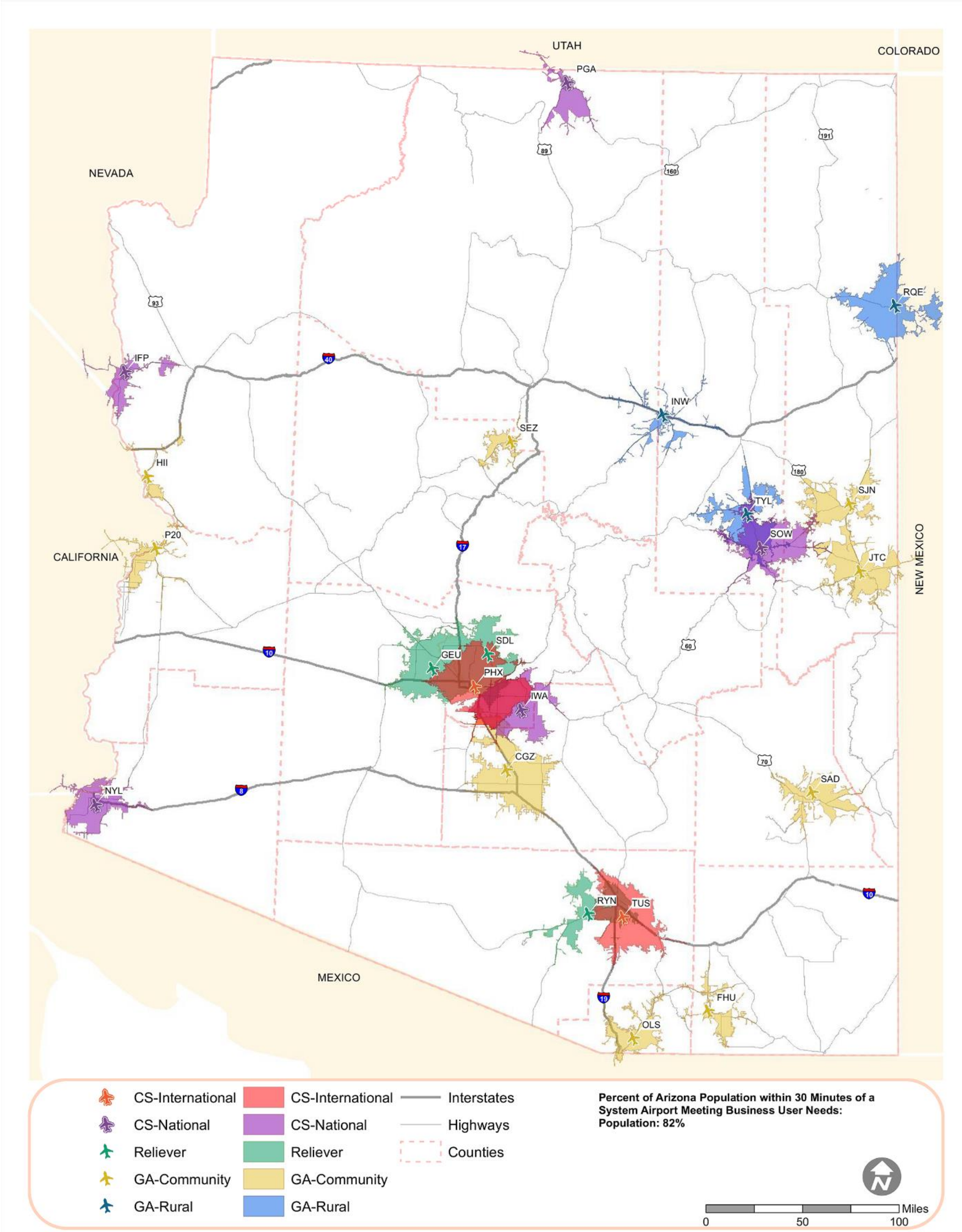


Sources: Kimley-Horn 2018, ESRI Community Analyst 2017

Figure 37. Communities in the State with a Population Greater than 1,000 within a 30-Minute Drive Time of a GA Airport

Percent of Population Within 30 Minutes of a System Airport Meeting Business User Needs

The presence of an airport that supports business and corporate aviation is an important indicator of the health of the local or regional economy. Not only does business aviation support good, well-paying jobs, but airports that serve this type of activity provide access to communities, many of which are not served by scheduled airlines. As a result, airports that support business/corporate aviation can have significant direct and indirect impacts on local economies. This analysis included the most important attributes needed to support a typical business jet, including at least a 5,000-foot-long runway, weather reporting station (i.e., AWOS or ASOS), IAP, and jet fuel. As shown in **Figure 38**, 82 percent of the state's population is within a 30-minute drive time of airports meeting the criteria to serve business user needs.



Sources: Airport Inventory and Data Survey 2017, AirNav 2017, CDM Smith 2017, Kimley-Horn 2018

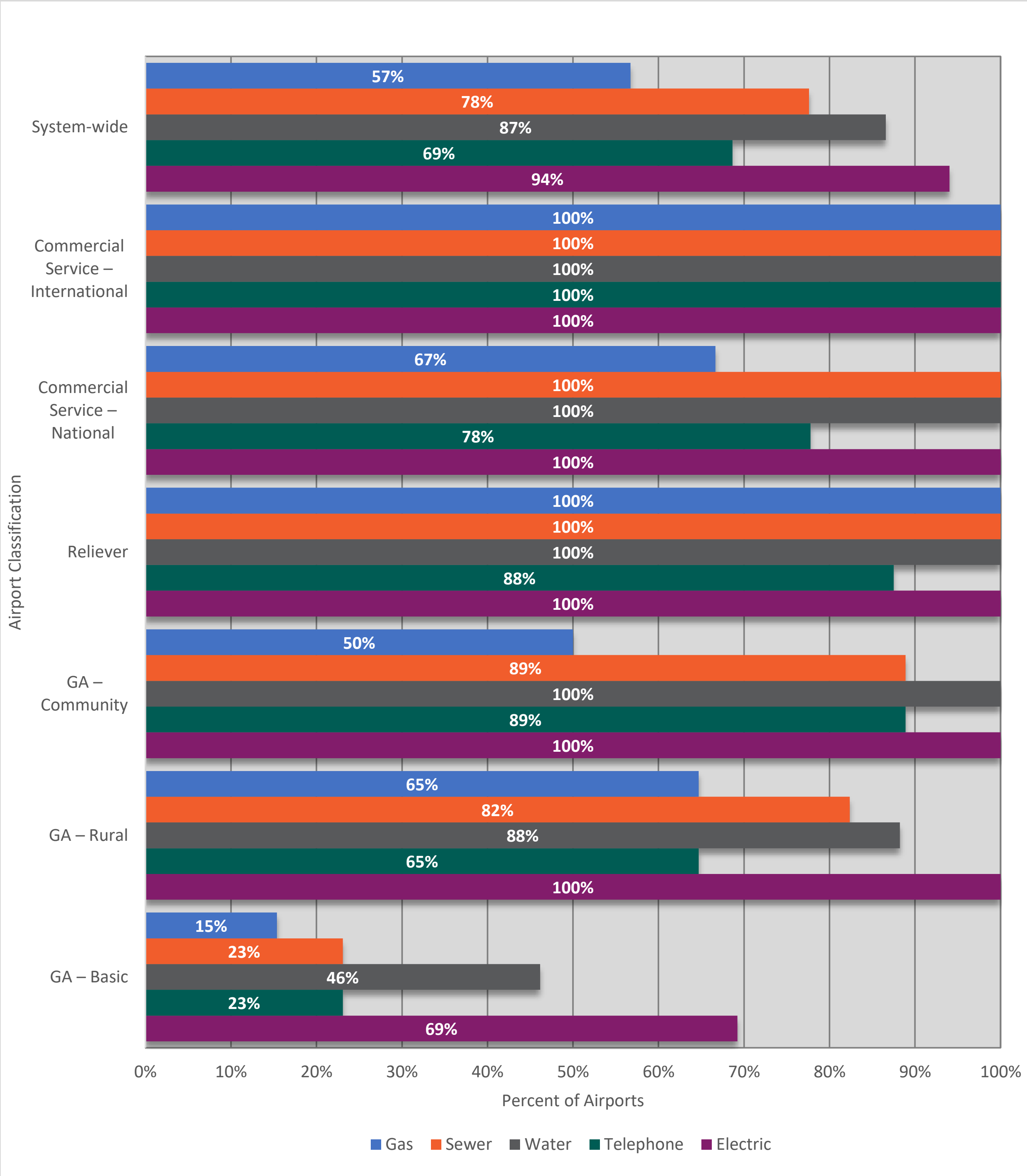
Figure 38. 30-Minute Drive Times of System Airports Meeting Business User Needs

Number of Airports with Utilities (i.e., Electricity, Telephone, Water, Sewer, and Gas)

Adequate utilities provide a number of important benefits for both commercial service and GA airports. In addition to providing for passenger comfort and convenience at commercial service airports, utilities support safety and security at all types of airports. Water, for example, is required for fire suppression systems at commercial service and GA airports. Power is essential for security procedures of the Transportation Security Administration (TSA). Utilities, including electricity, water, and sewer, are also vital for many airport tenants, which may provide the only source of revenue at GA airports. They can also be a determining factor in where aircraft owners choose to base their aircraft. Phone service can be important for pilots landing at rural airports without reliable cell service.

Airports were asked about the availability of electricity, telephone, water, sewer, and gas during the airport inventory.[17] State-wide, 57 percent of airports reported having gas, 78 percent sewer, 87 percent water, 69 percent telephone, and 94 percent electricity. **Figure 39** presents results based on airport classification as well as system-wide totals.

[17] This analysis was limited to those utilities explicitly noted on the Airport Inventory and Data Survey. In some cases, airports reported that their facilities were served by septic system. Septic systems were excluded from the analysis for consistency purposes.



Source: Airport Inventory and Data Survey 2017

Figure 39. Percent of Airports by Classification with Utilities

GOAL CATEGORY: ECONOMIC SUPPORT

Airports play an important role in promoting economic activity in Arizona and provide a critical competitive advantage in today's global marketplace. Airports are the keystone to the multibillion dollar air cargo industry and are gateways between markets in Arizona and across the globe. The 2012 *Economic Impact of Aviation in Arizona* report found that the aviation industry accounts for 16.8 percent of all jobs and generates a significant source of tax revenues in the state. Additionally, the majority of visitors to Arizona arrive through commercial service and GA airports (versus travel by car, bus, or train). Businesses in Arizona and across the U.S. regularly report that the presence of an airport network is a critical factor in their relocation and expansion decisions. Based on the significant economic impacts provided by the aviation industry, investing in Arizona's airports can provide a significant return on investment for Arizona's residents and businesses.

Performance Measures

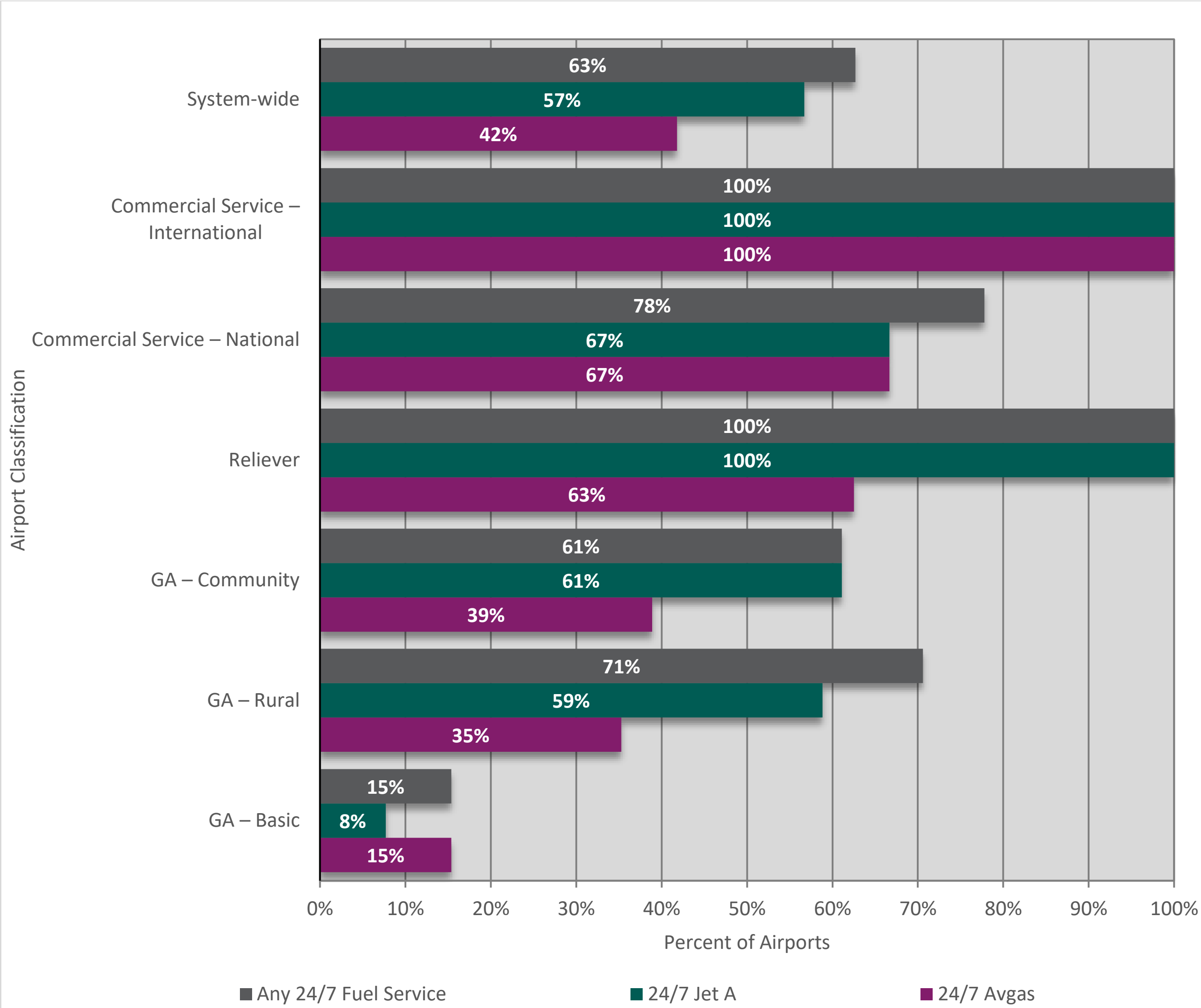
The analyses of performance measures associated with the economic support goal category are presented below. These performance measures include:

1. Percent of airports with 24/7 fuel
2. Percent of airports that are recognized in local/regional growth plans
3. Percent of airports with the facilities to support jet aircraft

Percent of Airports with 24/7 Fuel

The widespread availability of fuel is an important driver of the level of aviation activity found in Arizona. Access to fuel 24 hours per day, seven days per week allows aircraft to fly at non-peak hours and adds a layer of safety for pilots in emergency situations when aircraft require immediate re-fueling. The benefits of 24/7 fuel also extend to community safety and resiliency, as aircraft can re-fuel during times of disaster when they are needed to transport people, goods, and services. Additionally, 24/7 fuel helps attract both based and transient aircraft operators who need quick access to fuel on-demand.

Airports were asked about the availability of fuel during the airport inventory. This assessment included airports that provide AvGas (used by piston-powered engines in many GA aircraft), Jet A (used by the turbine engines in jet aircraft), or both. Fuel could be distributed via a self-serve pump or a 24-hour fixed-base operator (FBO) service. **Figure 40** summarizes the percentage of airports by classification that offer 24/7 fueling as reported during the airport inventory. In total, 63 percent of the system reported offering some form of 24/7 fueling, including all airports in the Commercial Service-International and Reliever classifications. Individually, 57 percent of the system reported offering 24/7 jet fuel, while 42 percent reported offering 24/7 AvGas (albeit not the exact same set of airports).



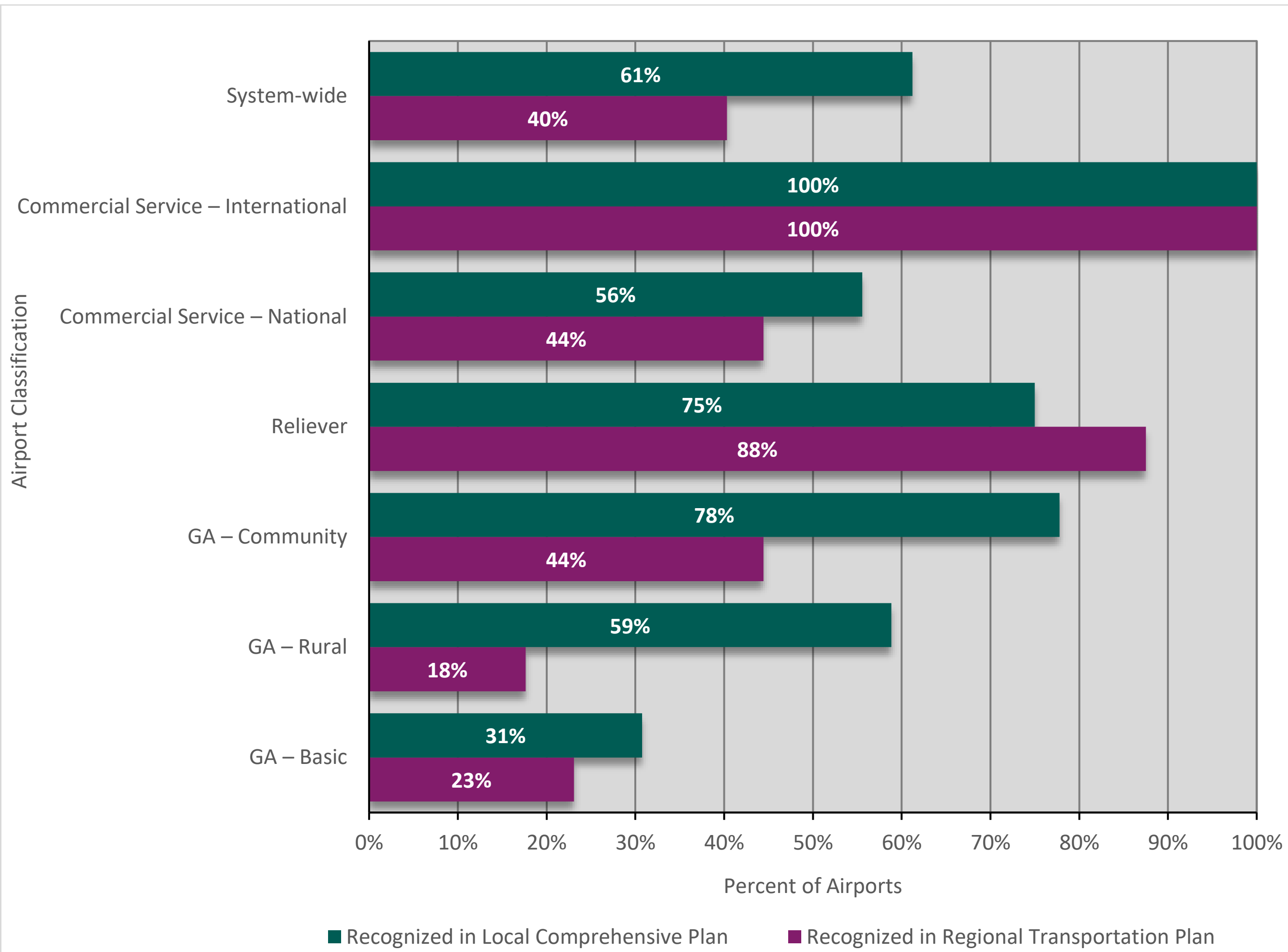
Source: Airport Inventory and Data Survey 2017

Figure 40. Percent of Airports by Classification with 24/7 Fuel Service

Percent of Airports that are Recognized in Local/Regional Growth Plans

An airport's inclusion in local or regional growth plans indicates community support by recognizing the facility's role in future growth and economic development, as well as applicable multimodal transportation goals. Being recognized in local or regional plans is a sign of stability within an airport's community. Airports that are included in these types of plans are also typically more likely to be located in areas with controls or zoning designed to promote airport compatible land uses, which increase the airport's long-term viability and potential (see discussion on page 6-6-5 for further details about airport compatible land use).

Airports were asked if they are recognized in local/regional growth plans during the airport inventory. **Figure 41** summarizes the percentage of airports by classification that are recognized in their local comprehensive plan or regional transportation plan as reported. In total, 61 percent of Arizona's system airports are recognized in their local comprehensive plan, including both Commercial Service-International airports, 78 percent of GA-Community airports, and 75 percent of Reliever airports. Forty percent of total system airports are included in their regional transportation plan, including 100 percent of Commercial Service-International airports and 88 percent of Reliever airports.



Source: Airport Inventory and Data Survey 2017

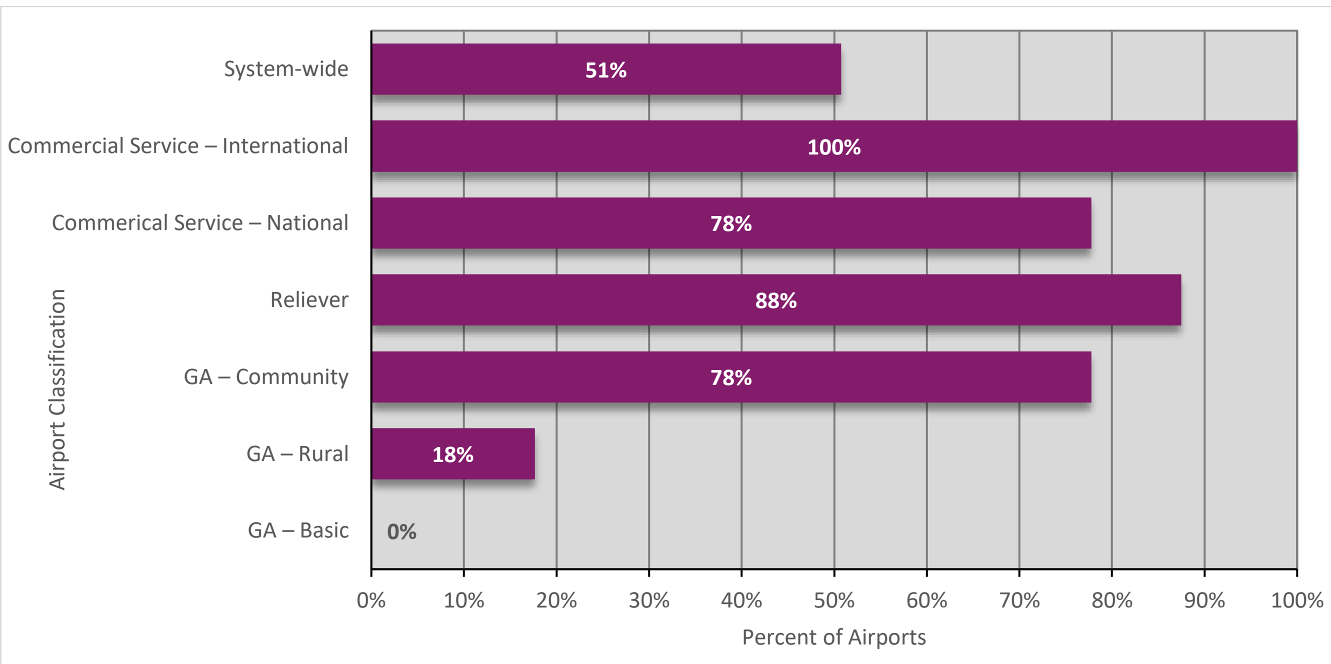
Figure 41. Percent of Airports by Classification Recognized in Local or Regional Growth Plans

Percent of Airports with the Facilities to Support Jet Aircraft

The ability to support jet aircraft is important for airports hoping to attract and support more demanding aviation activity such as corporate flights and air cargo. Similar to supporting business activity, for the purposes of the SASP Update, airports are seen as having the facilities to support jet aircraft if they have the following:

1. Paved runway at least 5,000 feet in length
2. Published IAP
3. Conventional hangar space
4. Jet A fuel

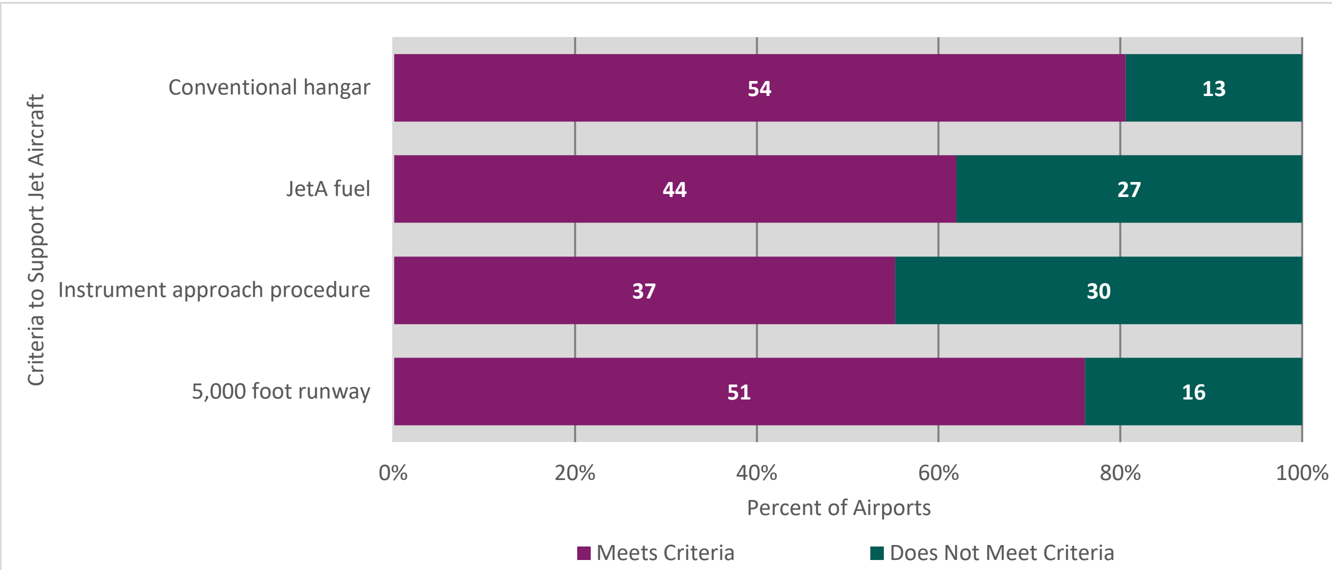
During the airport inventory, airports confirmed the length of their runway and provided information about the type and availability of hangar space and fuel. Data regarding IAPs were obtained from SkyVector. **Figure 42** summarizes the percentage of airports by classification that meet these criteria. In total, 51 percent of system airports have the above facilities, optimizing their ability to support jet aircraft. This includes both Commercial Service-International airports, 78 percent of Commercial Service-National airports, and 88 percent of Reliever airports.



Sources: Airport Inventory and Data Survey 2017, SkyVector 2017

Figure 42. Percentage of Airports by Classification with the Facilities to Support Jet Aircraft

Figure 43 summarizes airports' abilities to achieve each of the individual criterion used to assess this performance measure. Of those airports that do not meet the criteria to support jet aircraft, most are missing an IAP (30 airports missing this component), followed by Jet A fuel (27 airports), 5,000-foot runway (16 airports), and conventional hangars (13 airports).



Source: Airport Inventory and Data Survey 2017

Figure 43. Number of Airports that Meet/Do Not Meet Criterion to Support Jet Aircraft

System Indicators

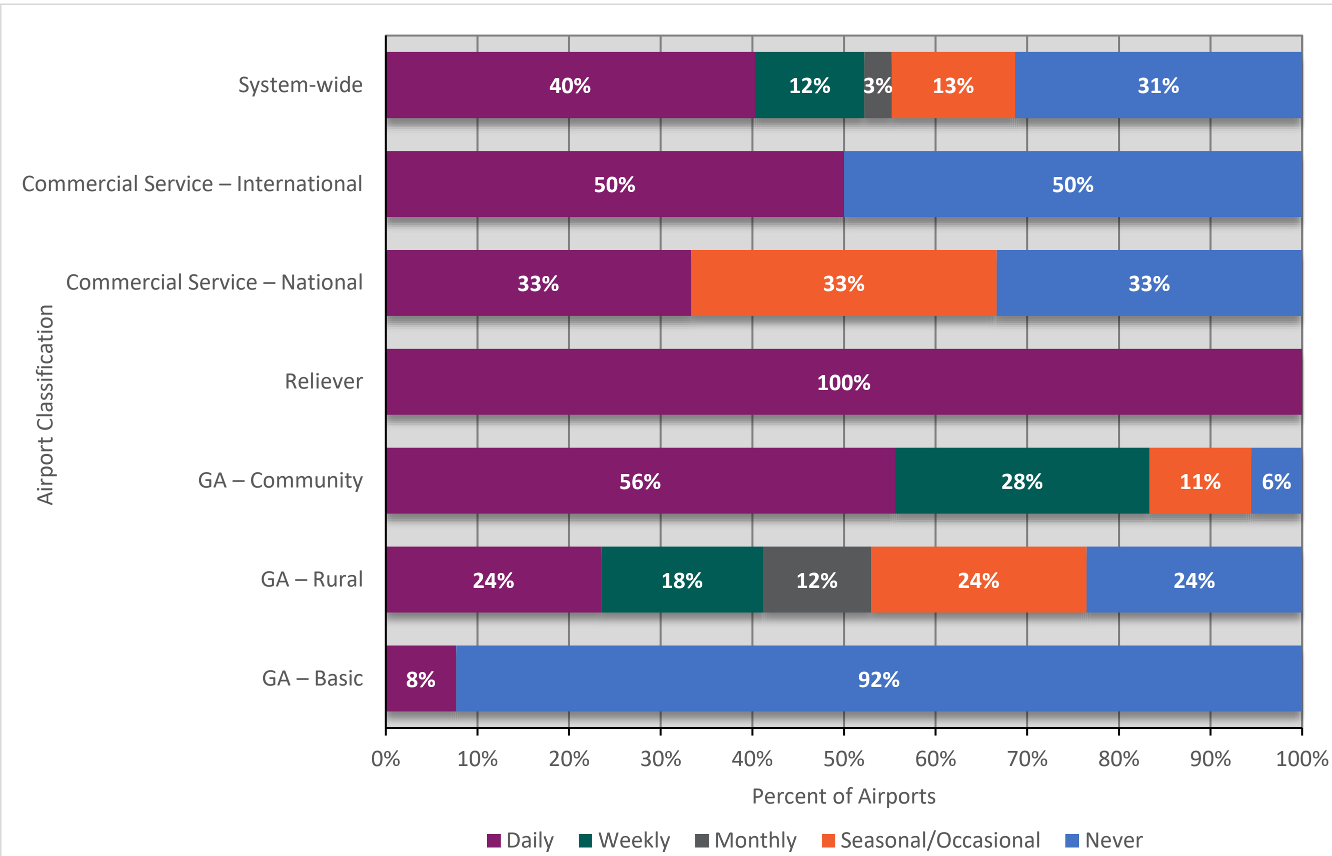
This section discusses results of the evaluation of system indicators associated with the economic support goal category. System indicators include:

1. Percent of system airports supporting flight training
2. Dollars of direct and indirect economic impact in the state from aviation

Percent of System Airports Supporting Flight Training

Flight training is one of the most significant components of the aviation industry in the state. In fact, Arizona has the fourth highest number of flight instructors in the country and the second highest number of flight instructors per capita. The state's ideal flying conditions draw student pilots from around the globe, and numerous countries send current or future military pilots to the state for flight instruction and/or specialized training. Perhaps most importantly, the growing international pilot shortage underscores Arizona's role in the long-term health of the aviation industry. Flight schools also act as marketers of aviation, hosting events and providing free flights to those interested in aviation. Flight training based at an airport is also an important source of revenue and may help to attract transient activity and other businesses. Flight schools often purchase fuel from an airport's FBO to expand their economic impact to the airport and surrounding area.

During the inventory effort, Arizona airports were asked to report the frequency with which they experience flight training activities. These activities may be based (i.e., the flight school is located on the airport itself) or transient (such as touch-and-go operations). **Figure 44** summarizes this reported data by role. In total, 69 percent of the system reported experiencing flight training activities at least occasionally, with 40 percent of system airports reporting that they experience flight training on a daily basis.



Source: Airport Inventory and Data Survey 2017

Figure 44. Percentage of Airports by Classification Experiencing Flight Training Operations

Dollars of Direct and Indirect Economic Impact in 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, GA, and aerospace manufacturing all contribute to the state and local economies. To gauge the economic impact of SASP airports, data was used from the statewide aviation economic impact study, *The Economic Impact of Aviation in Arizona 2012*, conducted by Elliott D. Pollack & Company for ADOT. Additional information about this study is available in **Chapter 5: Airport Classification Analysis**.

Primary economic impacts are the statewide economic activities, employment, and payroll that can be attributed directly and indirectly to the operation of system airports. They help describe the importance of aviation as an industry. Direct impacts are the consequences of on-airport economic activities carried out by airlines, airport management, FBOs, and other aviation-dependent 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 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.

Table 6 details direct and indirect economic impacts at Arizona airports as reported in *The Economic Impact of Aviation in Arizona 2012*. For the airports analyzed in the study, there was a total direct annual economic impact of over $12.1 billion and indirect economic impact of over $19.8 billion. The average direct economic impact of these airports was nearly $259 million, while the average indirect economic impact was nearly $422 million. However, these average impact numbers were heavily skewed by the state's commercial service airports.

Table 6. Direct and Indirect Economic Impact of Arizona Airports

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Commercial Service-International				
Phoenix	Phoenix Sky Harbor International	PHX	$9,551,000,000	$9,435,000,000
Tucson	Tucson International	TUS	$1,732,000,000	$9,710,000,000
	Commercial Service-International Total		**$11,283,000,000**	**$19,145,000,000**
Commercial Service-National				
Bullhead City	Laughlin/Bullhead City International	IFP	$46,813,000	$43,649,000
Flagstaff	Flagstaff Pulliam	FLG	$32,957,000	$14,962,000
Grand Canyon	Grand Canyon National Park	GCN	$25,356,000	$16,073,000
Page	Page Municipal	PGA	$14,274,000	$7,478,000
Peach Springs	Grand Canyon West	1G4	Not in EIS	Not in EIS
Phoenix	Phoenix-Mesa Gateway	IWA	$309,553,000	$247,186,000
Prescott	Ernest A. Love Field	PRC	$21,527,000	$10,959,000
Show Low	Show Low Regional	SOW	$14,625,000	$4,872,000
Yuma	Yuma International	NYL	$55,808,000	$24,540,000
	Commercial Service-National Total		**$520,913,000**	**$369,719,000**
Reliever				
Chandler	Chandler Municipal	CHD	$10,235,000	$9,858,000
Glendale	Glendale Municipal	GEU	$16,837,000	$17,293,000
Goodyear	Phoenix Goodyear	GYR	$71,193,000	$67,417,000
Marana	Marana Regional	AVQ	$7,888,000	$5,764,000
Mesa	Falcon Field	FFZ	$35,544,000	$36,491,000
Phoenix	Phoenix Deer Valley	DVT	$62,261,000	$55,721,000
Scottsdale	Scottsdale	SDL	$61,929,000	$54,970,000
Tucson	Ryan Field	RYN	$26,381,000	$20,764,000
	Reliever Total		**$292,268,000**	**$268,278,000**
GA-Community				
Benson	Benson Municipal	E95	$1,127,000	$537,000
Buckeye	Buckeye Municipal	BXK	$141,000	$1,140,000
Casa Grande	Casa Grande Municipal	CGZ	$2,112,000	$587,000
Coolidge	Coolidge Municipal	P08	$2,697,000	$962,000
Cottonwood	Cottonwood Municipal	P52	$516,000	$286,000
Kingman	Kingman	IGM	$16,984,000	$16,491,000

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Lake Havasu City	Lake Havasu City	HII	$6,281,000	$5,692,000
Marana	Pinal Airpark	MZJ	Not in EIS	Not in EIS
Nogales	Nogales	OLS	$1,337,000	$508,000
Parker	Avi Suquilla	P20	$1,441,000	$586,000
Payson	Payson	PAN	$2,850,000	$1,051,000
Safford	Safford Regional	SAD	$1,939,000	$720,000
Sedona	Sedona	SEZ	$5,249,000	$2,489,000
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	$5,683,000	$2,240,000
Springerville	Springerville Municipal	JTC	$4,051,000	$1,020,000
St. Johns	St. Johns Industrial Air Park	SJN	$1,826,000	$441,000
Wickenburg	Wickenburg Municipal	E25	$396,000	$393,000
Willcox	Cochise County	P33	$912,000	$342,000
		GA-Community Total	**$55,542,000**	**$35,485,000**
		GA-Rural		
Bisbee	Bisbee Municipal	P04	$1,055,000	$426,000
Chinle	Chinle Municipal	E91	Not in EIS	Not in EIS
Colorado City	Colorado City Municipal	AZC	$2,670,000	$2,471,000
Douglas	Bisbee-Douglas International	DUG	$406,000	$170,000
Douglas	Cochise College	P03	$3,111,000	$1,164,000
Douglas	Douglas Municipal	DGL	$5,606,000	$2,604,000
Eloy	Eloy Municipal	E60	$0	$0
Gila Bend	Gila Bend Municipal	E63	$822,000	$771,000
Holbrook	Holbrook Municipal	P14	$422,000	$122,000
Maricopa	Ak-Chin Regional	A39	Not in EIS	Not in EIS
San Luis	Rolle Airfield	44A	Not in EIS	Not in EIS
San Manuel	San Manuel	E77	Not in EIS	Not in EIS
Taylor	Taylor	TYL	$258,000	$75,000
Whiteriver	Whiteriver	E24	Not in EIS	Not in EIS
Williams	H.A. Clark Memorial Field	CMR	$176,000	$68,000
Window Rock	Window Rock	RQE	Not in EIS	Not in EIS
Winslow	Winslow-Lindbergh Regional	INW	$1,194,000	$343,000
		GA-Rural Total	**$15,720,000**	**$8,214,000**
		GA-Basic		
Ajo	Eric Marcus Municipal	P01	Not in EIS	Not in EIS
Bagdad	Bagdad	E51	Not in EIS	Not in EIS
Cibecue	Cibecue	Z95	Not in EIS	Not in EIS
Clifton	Greenlee County	CFT	Not in EIS	Not in EIS
Globe	San Carlos Apache	P13	Not in EIS	Not in EIS
Kayenta	Kayenta	0V7	Not in EIS	Not in EIS
Kearny	Kearny	E67	Not in EIS	Not in EIS
Polacca	Polacca	P10	Not in EIS	Not in EIS
Seligman	Seligman	P23	$331,000	$264,000
Sells	Sells	E78	Not in EIS	Not in EIS
Superior	Superior	E81	Not in EIS	Not in EIS

Associated City	Airport Name	FAA ID	Direct Economic Impact	Indirect Economic Impact
Tombstone	Tombstone Municipal	P29	Not in EIS	Not in EIS
Tuba City	Tuba City	T03	Not in EIS	Not in EIS
		GA-Basic Total	**$331,000**	**$264,000**
		Arizona System Total	**$12,167,774,000**	**$19,826,960,000**
		Arizona System Airport Average	**$258,888,809**	**$421,850,213**

Source: Elliott D. Pollack & Company 2013

FACILITY AND SERVICE OBJECTIVES

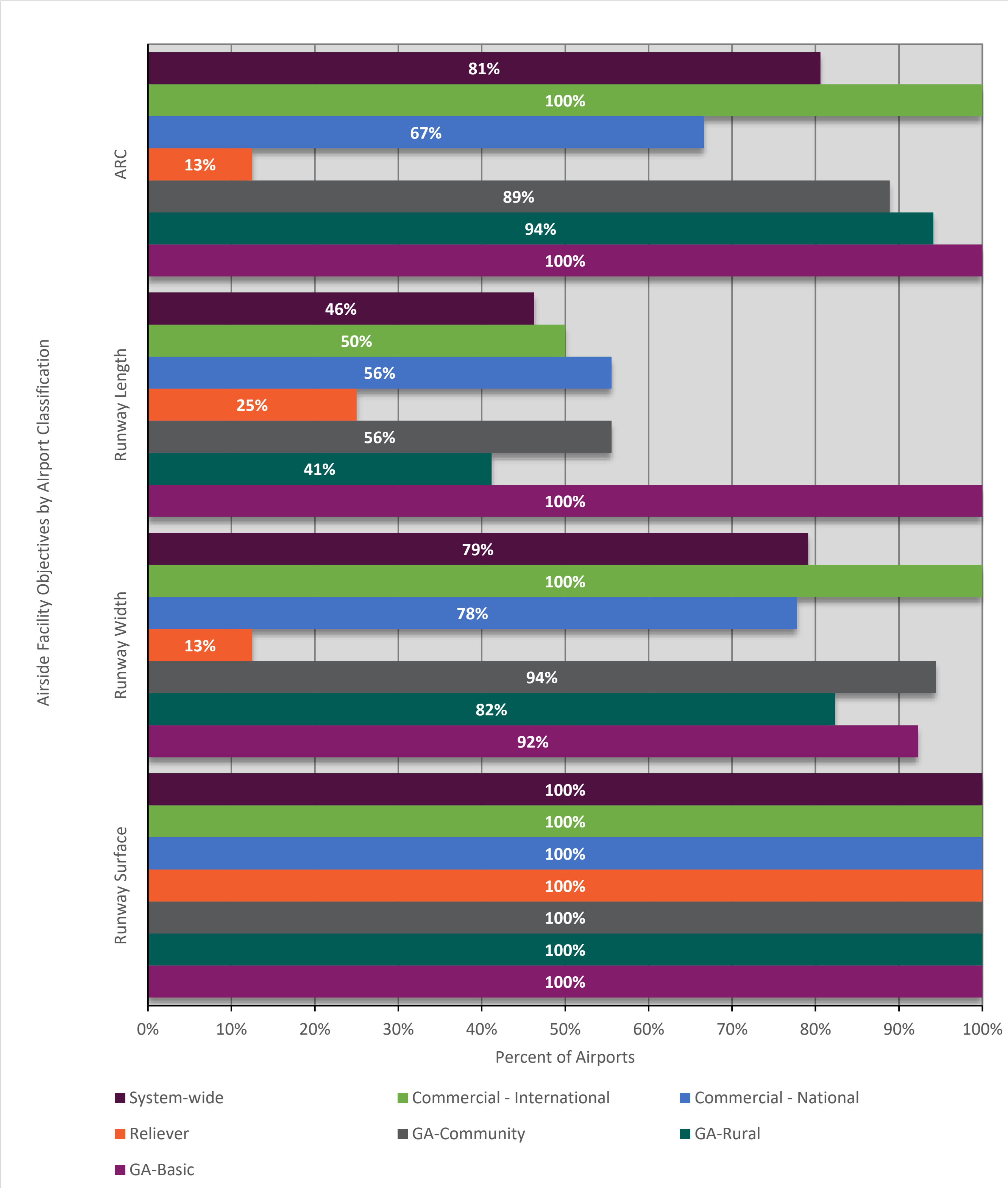
In addition to evaluating airports' current abilities to achieve the performance measures of the three goals established for the state aviation system, the SASP Update identified a series of facility and service objectives to guide development at system airports. As discussed in **Chapter 5: Airport Classification Analysis**, these objectives are designed to provide guidance on the minimum level of development that airports should strive to achieve. They are not intended to be mandates, but recommended standards to help guide airports to optimally perform their roles within the system. In general, airports that serve larger, more sophisticated aircraft and support diverse aviation activities typically require more extensive services and facilities, while smaller airports with limited aircraft operations and activities necessitate fewer.

It is important to note that the SASP Update serves as an overview of statewide aviation needs to the ADOT Aeronautics Group. An airport that is deficient in a particular objective does not necessarily indicate a project should be pursued. Instead, an airport should consider if its existing facilities and services accommodate current and anticipated needs during the master planning process. From federal (i.e., FAA) and state (i.e., ADOT) perspectives, specific projects must be justified in an airport-specific study (e.g., master plan) and included on the ALP before funding can be awarded. While the SASP Update provides the framework of statewide needs, airport-specific analyses are critical to determine the facilities and objectives appropriate for a specific airport.

Figure 45 through **Figure 51** summarize the current compliance of each airport classification with the specific facility and service objectives established for it, in the following order:

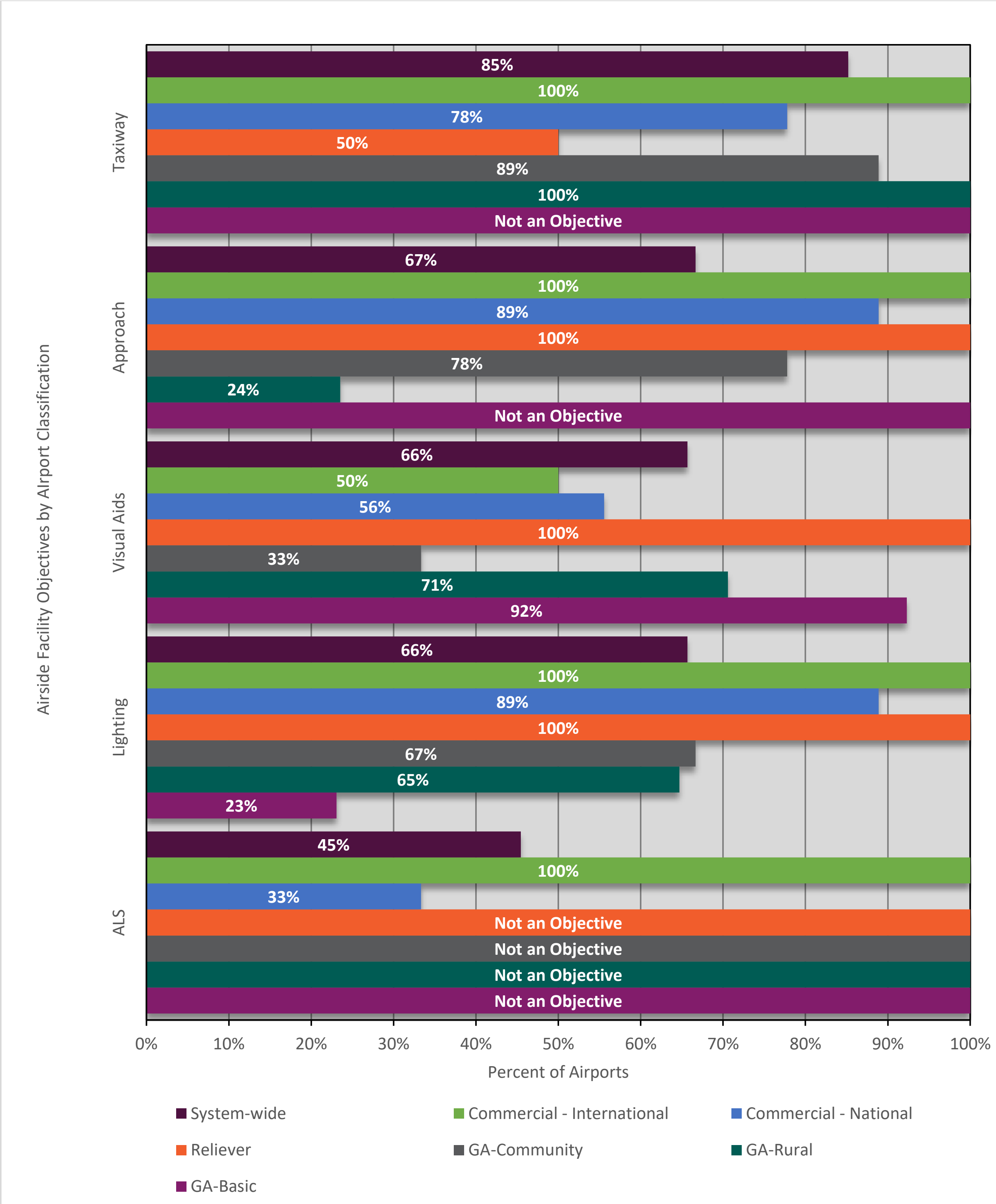
1. Airside facility objectives
2. Landside facility objectives
3. Landside service objectives

The results of the airside facility objectives have been split into two figures, and the landside service objectives have been split into four figures for ease of presentation. A more complete analysis of each airport and associated objective is provided in **Appendix E**, including the targets set for each objective by airport role, and a listing of airports not meeting each individual objective. The following figures represent a state-level snapshot of objective achievement.



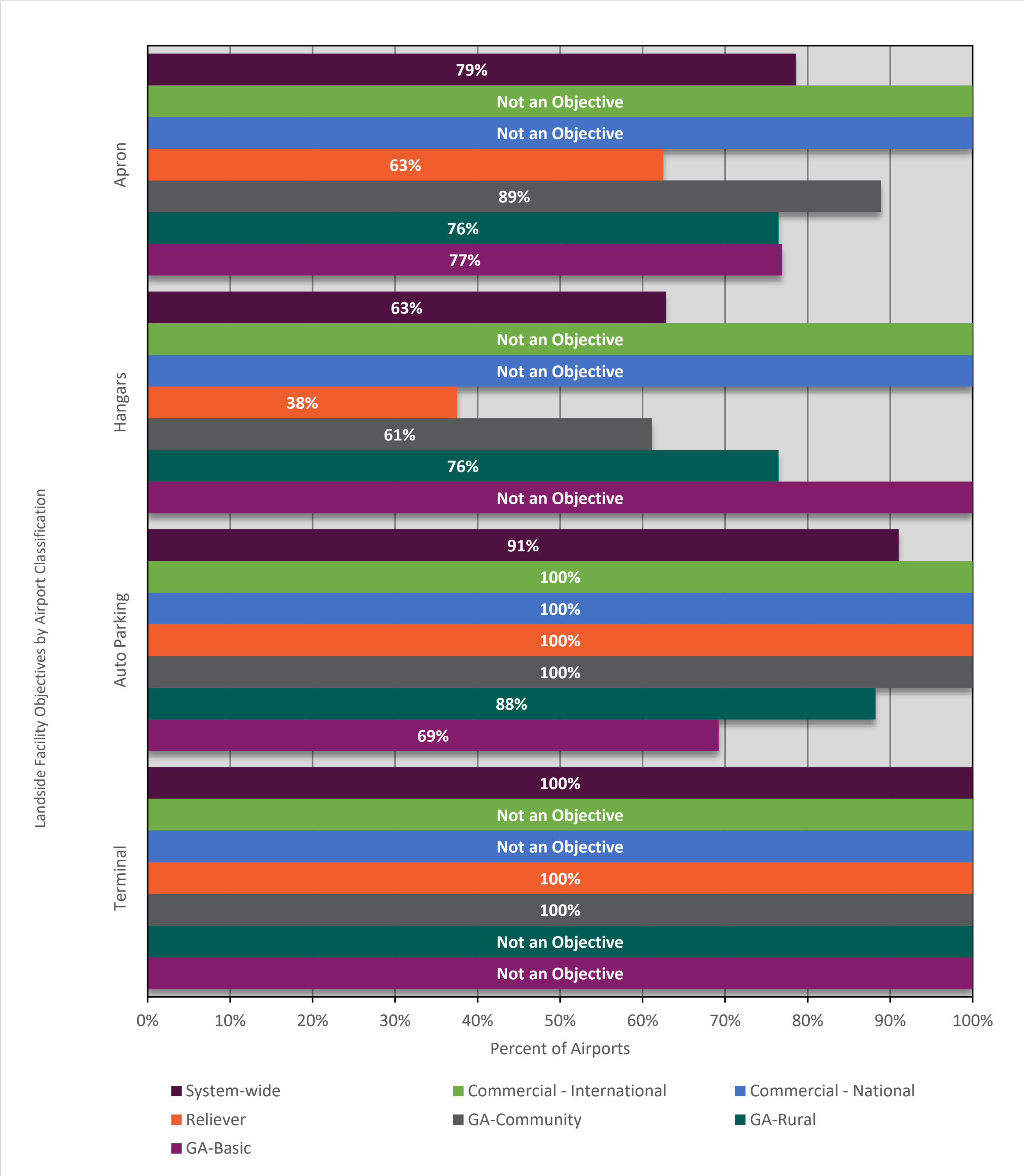
Sources: Airport Inventory and Data Survey 2017, FAA 5010 Airport Master Record

Figure 45. Percent of Airports by Classification Meeting Airside Facility Objectives (1 of 2)



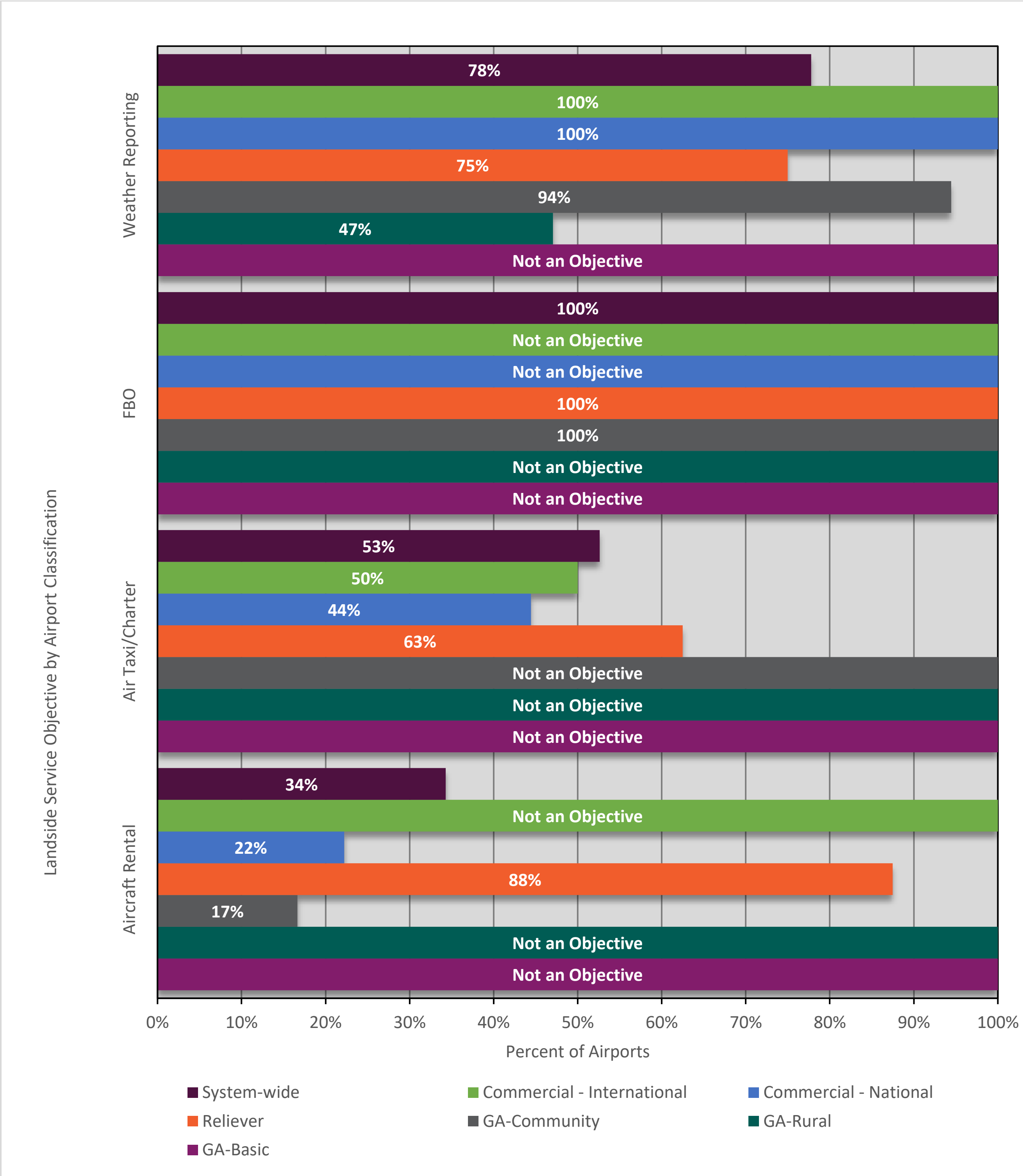
Source: Airport Inventory and Data Survey 2017

Figure 46. Percentage of Airports by Classification Meeting Airside Facility Objectives (2 of 2)



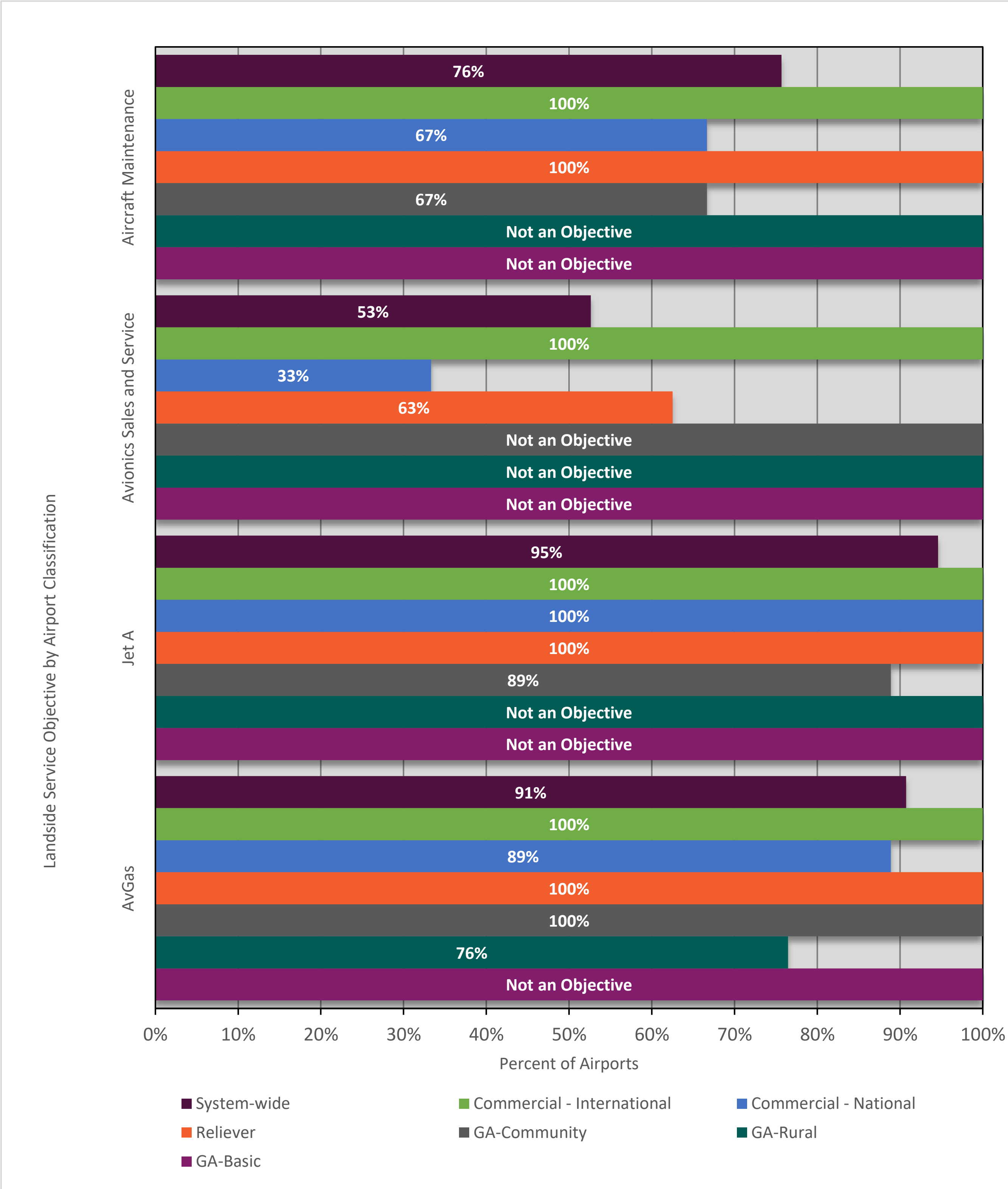
Source: Airport Inventory and Data Survey 2017

Figure 47. Percent of Airports by Classification Meeting Landside Facility Objectives



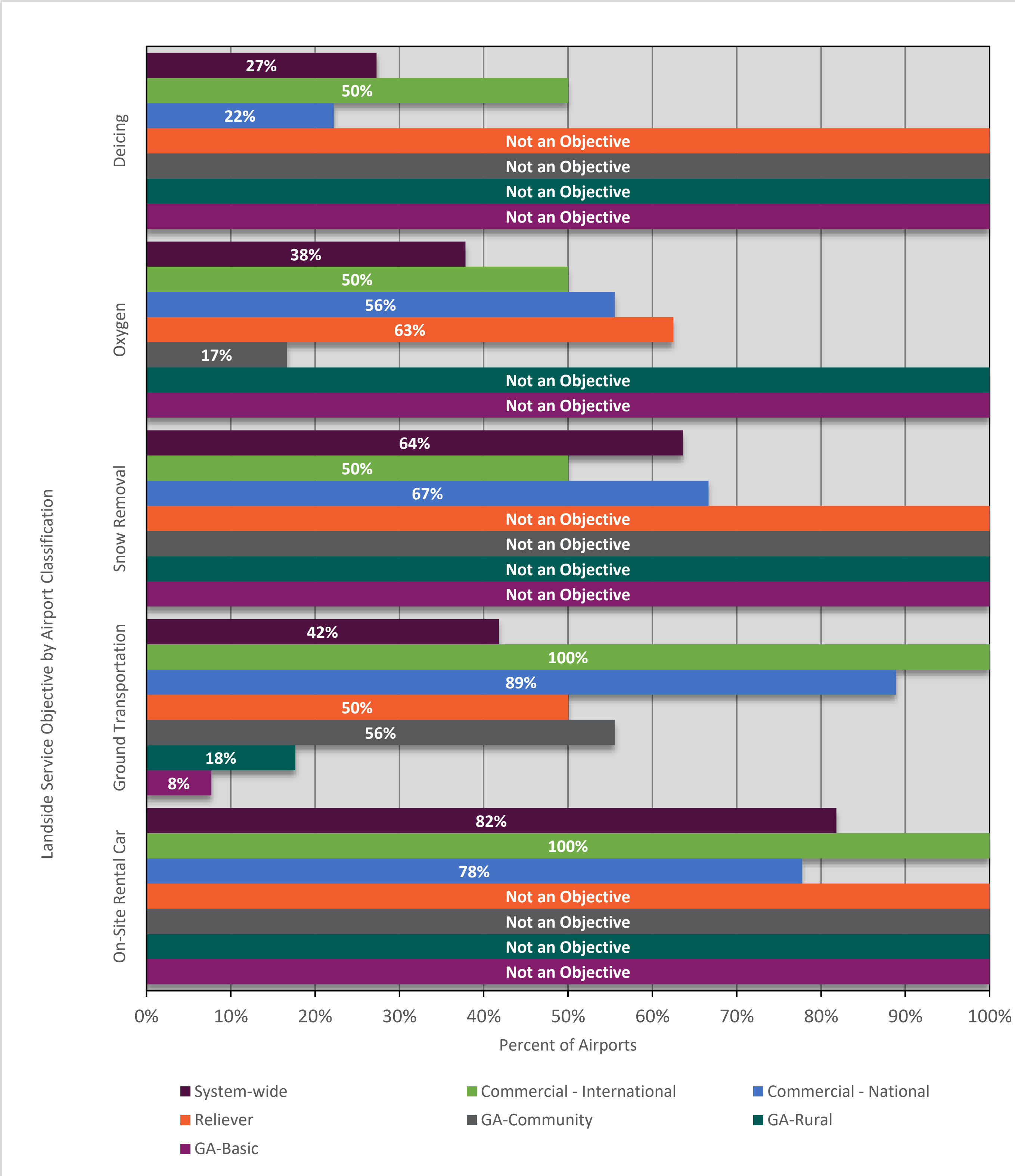
Source: Airport Inventory and Data Survey 2017

Figure 48. Percentage of Airports by Classification Meeting Landside Service Objectives (1 of 4)



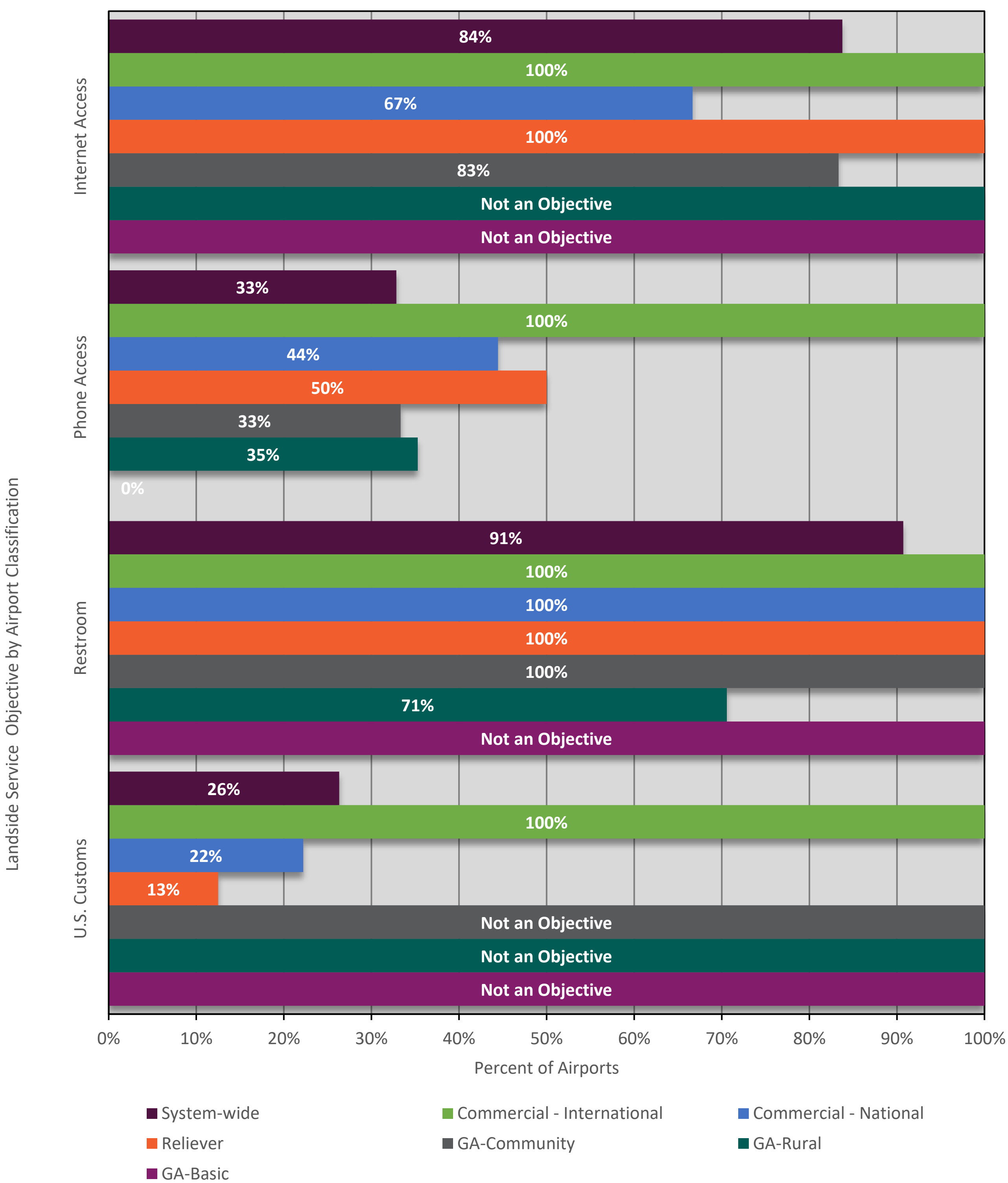
Source: Airport Inventory and Data Survey 2017

Figure 49. Percent of Airports by Classification Meeting Landside Service Objectives (2 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 50. Percent of Airports by Classification Meeting Landside Service Objectives (3 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 51. Percent of Airports by Role Meeting Landside Service Objectives (4 of 4)

SUMMARY

Assessing airports in terms of performance measures, system indicators, and geographic coverage identified areas in Arizona that effectively serve existing aviation need and pinpointed areas of potential improvement. Ninety-three percent of Arizona's population has access to an airport within a 30-minute drive time, providing residents, visitors, and business with exemplary levels of access, mobility, and resiliency in emergency situations—among the many other benefits associated with aviation. Together, commercial service and reliever airports make up 76 percent of operations statewide, and generally offer the widest range of facilities and services to airport users. Eighty-three percent of the state's population is within a 30-minute drive time of these airports. GA airports play unique roles at local, regional, and statewide levels. These airports can provide access to the most remote corners of the state, offer a layer of safety and security for residents, and serve as vital economic engines in their communities. Seventy-nine percent of the state's communities with a population of at least 1,000 has access to a GA airport within a 30-minute drive time.

While population coverage was a bright spot in the system, other performance measures offer important insight into system-wide opportunities for improvement that should be further evaluated to ensure the system continues to offer an optimal level of service to all users. While medical flights are one of the most valuable quality-of-life benefits of airports, only 30 percent of airports have all of the facilities and services identified as needed to most effectively support such operations by fixed-wing aircraft. That figure drops to 21 percent for GA airports. Twenty-eight percent of airports have clear approaches, which may pose safety concerns for pilots and passengers in the air and people and property on the ground. Policymakers, airports, and communities should carefully consider investment decisions to align limited resources with those areas where improvements could be most valuable. The APMS Implementation Program exemplifies the positive results that can arise when needs and resources are aligned. Resulting in large part from ADOT's commitment to ongoing pavement maintenance, 64 percent of primary runways in Arizona have PCIs greater than 70 percent.

For all measures, increasing the percent of airports that meet their performance measures is advised to maintain a safe and efficient system of airports in Arizona and the National Airspace System. Accordingly, specific recommendations for airport-specific and system-wide improvements will be developed in subsequent tasks.

CHAPTER SEVEN: FUTURE SYSTEM PERFORMANCE

INTRODUCTION

Building upon the current performance findings presented in **Chapter 6**, this chapter documents system progress since the last State Aviation System Plan (SASP) was published in 2008. Before identifying recommended actions to enhance the Arizona aviation system moving forward, it is important to understand how the system has changed over the last decade. This chapter compares the current performance of each measure with its historical results from the 2008 SASP. Future targets, as well as priority actions help the system achieve those targets, are also identified. The results presented in this chapter will inform **Chapter 8: Airport Project Costs and Alternative Scenarios**.

As previously discussed in **Chapters 1 and 6**, the goals and performance measures from the 2008 SASP were reviewed prior to conducting the 2018 SASP Update. During this review, adjustments were made to reflect changing needs while maximizing current and future applicability and efficacy. Furthermore, airports have changed classifications, and a new airport classification has been introduced in 2018 SASP Update. These changes impact airports' facility and service objectives, which affects system performance. The number of system airports was also reduced from 83 in 2008 to 67 in 2017. Finally, since the reporting of inventory data is a responsibility of airport managers and sponsors, the data type, amount, and understanding can vary from airport to airport.

As a result, the comparisons of system performance between 2008 and 2017 cannot be considered "apples-to-apples." Despite these variables, the historical comparisons of performance provided in this chapter do generally identify areas of performance that have improved or declined since the 2008 system plan. Any differences between the 2008 and 2017 performance assessments are noted by measure throughout the chapter. It is also important to note that this chapter only encompasses performance measures, as these areas can be directly impacted by actions or policies enacted by Arizona Department of Transportation (ADOT) Aeronautics Group (ADOT Aeronautics) or airports. System indicators are informative data points and are not designed to assess the ability of the system to meet current or future aviation demands.

Before historical, current, and future performance of the system is reviewed, it is important to understand the greater context of influences outside of aviation that have impacted past and current performance, and specifically those that are anticipated to have the greatest impact on future performance. A review of these factors or potential influencers is provided in the next section.

OUTSIDE INFLUENCES

Inherent to its role as a network connecting people and goods to destinations across the globe, aviation is affected by variables beyond and independent of the Arizona airport system. Global demands placed upon the system are ever-changing, and some influences can be characterized as chronic, while others are far more acute. Events like September 11, 2001 cause major industry overhauls seemingly overnight, while factors such as population, employment, and residency trends exhibit their influence slowly over time. Economic variables like global oil prices provide ongoing pressures that can catalyze industry growth, contraction, and change.

Some of the major factors that have the potential to significantly affect the future performance of the Arizona aviation system include:

1. Stability of oil prices
2. Population growth
3. Employment and industry trends
4. Business use of aviation services
5. Tourism and seasonal residency
6. International trade developments
7. Major surface transportation improvements

The purpose of this section is to provide a high-level overview of the types of factors that have and may continue to affect aviation demand in Arizona and, in turn, the needs and roles associated with the state airport system. This information provides the broader context within which the future system will be functioning and helps ADOT Aeronautics evaluate its effectiveness over time. While a summary of each of these factors is provided in the following pages, a more detailed discussion of each factor can be found in **Appendix F**. Planning for these types of future pressures also provides the opportunity to develop preemptive plans should significant changes occur to the state's aviation system. This proactive planning approach supports the system's ability to respond to future challenges and effectively function when the unexpected does occur, both of which are key components of a resilient airport system. Furthermore, recognizing these types of factors may help ADOT Aeronautics and airports maximize investments by ensuring improvement projects support long-term needs.

Stability of Oil Prices

Because fuel is the largest operating expense for all types of aviation operators, the price of oil has a dramatic impact on the industry as a whole. The cost of oil over the past two decades has oscillated between $20.59 per barrel in 1997 to a high of $99.67 per barrel in 2008. Oil prices reached historic lows in 2014 and appear to be stabilizing in recent years. The *Federal Aviation Administration* (*FAA) Aerospace Forecast Fiscal Years 2017-2037* assumes that the price of oil "will rise to exceed $100 [per barrel] by 2026 and approach $132 by the end of the forecast period" (FAA 2017, 1).

While all segments of the aviation industry are affected by the stability of oil's cost, variability affects commercial airlines and the general aviation (GA) community differently. Commercial airline passengers may realize higher operational costs in ticket fares and amenity fees, such as seat selection, checked and carry-on baggage, early check-in, and food. Ticket costs and the growing acceptance of amenity fees have spurred the growth and expansion of low-cost and ultra-low-cost carriers (LCC/ULCC), such as Spirit, Southwest, Allegiant, and Frontier airlines. Like many places with high tourism rates, fluctuating ticket prices and associated service levels may have a particularly acute impact on Arizona as potential visitors decide where and how to travel.

Like the commercial service market, the GA community faces its own challenges associated with oil prices. Increased oil costs can quickly make flying prohibitively expensive for many GA pilots and passengers, including businesses that use aviation services. It may also serve as a barrier for potential new pilots and aviation enthusiasts to enter the industry, further exacerbating the international shortage in pilots, mechanics, and other aviation professionals. Volatile and higher oil prices may cause some aircraft owners to purchase newer, more fuel-efficient engines, which could lower fuel sales for airport owners and fixed-base operators (FBOs).

As fuel generally composes the highest percentage of a GA airport's revenue stream, any reduction in consumption could negatively impact airports and their tenants.

Population Growth

Population continues to be one of the most important indicators of aviation demand, especially when that growth catalyzes growth in construction, retail, hospitality, and business services, amongst many other industries. During the last three decades of the 20th century, Arizona's population increased from 1.77 million in 1970 to 5.13 million by 2000, equating to a 3.63 percent compound annual growth rate (CAGR) or decade-over-decade growth rate of nearly 43 percent. Between 2002 and 2007, the state continued to experience some of the highest rates of growth in the country with an average annual increase 2.56 percent. However, the effects of the Great Recession became evident by 2007 with growth rates slowing before plummeting to just 0.77 percent between 2009 and 2010. Population growth rates have steadily increased since that time, reaching 1.89 percent by 2015 and leveling to an estimated 1.53 percent between 2017 and 2018.

Looking ahead, Arizona is expected to continue to add jobs, income, and residents at a rate faster than the rest of the nation. The population is projected to increase by 1.36 percent per year over the next 30 years, gaining 3.5 million new residents by 2047—far outpacing the national average of 0.6 percent per year (Office of Employment and Population Statistics n.d.). Despite this positive economic indicator, a report published by University of Arizona's Economic and Business Research Center states that Arizona's per capita income is not anticipated to keep pace with the national average (Hammond 2017). This means while Arizona will have far more potential travelers through the forecast horizon, those travelers may not have access to the same level of discretionary resources as in previous years. As a result, leisure travelers may choose destinations that are accessible by car or other modes of travel in lieu of scheduled commercial flight or use of GA. On the other hand, LCCs and ULCCs may witness an uptick in demand, catering to leisure travelers drawn to low ticket prices. Airports that primarily host these carriers should carefully consider their region's anticipated growth and economic shifts that could push travelers away from the state's largest commercial service airports. GA will likely remain inaccessible to many Arizona residents, and business and corporate aviation will continue to be reserved for a small percentage of executive-level staff and businesses that have historically utilized GA for their activities.

Sun Corridor Growth

While it is clear that most of the state will grow in several key ways, much of the growth will be concentrated in the Sun Corridor. While the Sun Corridor can be defined both in terms of economic and social connectivity as well as geographic space, the area generally spans six counties running from the middle of Yavapai County in central Arizona through western Cochise County to the south. In 2007, a report published by the Metropolitan Institute at Virginia Polytechnic Institute and State University (Virginia Tech) identified this so-called "megapolitan area" as one of 10 in the nation with the greatest potential for growth.[1] When comparing megapolitan areas across the U.S., report authors note, "The highest flyer of all should be in the Sun Corridor,

[1] The Metropolitan Institute at Virginia Tech defines megapolitan areas as "clustered networks of metropolitan areas that exceed 10 million total residents (or will pass that mark by 2040)" (Lang and Dhavale, Beyond Megalopolis: Exploring Amercia's New "Megapolitan" Geography 2005).

home to the rapidly merging Phoenix and Tucson metropolitan areas." (Lang and Nelson, The Rise of the Megapolitans 2007).

Employment Growth, Industry Trends, and the Business Use of Aviation Services

According to the Arizona Department of Commerce, "Arizona is a nationally ranked as the best state for business, number one for job growth, [and] one of the fastest-growing states in the U.S., with a superior quality of life" (Arizona Commerce Authority n.d.). Coupled with an increasingly diversified economic base, each of these factors place new and growing demands on the state's aviation system. Businesses often make relocation, expansion, and other major economic decisions based on the availability of commercial service and GA airports. Further, a reliable and accessible system is a vital piece of the supply chain by facilitating the quick and efficient transport of goods between suppliers, manufacturers, and consumers. Airports can open the door to global commerce for small communities and rural populations by linking remote areas with customers across the world. In essence, an effective and well-connected transportation system is a critical piece of the state's sustained economic growth.

While airports can have a major impact on all types of industries, certain segments are consistently recognized by aviation analysts as being particularly reliant on this mode of transportation. Air cargo, for example, is typified by high-value, time-sensitive shipments, such as perishables, electronics, and pharmaceuticals. Facilities that manufacture, handle, or process these types of goods are often located near airports and rely on surrounding surface transportation networks to efficiently transport goods to air cargo handling facilities. As a result, the presence of industries with a propensity to use aviation services can drive airport development within a particular geographic area. Conversely, the presence of certain aviation facilities and services can draw these types of industries to their vicinities. In short, airports have a reciprocal relationship with businesses with a propensity to use aviation by driving both the areas in which they are located and the aviation facilities and services provided therein.

In October 2016, the Arizona Office of Economic Opportunity (AOEO) released its latest long-term occupational employment projections for the 2014-2024 period. During this timeframe, employment in Arizona is anticipated to increase from approximately 2,728,012 to 3,305,314—representing 21.2 percent growth. Nationally, the employment growth rate is projected at just 6.5 percent. The AOEO projects that four industries will exceed the average growth rate of all industries combined (21.2 percent) as follows: construction (49.9 percent), professional and business services (34.0 percent), financial activities (28.6 percent), and education and health services (25.5 percent). According to Airport Cooperative Research Program (ACRP) Report 132, *The Role of U.S. Airports in the National Economy*, professional and businesses services and financial activities both rank amongst the top industries in which air travel improves sector productivity (National Academies of Sciences, Engineering, and Medicine 2015).

In addition to the market segments identified by the AOEO, the Arizona Commerce Authority (ACA) has recognized six key sector opportunities upon which to focus its business growth and recruitment efforts:

1. Aerospace and defense
2. Technology and innovation
3. Advanced manufacturing
4. Bioscience and healthcare

5. Advanced business services
6. Film and digital media

Each of the key market opportunities identified by the ACA has a tendency to rely on aviation while providing the greatest potential for Arizona to maintain and expand its position in the global marketplace. While each has strong ties with the airport system, none is more connected than aerospace and defense. In fact, a recent report published by the National Business Aviation Association and NEXA Advisors notes that 100 percent of aerospace and defense companies on the Forbes Global 2000 list are business aircraft users (2013).[2] A 2015 International Trade Administration report cited by the ACA observes that Arizona's aerospace and defense total exports rose by more than 21.8 percent from 2011 to 2014, reaching a total of $3.47 billion, primarily due to a near $400 million increase in the export of aircraft, engines, and parts. A 2012 Deloitte study reported that Arizona ranks fourth nationwide in aerospace revenue at $14.99 billion. More than 1,200 aerospace and defense companies are located in the state, including some of the largest names in the industry like Boeing, Honeywell Aerospace, Northrop Grumman, and Raytheon.

In a very direct way, aviation is inherently linked with the trajectory of the state's economy. As Arizona's economy continues to grow and evolve in the coming years, commercial service and GA airports can anticipate an uptick in business/corporate aviation. As such, airports with the facilities and services capable of serving jet aircraft typified by this type of aviation activity will be best positioned to benefit from the approaching growth. More broadly, Arizona must have a transportation system that provides the accessibility and mobility needed to travel between the state and other major economic centers in the region, such as California, Mexico, and Texas, as well as across the globe. Furthermore, the system should also focus on intrastate connectivity so areas beyond the major metropolitan regions can fully participate in the economy of tomorrow.

Tourism Rates

The Arizona Department of Tourism estimated 37.4 million people visited Arizona in 2016, drawn by the state's ideal weather, rich natural wonders, world-class sport and entertainment events, and numerous other attractions—making tourism the state's number one export industry. Visitors spent $21.2 billion in the state, generated $3.09 billion in tax revenue, and supported 184,200 industry jobs. In addition to supporting the state by paying for transportation and lodging, visitors spend money on entertainment, food, and retail purchases. Wages that workers earn in those industries are in turn spent in local communities, which then generate secondary impacts that ripple through entire economies. In 2016, these secondary impacts generated 158,300 jobs with $6.8 billion in earnings. In total, the gross domestic product of the travel industry in Arizona was $9.2 billion in 2016.

Tourism has steadily increased since 2009 at the bottom of the economic downturn, with rates reaching historic peaks in recent years. The state saw the largest year-over-year growth between 2009 and 2010 (13.2 percent), followed by 2015 to 2016 (4.0 percent). Visitors arriving on domestic flights to Arizona increased faster than overall visitor rates, with 5.4 and 7.0 percent increases in 2015 and 2016, respectively. More visitors are arriving in Arizona than ever before and spending more when they arrive, with annual visitor spending totals of $1.5 billion in 2007 versus $1.9 billion in 2016.

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[2] This same study reports that 85 percent of pharmaceutical companies (one segment of the bioscience and healthcare industry) are business aircraft users.

As the top industry in the state, tourism drives the Arizona economy and, in turn, places significant demand on the aviation industry. As a result, any reductions in tourism rates would have a notable impact on the state's commercial service and GA airports. The impacts would most severely affect those airports that primarily cater to leisure travelers, with LCCs and ULCCs conducting a high percentage of aviation operations. Airports without diversified operations would be least well positioned to absorb the potential impacts that may occur should tourism rates decline. Furthermore, airports in rural areas would also face a disproportionate economic impact in this scenario, as these economies are more reliant on the tourism-related spending than their urban counterparts. As a result, it is important for airports—especially in rural Arizona—to diversify operations to hedge against potential tourism reductions. Airports should also continue to support LCCs and ULCCs to facilitate tourism to the state.

Seasonal Residency

In addition to more traditional tourism, in which a person travels to a destination or point of interest for pleasure for a more limited duration of time, Arizona is host to large numbers of seasonal residents. These so-called "snowbirds" spend approximately two to four months in central and southern Arizona to escape winter temperatures in the northern U.S. and Canada. The economic impact of such activity is difficult to determine, with the last reliable study completed by Arizona State University in the early 2000s. That study, which analyzed the 2003-2004 visitor season, estimated that Arizona's seasonal population swelled by about 300,000 long-term visitors with a $1.0 billion spending impact (Coppola 2015). A more recent study conducted by the Canada Arizona Business Council reported that Canadian visitors spend an average of $3,500 per month during their tenures in the state (Akao 2017). Long-term seasonal residents from Canada provide a $1.4 billion boost to the Arizona economy each year, with short-term visitors contributing an additional $1.0 billion. These snowbirds own or rent approximately 100,000 residences in cities across the state, with Yuma, Apache Junction, Desert Mountain, and Scottsdale drawing the highest number of seasonal residents.

As many Arizona residents know, the annual arrival of snowbirds is heralded by a notable increase in traffic congestion and busier shopping malls, restaurants, and retail establishments. Arizona's airports in the warmer areas of the state likewise witness increased activity; however, like seasonal residency, snowbird-related demand is difficult to capture. Anecdotally, GA airports report that short-term aircraft storage facilities, including hangars and tie-downs, typically become more occupied from October through April. This issue can exacerbate existing storage facility shortages. Similarly, commercial service facilities see an uptick in activity during winter months.

While the influx of seasonal residents may increase congestion at some airports, it concurrently presents revenue-producing opportunities for airports in warm climates. Seasonal residents generate fuel sales and may improve the return on hangar development for investors which, in turn, could impact ground lease rates for airport sponsors. It is also important for airports and ADOT Aeronautics to consider the potential impacts of seasonal residents during long-term planning efforts. International visitors also provide an additional layer of risk mitigation for airports that cater to foreign leisure travelers, as they are not subject to the same economic forces as domestic visitors. For example, the Arizona Office of Tourism reported that travel amongst Canadians remained strong during the recession due to a favorable exchange rate with the U.S. dollar (Coppola 2015).

International Trade Developments

Arizona exported $22.0 billion in goods to international markets in 2016. The U.S. Department of Commerce's International Trade Administration reports that Arizona's foreign exports supported 101,579 U.S. jobs in 2015—an increase of 23,000 jobs since 2009. Mexico is the state's top foreign trading partner, receiving 37.6 percent of Arizona's international exports, followed by Canada, which accounts for 9.7 percent. Combined, exports to Mexico and Canada totaled 10.4 billion in 2016—nearly 50 percent of Arizona's total exports that year. Growth in air freight between Arizona and Mexico annually grew 30 percent between 2011 and 2015—or 180 percent during that four-year timeframe. Airfreight has outpaced all other modes of transport and currently totals $390 million per year; this figure is anticipated to reach $650 million by 2025 (Office of the Governor 2018).

Capitalizing on the massive growth projected for Arizona-Mexico trade, Phoenix-Mesa Gateway Airport recently announced that it will be home to SkyBridge Arizona (SkyBridge), the first international cargo hub to house both U.S. and Mexican customs (Ibid.). Through the Unified Cargo Processing (UCP) Program at SkyBridge, both U.S. and Mexican customs officers will approve incoming and outgoing freight bound for customers on either side of the border. Other airports have also recognized the growing opportunities presented by international trade. Phoenix Goodyear, Yuma International, and several other airports have established foreign-trade zones (FTZs) on airport property. Because FTZs are considered outside U.S. customs territory, goods received into these zones are generally not subject to duties, tariffs, or quotas until (or if) they leave the zone. FTZs offer companies significant financial incentives, including a 72.9 percent reduction in state real estate and personal property taxes; an effective mechanism to manage duty payments; and logistical benefits such as streamlined Customs and Border Protection (CBP) procedures. There are seven FTZs across the state.[3]

Structured similarly to FTZs, Phoenix-Mesa Gateway and Phoenix Goodyear airports are also designated Military Reuse Zones (MRZs). MRZs were established in 1992 to minimize the impact of military base closures on local economies by providing tax incentives to aviation or aerospace companies and airport authorities located therein. Such massive growth in international trade coupled with the growing expectations for overnight deliveries promised by e-commerce giants like Amazon and Walmart will place new demands on air cargo providers and the commercial and GA facilities from where they operate. As demand for air cargo and global trade increases, airports may too experience congested airspace, pushing GA pilots to airports further outside of the urban core and causing shift demand/capacity ratios across the broader system.

Major Surface Transportation Improvements

Airports depend on surface transportation systems to efficiently transport people and goods to and from their facilities. Traffic congestion in the vicinity of airports is a major obstacle for air cargo, as well as for major commercial service airports such as Phoenix Sky Harbor International and Tucson International. Enhancing the accessibility of airports can have a major impact on aviation demand for both commercial service and GA airports. Access is often an important factor as people choose which airports to fly into and out of, base aircraft, and conduct other types of aviation-related activities. Further, the surface transportation network directly impacts the population coverage of certain types of airports and is a critical component of the state's overall mobility. In short, a functional and efficient surface transportation network with the ability to support capacity

[3] Not all of these sites are located at airports. More information about FTZs and their locations in Arizona are available at enforcement.trade.gov/ftzpage/letters/ftzlist-map.html#arizona.

demands supports the efficient movement of goods and people across multiple modes while supporting Arizona's economic competitiveness.

ADOT is mandated to construct and maintain all interstate and state highways in Arizona, and has planned a number of major roadway improvements that will help alleviate congestion and improve multi-modal access (including access to airports) in the Five-Year Transportation Facilities Construction Program. A listing of improvements and a more detailed discussion of these surface transportation improvements can be found in **Appendix F**.

Conclusions

In the coming decades, Arizona is anticipated to experience growth outpacing the rest of the nation in key segments affecting aviation demand including population; tourism; international trade; and industries such as aerospace and defense, technology, and manufacturing. Much of this growth will be centered in Arizona's Sun Corridor, an area roughly comprising six counties from Cochise and Santa Cruz in southeastern Arizona; traversing Pima, Pinal, and Maricopa counties in the center of the state; before reaching its upper boundary in Yavapai County to the northwest. ADOT has already recognized the need to improve the surface connectivity within the Sun Corridor, as well as with markets across Arizona, in surrounding states, and amongst our North American Free Trade Agreement (NAFTA) partners (i.e., Mexico and Canada). Each of these and numerous other outside influences have shaped and will continue to shape the evolution of individual airports—as well as the system more broadly—over the next two decades. The ever-growing demands anticipated for Arizona aviation underline the importance of a coordinated and proactive planning approach for all airports in the state system.

REVIEW OF HISTORICAL, CURRENT, AND FUTURE PERFORMANCE

Based the analysis of current performance described in **Chapter 6** and in consideration of the non-aviation factors expected to influence the future of Arizona's aviation industry, the remainder of this chapter is dedicated to evaluating future system needs. This analysis began by establishing performance targets for each measure in close coordination with ADOT Aeronautics and the Project Advisory Committee (PAC). In short, these targets reflect the percent of airports by classification that should be achieving each measure to provide an airport system that embodies the SASP Update vision established at the inception of this study:

> ***To provide the framework that will allow Arizona's aviation system to meet the needs of citizens, visitors, and businesses by supporting economic competitiveness, connectivity, and accessibility with a commitment to safety, sound resource management, and partnerships.***

Like previous chapters, the following section is organized by goal category and associated performance measures (action-oriented). Through this chapter, it is important to remember that the intent of a system plan is to provide a network of airports that together meet all aviation demands across the state. In many cases, targets associated with safety and security are set at 100 percent of airports—there is no reasonable number of airports that should not take every step possible to ensure the safety of pilots, passengers, and people and property on the ground. Conversely, a reasonable sub-set of airports can offer specific facilities and services to, for example, support economic competitiveness, connectivity, and accessibility. Performance targets have been established per classification, with these targets summed to provide the system-wide target. Achieving the targets established by the 2018 SASP Update will come about as a process of continual improvement over time.

As such, ADOT and the PAC worked together to prioritize performance measures on a scale of low, medium, and high priority.

Action items have also been outlined to improve the performance of each measure. Some of these items require actions by policymakers including ADOT Aeronautics, while others are primarily the responsibility of individual airports and sponsors, guided by the input, support, and funding prioritization of ADOT Aeronautics and the State Transportation Board. These action items are addressed in **Chapter 9: Recommended Plan**.

Key Differences Between 2008 and 2017 Arizona Airport System

While this chapter looks forward to airport needs through the 2036 planning horizon based on the evaluation of the 2018 SASP Update's performance measures and targets, 2008 system performance and performance targets are included to provide insight into the system's performance over time. When reviewing this data, it is important to consider several key differences between the 2008 SASP and 2018 SASP Update, which impact the ability to conduct an equitable comparison. In some cases, the criteria utilized to evaluate each measure have been modified from 2008 to 2017; any changes are noted in the comments below each historic/current performance tables by measure.

More significantly, the 2008 state system included 83 airports, while the 2017 system includes 67 airports, primarily due to the exclusion of privately and federally owned airports. To show how the composition of the Arizona system has changed over time, **Table 1** summarizes the number/percent of total airports by 2008 SASP role and 2018 SASP Update classification.

Table 1. Summary of 2008 SASP Roles versus 2018 SASP Update Classifications

Roles/Classifications	Number of Airports (No.)		Percent of Total Airports (%)	
	2008 SASP	2018 Update	2008 SASP	2018 Update
CS*-International	12	2	14%	3%
CS-National		9		13%
Reliever	8	8	10%	12%
GA-Community	29	18	32%	27%
GA-Rural	24	17	32%	25%
GA-Basic	10	13	12%	19%
Total System	**83**	**67**	**100%**	**100%**

Note: CS = Commercial Service

Sources: Kimley-Horn 2017, Wilbur Smith and Associates 2008

In addition to a system-wide reduction of 16 airports, 16 other airports changed roles/classifications between 2008 and 2018, with most of those changes affecting the GA-Rural and GA-Basic classifications. These changes are detailed in **Table 2**. Airports that moved classifications are denoted in red, and 2008 SASP airports excluded from the 2018 SASP Update are listed at the beginning of the table. Please reference **Chapter 5** for further information about airport roles and classifications, including information about the criteria used to develop the 2018 SASP Update classifications.

Table 2. 2008 SASP Roles versus 2018 SASP Update Classifications

Associated City	Airport	FAA ID	2008 SASP Roles
	2008 Airports Excluded from the 2018 SASP Update		
Aguila	Eagle Roost	27AZ	GA-Basic
Bullhead City	Sun Valley	A20	GA-Rural
Carefree	Sky Ranch at Carefree	18AZ	GA-Community
Chandler	Memorial Airfield	34AZ	GA-Community
Chandler	Stellar Airpark	P19	GA-Community
Grand Canyon	Valle	40G	GA-Community
Marble Canyon	Marble Canyon	L41	GA-Rural
Maricopa	Estrella Sailport	E68	GA-Rural
Meadview	Pearce Ferry	L25	GA-Basic
Peach Springs	Hualapai	3AZ5	GA-Basic
Peach Springs	Grand Canyon Caverns	L37	GA-Rural
Peoria	Pleasant Valley	P48	GA-Community
Rimrock	Rimrock	48AZ	GA-Basic
Temple Bar	Temple Bar	U30	GA-Rural
Tucson	La Cholla Airpark	57AZ	GA-Rural
Whitmore	Grand Canyon Bar Ten Airstrip	1Z1	GA-Basic
	Commercial Service-International (2017 classifications)		
Phoenix	Phoenix Sky Harbor International	PHX	Commercial Service
Tucson	Tucson International	TUS	Commercial Service
	Commercial Service-National (2017 classifications)		
Peach Springs	Grand Canyon West	1G4	Commercial Service
Flagstaff	Flagstaff Pulliam	FLG	Commercial Service
Grand Canyon	Grand Canyon National Park	GCN	Commercial Service
Bullhead City	Laughlin/Bullhead International	IFP	Commercial Service
Mesa	Phoenix-Mesa Gateway	IWA	Commercial Service
Yuma	Yuma International Airport	NYL	Commercial Service
Page	Page Municipal	PGA	Commercial Service
Prescott	Ernest A. Love Field	PRC	Commercial Service
Show Low	Show Low Regional	SOW	Commercial Service
	Reliever (2017 classifications)		
Marana	Marana Regional	AVQ	Reliever
Chandler	Chandler Municipal	CHD	Reliever
Phoenix	Phoenix Deer Valley	DVT	Reliever
Mesa	Falcon Field	FFZ	Reliever
Glendale	Glendale Municipal	GEU	Reliever
Goodyear	Phoenix Goodyear	GYR	Reliever
Tucson	Ryan Field	RYN	Reliever
Scottsdale	Scottsdale	SDL	Reliever
Marana	Pinal Airpark	MZJ	GA-Community
Nogales	Nogales International	OLS	GA-Community
Coolidge	Coolidge Municipal	P08	GA-Community
Parker	Avi Suquilla	P20	GA-Community
Willcox	Cochise County	P33	GA-Community
Cottonwood	Cottonwood	P52	GA-Community
Payson	Payson	PAN	GA-Community
Safford	Safford Regional	SAD	GA-Community
	GA-Rural (2017 classifications)		
San Luis	Rolle Airfield	44A	GA-Rural
Maricopa	Ak-Chin Regional	A39	GA-Rural
Colorado City	Colorado City Municipal	AZC	GA-Community

Associated City	Airport	FAA ID	2008 SASP Roles
Williams	H.A. Clark Memorial Field	CMR	GA-Community
Douglas	Douglas Municipal	DGL	GA-Community
Douglas Bisbee	Bisbee Douglas International	DUG	GA-Rural
Whiteriver	Whiteriver	E24	GA-Rural
Eloy	Eloy Municipal	E60	GA-Community
Gila Bend	Gila Bend Municipal	E63	GA-Rural
San Manuel	San Manuel	E77	GA-Rural
Chinle	Chinle Municipal	E91	GA-Rural
Winslow	Winslow-Lindbergh Regional	INW	GA-Community
Douglas	Cochise College	P03	GA-Rural
Bisbee	Bisbee Municipal	P04	GA-Rural
Holbrook	Holbrook Municipal	P14	GA-Community
Window Rock	Window Rock	RQE	GA-Rural
Taylor	Taylor	TYL	GA-Community
GA-Basic (2017 Classifications)			
Kayenta	Kayenta	0V7	GA-Rural
Clifton/Morenci	Greenlee County	CFT	GA-Rural
Bagdad	Bagdad	E51	GA-Basic
Kearny	Kearny	E67	GA-Rural
Sells	Sells	E78	GA-Basic
Superior	Superior Municipal	E81	GA-Basic
Ajo	Eric Marcus Municipal	P01	GA-Rural
Polacca	Polacca	P10	GA-Rural
Globe	San Carlos Apache	P13	GA-Rural
Seligman	Seligman	P23	GA-Rural
Tombstone	Tombstone Municipal	P29	GA-Basic
Tuba City	Tuba City	T03	GA-Rural
Cibecue	Cibecue	Z95	GA-Basic

Note: Red text denotes airports that moved classifications.

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Safety and Security

This section reviews the historical and future performance targets established for the six performance measures related to safety and security. At the system-wide level, two measures improved, two measures declined, and one measure remained constant over time. One measure was split into two components for analysis: one aspect improved, while the other regressed. Potential actions to help remedy any shortfalls are provided by performance measure.

Percent of Airports Capable of Supporting Medical Operations

Supporting medical operations is essential for residents' and visitors' qualities of life and, in many cases, is a matter of life and death. As discussed in **Chapter 6**, this performance measure specifically addresses airports meeting the criteria to optimally support medical operations by fixed-wing aircraft as follows:

1. Runway length of 4,000 feet or greater[4]
2. 24/7 availability of fuel
3. At least a non-precision instrument (NPI) approach capability

[4] 4,000 feet of runway length was used as the baseline; however, airports at higher elevations will require a longer runway length.

4. Weather reporting (i.e., Automated Surface Observing System [ASOS] or Automated Weather Observation Station [AWOS])

While it is acknowledged that medical operations are also conducted by rotorcraft, fixed-wing aircraft require far more complex facilities and services. Accordingly, it is assumed that an airport meeting the above criteria can support most types of medical flights occurring in Arizona (i.e., either by fixed-wing or rotorcraft). Currently, 40 percent of airports meet the criteria to optimally support medical operations by fixed-wing aircraft, the same percentage witnessed in 2008 (**Table 3**). While the overall number of airports has decreased by five, this can likely be explained by the overall decrease in system size instead of a statewide reduction in capacity to support medical operations.

Table 3. Airports Capable of Supporting Medical Operations — Historic/Current Performance

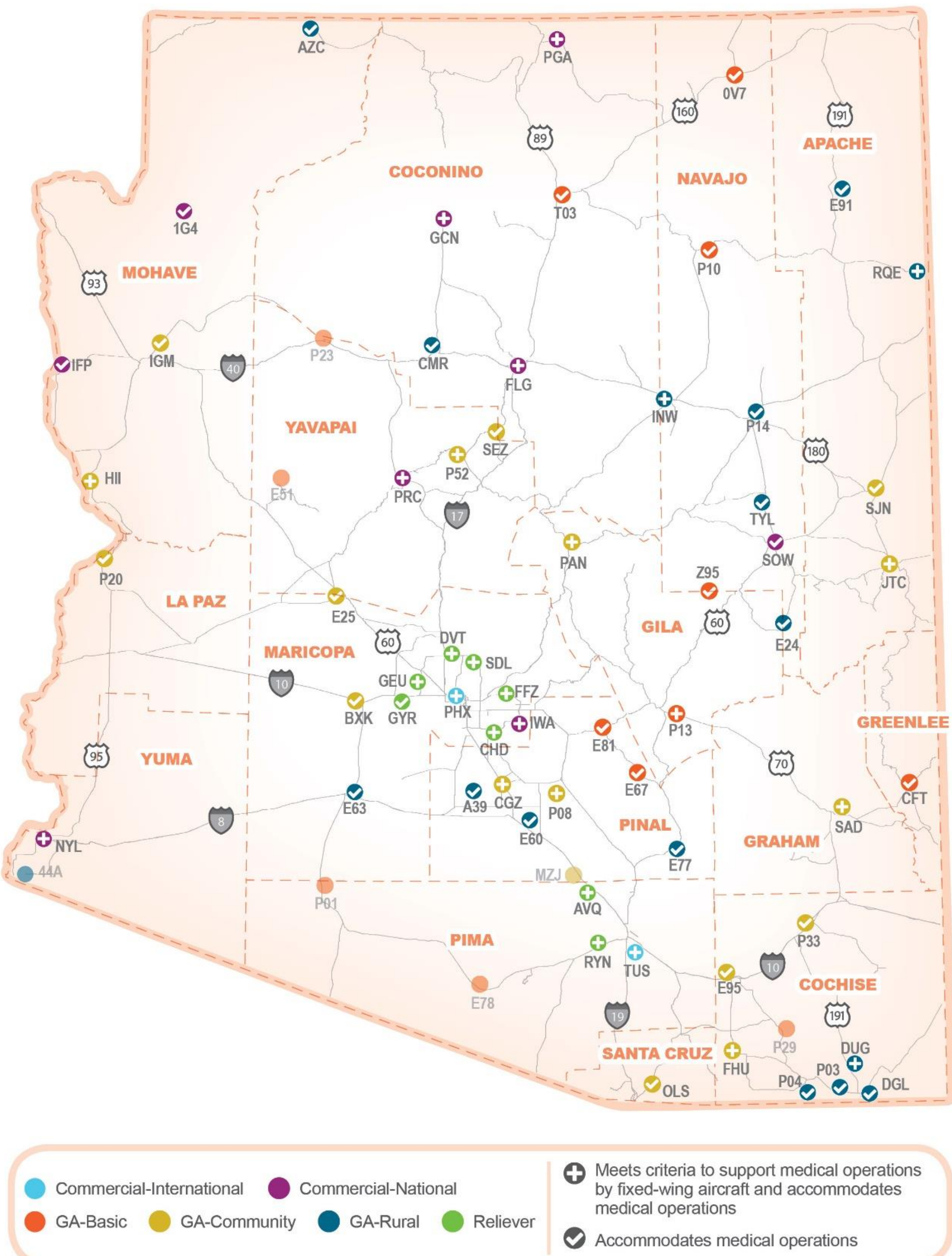
Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	83%	10	100%	2
CS-National			67%	6
Reliever	88%	7	89%	7
GA-Community	45%	13	44%	8
GA-Rural	13%	3	18%	3
GA-Basic	0%	0	8%	1
System-wide	**40%**	**33**	**40%**	**27**

Notes: [1]2008 criteria included: 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 (HIRL), full perimeter fencing (desired), approach landing system (ALS) (desired). If perimeter fencing and ALS are removed, system compliance increases to 45 percent.[2] 2018 criteria include: Runway length of 4,000 feet or greater, weather reporting, 24/7 fuel, and at least a NPI approach capability.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

While these criteria have been established to generally describe the more stringent requirements necessitated by most fixed-wing medical aircraft operating in Arizona, it is also important to understand the full breadth of medical operations occurring in the state. According to the 2017 Airport Inventory and Data Survey, 88 percent of Arizona airports actively accommodate operations for emergency medical evacuation/air ambulance services, physician/medical transport, medical shipments, and patient transfers by either fixed-wing aircraft or rotorcraft. In many cases, these types of activities can be safely and effectively accommodated at airports that do not necessarily meet the criteria outlined above, as they are being conducted by rotorcraft or other fixed-wing aircraft during times that do not require an instrument approach and weather is not a concern.

Figure 1 depicts the airports that meet the criteria for supporting medical operations by fixed-wing aircraft and those that accommodate any type of medical flight. It is important to note that all airports that meet the criteria also indicated that they accommodate medical flights.



Source: Airport Inventory and Data Survey 2017

Figure 1. Airports that Meet Criteria to Support and Accommodate Medical Operations

Future System Performance

Because of the importance of medical flights for the safety and security of residents and visitors, it is suggested that all airports in the four largest categories meet the criteria for supporting medical operations, along with the three GA-Rural and one GA-Basic airports that currently meet the criteria. Furthermore, it is suggested that two additional GA-Rural and two additional GA-Basic airports achieve this target to provide adequate access to an airport supporting medical operations to residents in rural areas of the state.[5] Together, this represents nearly a 10 percent increase from the 2008 performance target. **Table 4** summarizes the 2008 and 2017 performance and future performance targets by airport classification. This is a high priority for ADOT Aeronautics.

Table 4. Airports Capable of Supporting Medical Operations — Historic/Future Performance Targets

	2008 SASP		2018 SASP Update	
Classifications	Performance	Performance Target	Performance	Future Performance Target
CS-International	83%	Not applicable (N/A)	100%	100%
CS-National			67%	100%
Reliever	88%		89%	100%
GA-Community	45%		44%	100%
GA-Rural	13%		18%	29%
GA-Basic	0%		8%	23%
System-wide	**40%**	**59%**	**40%**	**67%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Performance

The 2018 SASP Update established facility and service objectives for each airport classification (see **Chapter 5: Airport Classification Analysis**), including individual objectives for runway length, weather reporting, fuel availability, and approach type. As a first action, it is suggested that airports include these objectives in their capital improvement planning efforts as they are able to be justified by projected airport activity. If all airports in the system achieve their facility and service objectives, system performance could increase to 52 percent, which would not meet the future target established for this performance measure. In general, 24/7 fuel is the most prevalent limiting factor, as this is not a service objective for any classification. ADOT Aeronautics should work with airports to identify funding sources or other programs to help airports achieve this criterion. **Table 5** summarizes needs by airport for those facilities not currently achieving this performance measure to achieve future performance targets.

[5] The airports recommended to support medical operations to provide adequate access to residents include Colorado City Municipal (GA-Rural), Gila Bend Municipal (GA-Rural), Kayenta (GA-Basic), and Polacca (GA-Basic). With the exception of Gila Bend Municipal, these airports are located in the northern portion of the state (including two Tribal airports), with low population densities, limited access to surface transportation, and long distances between medical facilities in more urban areas.

Table 5. Needs by Airports Not Currently Meeting Criteria to Support Medical Operations to Achieve Future Performance Targets

Associated City	Airport	FAA Identifier	Performance Measure Criteria							
			Runway Length (ft.)	Achieves Criterion	Approach Capability	Achieves Criterion	System Type	Achieves Criterion	24/7 Fuel Availability	Achieves Criterion
Commercial Service-National										
Bullhead City	Laughlin/Bullhead City International	IFP	8,500	✓	APV	✓	ASOS	✓	None	×
Peach Springs	Grand Canyon West	1G4	5,000	✓	Visual	×	AWOS	✓	Jet A	✓
Show Low	Show Low Regional	SOW	7,200	✓	APV	✓	AWOS	✓	None	×
Reliever										
Goodyear	Phoenix Goodyear	GYR	8,501	✓	Non-precision	✓	None	×	AvGas and Jet A	✓
GA-Community										
Benson	Benson Municipal	E95	4,002	✓	Visual	×	AWOS	✓	AvGas and Jet A	✓
Buckeye	Buckeye Municipal	BXK	5,500	✓	Visual	×	AWOS	✓	AvGas	✓
Kingman	Kingman	IGM	6,825	✓	APV	✓	ASOS	✓	None	×
Marana	Pinal Airpark	MZJ	6,849	✓	Visual	×	AWOS	✓	None	×
Nogales	Nogales	OLS	7,199	✓	Non-precision	×	ASOS	✓	None	×
Parker	Avi Suquilla	P20	6,250	✓	APV	✓	AWOS	✓	None	×
Sedona	Sedona	SEZ	5,132	✓	Non-precision	✓	AWOS	✓	None	×
St. Johns	St. Johns Industrial Air Park	SJN	5,322	✓	APV	×	ASOS	✓	None	×
Wickenburg	Wickenburg Municipal	E25	6,101	✓	Visual	×	AWOS	✓	AvGas and Jet A	✓
Willcox	Cochise County	P33	6,095	✓	APV	✓	None	×	None	×
GA-Rural										
Colorado City	Colorado City Municipal	AZC	6,300	✓	Visual	×	AWOS	✓	AvGas and Jet A	✓
Gila Bend	Gila Bend Municipal	E63	5,200	✓	Visual	×	None	×	AvGas	✓
GA-Basic										
Kayenta	Kayenta	0V7	7,101	✓	Visual	×	AWOS	✓	AvGas	✓
Polacca	Polacca	P10	4,200	✓	Visual	×	None	×	None	×

Source: Airport Inventory and Data Survey 2017

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Percent of Airports with Surrounding Municipalities that have Adopted Controls/Zoning, including "Disclosure Areas," to Make Land Use in the Airport Environs Compatible with Airport Operation and Development

While controls/zoning and airport disclosure areas are related elements aimed at supporting airport land use compatibility, they function differently and play unique roles in protecting airports, aircraft, people, and property, both on the ground and in the sky. Airports and surrounding communities can implement controls/zoning and airport disclosure areas separately or together. In other words, airports can have:

1. Either controls/zoning or disclosure areas
2. Neither controls/zoning nor disclosure areas
3. Both controls/zoning and disclosure areas

Accordingly, controls/zoning and disclosure areas were reviewed as individual elements during both the 2008 SASP and 2018 SASP Update. Data for this measure were obtained during the airport inventory and responses were not independently validated with surrounding communities. As shown in **Table 6**, the percent of system airports that have established municipal controls/zoning to protect the airport has grown by 16 percent since 2008; however, the total number of airports with control has generally remained consistent over time.

Table 6. Airports with Controls/Zoning — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	67%	8	100%	2
CS-National			78%	7
Reliever	100%	8	100%	8
GA-Community	72%	21	83%	15
GA-Rural	46%	11	76%	13
GA-Basic	20%	2	46%	6
System-wide	**60%**	**50**	**76%**	**51**

Notes: [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

As further described in **Chapter 2** and **Chapter 6**, publicly owned, public-use airports must develop and file an airport disclosure map with the Arizona Department of Real Estate (ADRE) in accordance with Arizona Revised Statute (A.R.S.) 28-8486. These maps are designed to inform existing and potential property owners of the presence of the airport in the vicinity and the affiliated noise and safety considerations.

As shown in **Table 7**, the percent of system airports that have filed these maps with the ADRE decreased slightly from 35 to 30 percent between 2008 and 2017, with the total number of airports decreasing by nine. This is likely due to the way this information was reported on the Airport Inventory and Data Survey Form, as these maps do not expire and it is unlikely that an airport would remove it from the agency.

Table 7. Airports with Airport Disclosure Maps — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	67%	8	100%	2
CS-National			33%	3
Reliever	100%	8	88%	7
GA-Community	31%	9	17%	3
GA-Rural	8%	2	24%	4
GA-Basic	20%	2	8%	1
System-wide	**35%**	**29**	**30%**	**20**

***Notes:** [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.*

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017, ADRE 2017

Future System Performance

Because municipal controls/zoning and airport disclosure maps are cornerstone elements of airport compatible land use and protecting airports from encroachment, the future performance target has been established at 100 percent for all airport classifications. Airport disclosure maps are also mandated by law. This issue is of medium priority for ADOT Aeronautics. The 2008 and 2017 performance and performance targets associated with controls/zoning and airport disclosure maps are summarized in **Table 8** and **Table 9** (respectively).

Table 8. Controls/Zoning — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	67%	N/A	100%	100%
CS-National			78%	100%
Reliever	100%		100%	100%
GA-Community	72%		83%	100%
GA-Rural	46%		76%	100%
GA-Basic	20%		46%	100%
System-wide	**60%**	**100%**	**76%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2018

Table 9. Airport Disclosure Maps — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	67%	N/A	100%	100%
CS-National			33%	100%
Reliever	100%		88%	100%
GA-Community	31%		17%	100%
GA-Rural	8%		24%	100%
GA-Basic	20%		8%	100%
System-wide	**35%**	**100%**	**30%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2018

Table 10 details the airports that currently lack control/zonings, an airport disclosure map, or both to make land use in the airport environs compatible with airport operations and development.

Table 10. Needs by Airports Currently Lacking Land Use Compatibility Controls to Achieve Future Performance Targets

Associated City	Airport	FAA Identifier	Controls/ Zoning	Airport Disclosure Map
		Commercial Service-National		
Bullhead City	Laughlin/Bullhead City International	IFP	✓	×
Flagstaff	Flagstaff Pulliam	FLG	×	×
Grand Canyon	Grand Canyon National Park	GCN	×	×
Page	Page Municipal	PGA	✓	×
Peach Springs	Grand Canyon West	1G4	✓	×
Yuma	Yuma International	NYL	✓	×
		Reliever		
Goodyear	Phoenix Goodyear	GYR	✓	×
		GA-Community		
Benson	Benson Municipal	E95	✓	×
Coolidge	Coolidge Municipal	P08	✓	×
Cottonwood	Cottonwood Municipal	P52	✓	×
Kingman	Kingman	IGM	×	×
Lake Havasu City	Lake Havasu City	HII	✓	×
Marana	Pinal Airpark	MZJ	×	×
Nogales	Nogales	OLS	✓	×
Parker	Avi Suquilla	P20	✓	×
Safford	Safford Regional	SAD	✓	×
Sedona	Sedona	SEZ	✓	×
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	✓	×
Springerville	Springerville Municipal	JTC	✓	×
St. Johns	St. Johns Industrial Air Park	SJN	×	×
Wickenburg	Wickenburg Municipal	E25	✓	×
Willcox	Cochise County	P33	✓	×
		GA-Rural		
Chinle	Chinle Municipal	E91	✓	×
Douglas	Bisbee-Douglas International	DUG	✓	×
Douglas	Cochise College	P03	✓	×
Eloy	Eloy Municipal	E60	×	×
Gila Bend	Gila Bend Municipal	E63	✓	×
Holbrook	Holbrook Municipal	P14	✓	×
Maricopa	Ak-Chin Regional	A39	×	×
San Luis	Rolle Airfield	44A	×	×
San Manuel	San Manuel	E77	×	×
Taylor	Taylor	TYL	×	✓

Associated City	Airport	FAA Identifier	Controls/ Zoning	Airport Disclosure Map
Whiteriver	Whiteriver	E24	✓	×
Williams	H.A. Clark Memorial Field	CMR	✓	×
Window Rock	Window Rock	RQE	✓	×
Winslow	Winslow-Lindbergh Regional	INW	✓	×
	GA-Basic			
Ajo	Eric Marcus Municipal	P01	×	✓
Bagdad	Bagdad	E51	×	×
Cibecue	Cibecue	Z95	✓	×
Clifton	Greenlee County	CFT	✓	×
Globe	San Carlos Apache	P13	×	×
Kayenta	Kayenta	0V7	✓	×
Kearny	Kearny	E67	×	×
Polacca	Polacca	P10	✓	×
Seligman	Seligman	P23	×	×
Sells	Sells	E78	×	×
Superior	Superior	E81	✓	×
Tombstone	Tombstone Municipal	P29	×	×
Tuba City	Tuba City	T03	✓	×

Source: Airport Inventory and Data Survey 2017

Airports without land use control/zoning should actively engage with their local municipal planning department, zoning commission, and/or city council (as appropriate) to discuss the importance of land use protections for safety and noise issues that can affect communities surrounding airports, as well as affiliated encroachment concerns. To support this process, a number of resources exist for local municipalities and airports to develop and implement airport zoning, height controls, and other related solutions. Specifically, ACRP Report 27: *Enhancing Airport Land Use Compatibility* provides model zoning legislation. The FAA is currently updating the Advisory Circular (AC) on land use compatibility, with a revised document anticipated in the near future. The updated land use compatibility AC is expected to include other useful tools to help airports and local policymakers enact appropriate land use protections.

It is also recommended that the ADOT Aeronautics Group work with the Arizona Airports Association and other forums to educate airports on the purpose and process of airport disclosure maps, as well as the associated statutory obligation to file them with the ADRE. The ADOT Aeronautics Group should also strongly encourage airports to develop airport influence areas in accordance with A.R.S. 28-8485. This process formally establishes the territorial boundaries of the area that may be impacted by an airport to provide an additional layer of awareness for existing and potential property owners near an airport. More information about airport influence areas is provided in **Chapter 2** and **Chapter 6**.

Percent of Airports Controlling all Primary Runway End Runway Protection Zones (RPZs)

RPZs are critical safety areas off the end of each runway that, when properly maintained, enhance safety in the event of a runway underrun or overshoot. In order to properly maintain RPZs clear of obstructions, it is ideal for airports to control entire property within these defined areas by easement or fee simple acquisition. While this

performance measure specifically addresses primary runway end RPZs, airports should control RPZs on all runways. Data were collected for all RPZs during the airport inventory process.

Table 11 shows a reduction in system-wide compliance from 60 percent in 2008 to 37 percent in 2017, with a decrease in the total number of airports from 50 to 25. It is likely that this reduction is the result of the way information was reported on the Airport Inventory and Data Survey, instead of an indication that airports have lost control over their primary runway end RPZs. An actual reduction in compliance would be the result of airports releasing their property control by selling their property interest or giving up an existing easement, which is highly unlikely. Additionally, the FAA would not allow National Plan of Integrated Airport Systems (NPIAS) airports to sell property in these critical safety areas.

Table 11. Airports Controlling All Primary Runway End RPZs — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	75%	9	0%	0
CS-National			67%	6
Reliever	38%	3	38%	3
GA-Community	59%	17	39%	7
GA-Rural	71%	17	12%	2
GA-Basic	40%	4	54%	7
System-wide	**60%**	**50**	**37%**	**25**

Notes: [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Future System Performance

While it is recognized that full control of all runway end RPZs may not be realistic in some cases, increasing control should be a goal for all facilities. As a result, the future target for this performance measure is established at 100 percent of system airports, just as in the 2008 SASP (see **Table 12**). This performance measure is a high priority for ADOT Aeronautics, although the emphasis is on easements as opposed to acquisition due to the high cost of this action for airports.

Table 12. Airports Controlling All Primary Runway End RPZs — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	75%	N/A	0%	100%
CS-National			67%	100%
Reliever	38%		38%	100%
GA-Community	59%		39%	100%
GA-Rural	71%		12%	100%
GA-Basic	40%		54%	100%
System-wide	**60%**	**100%**	**37%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Performance

Table 13 details the level and type of control currently held by airports that do not achieve this performance measure (i.e., do not maintain 100 percent control of their primary runway end RPZs) as reported during the airport inventory. Data recorded as "unknown" were considered uncontrolled during the performance assessment.

Table 13. Existing Type and Level of Primary Runway End RPZ Control by Airports Not Meeting Criteria to Achieve Performance Measure

Associated City	Airport	FAA ID	Primary Runway End 1		Primary Runway End 2	
			Runway End	Type (Percent Control)	Runway End	Type (Percent Control)
Commercial Service-International						
Phoenix	Phoenix Sky Harbor	PHX	08	Fee simple (100%)	26	Fee simple (80%) Uncontrolled (20%)
Tucson	Tucson International	TUS	11R	Fee simple (90%) Uncontrolled (10%)	29L	Fee simple (100%)
Commercial Service-National						
Flagstaff	Flagstaff Pulliam	FLG	03	Uncontrolled (100%)	21	Uncontrolled (100%)
Prescott	Ernest A. Love Field	PRC	03R	Fee simple (71%) Uncontrolled (29%)	21L	Fee simple (98%) Uncontrolled (2%)
Yuma	Yuma International	NYL	03L	Unknown	21R	Unknown
Reliever						
Glendale	Glendale Municipal	GEU	01	Unknown	19	Unknown
Goodyear	Phoenix Goodyear	GYR	03	Fee simple (60%) Uncontrolled (40%)	21	Fee simple (57%) Uncontrolled (43%)
Marana	Marana Regional	AVQ	03	Fee simple (60%) Uncontrolled (40%)	21	Fee simple (31%) Uncontrolled (69%)
Mesa	Falcon Field	FFZ	4R	Fee simple (80%) Uncontrolled (20%)	22L	Fee simple (100%)
Scottsdale	Scottsdale	SDL	03	Fee simple (45%) Uncontrolled (55%)	21	Fee simple (95%) Uncontrolled (5%)
GA-Community						
Buckeye	Buckeye Municipal	BXK	17	Uncontrolled (100%)	35	Uncontrolled (100%)
Casa Grande	Casa Grande Municipal	CGZ	05	Fee simple (97%) Uncontrolled (3%)	23	Fee simple (57%) Uncontrolled (43%)
Kingman	Kingman	IGM	03		21	
Lake Havasu City	Lake Havasu City	HII	14	Fee simple (75%) Uncontrolled (25%)	32	Fee simple (100%)
Nogales	Nogales	OLS	03	Fee simple (100%)	21	Fee simple (80%) Uncontrolled (20%)
Parker	Avi Suquilla	P20	01	Easement (100%)	19	Easement (95%) Uncontrolled (5%)
Payson	Payson	PAN	06	Uncontrolled (100%)	24	Fee simple (50%) Easement (40%)
Safford	Safford Regional	SAD	12	Fee simple (30%) Uncontrolled (70%)	30	Fee simple (60%) Uncontrolled (40%)
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	08	Fee simple (85%) Uncontrolled (15%)	26	Fee simple (80%) Uncontrolled (20%)
Wickenburg	Wickenburg Municipal	E25	05	Fee simple (100%)	23	Fee simple (80%) Uncontrolled (20%)

Associated City	Airport	FAA ID	Primary Runway End 1		Primary Runway End 2	
			Runway End	Type (Percent Control)	Runway End	Type (Percent Control)
Willcox	Cochise County	P33	03	Fee simple (partial)[1] Uncontrolled (partial)	21	Fee simple (partial)[1] Uncontrolled (partial)
			GA-Rural			
Bisbee	Bisbee Municipal	P04	17	Fee simple (10%) Uncontrolled (90%)	35	Fee simple (50%) Uncontrolled (50%)
Chinle	Chinle Municipal	E91	18	Fee simple (90%) Uncontrolled (10%)	36	Fee simple (80%) Uncontrolled (20%)
Colorado City	Colorado City Municipal	AZC	11	Uncontrolled (100%)	29	Uncontrolled (100%)
Douglas	Bisbee-Douglas International	DUG	08	Uncontrolled (100%)	26	Uncontrolled (100%)
Douglas	Cochise College	P03	05	Fee simple (20%) Uncontrolled (80%)	23	Fee simple (30%) Uncontrolled (70%)
Douglas	Douglas Municipal	DGL	02	Fee simple (50%) Uncontrolled (50%)	21	Fee simple (20%) Uncontrolled (80%)
Eloy	Eloy Municipal	E60	02	Fee simple (8%) Uncontrolled (92%)	20	Uncontrolled (100%)
Gila Bend	Gila Bend Municipal	E63	04	Uncontrolled (100%)	22	Uncontrolled (100%)
Holbrook	Holbrook Municipal	P14	03	Fee simple (30%) Uncontrolled 70%)	21	Fee simple (100%)
Maricopa	Ak-Chin Regional	A39	04	Fee simple (85%) Uncontrolled (15%)	22	Fee simple (100%)
San Luis	Rolle Airfield	44A	17	Uncontrolled (100%)	35	Uncontrolled (100%)
Taylor	Taylor	TYL	03	Fee simple (100%)	21	Fee simple (50%) Uncontrolled (50%)
Whiteriver	Whiteriver	E24	01	Fee simple (25%) Uncontrolled (75%)	19	Fee simple (100%)
Window Rock	Window Rock	RQE	02	Uncontrolled (100%)	20	Uncontrolled (100%)
Winslow	Winslow-Lindbergh Regional	INW	19	Unknown	29	Unknown
			GA-Basic			
Bagdad	Bagdad	E51	05	Easement (100%)	23	Easement (90%) Uncontrolled (10%)
Kearny	Kearny	E67	08	Uncontrolled (100%)	26	Uncontrolled (100%)
Seligman	Seligman	P23	04	Easement (100%)	22	Fee simple (32%) Uncontrolled (68%)
Sells	Sells	E78	04	Uncontrolled (100%)	22	Uncontrolled (100%)
Superior	Superior	E81	04	Fee simple (5%) Uncontrolled (95%)	22	Fee simple (20%) Uncontrolled (80%)
Tombstone	Tombstone Municipal	P29	06	Fee simple (50%) Uncontrolled (80%)	24	Fee simple (90%) Uncontrolled (10%)

Source: Airport Inventory and Data Survey 2017

While all system airports should ideally control the land within their primary runway RPZs, a variety of factors can prevent complete property control. For example, some property may be privately owned, developed with major roadways and interstates, or host natural features such as rivers or protected wildlife. In such cases, acquisition and land clearing is too costly or not feasible. However, even if an airport cannot completely control its RPZs at this time, airport sponsors should actively work towards complete control of RPZ property by either fee simple or easement. In the event that the RPZ property is privately owned, airport sponsors should actively engage with the owners and use tools such as right of first refusal agreements to position the airport to acquire the property if it is ever offered for sale.

In situations where complete acquisition is not possible, airport sponsors should maintain open and active lines of communication with the controlling entity. For example, if RPZs are developed with public infrastructure such as roads or rail lines, airport sponsors should reach out to the responsible authority (e.g., ADOT, city, county, etc.) to discuss any planned infrastructure changes so the airport sponsor can share any concerns over impacts to the airport (such as raised approach minimums). For NPIAS airports, any changes to RPZs must be coordinated with the FAA as outlined in the *Interim Guidance on Land Uses Within a Runway Protection Zone* (issued September 27, 2012). When natural features are an issue, such as bodies of water, endangered species, or state park land, airport sponsors can with the governing authority to identify ways to enhance compatibility, such as wildlife and/or vegetation management plans. Finally, airport sponsors can work with the appropriate jurisdictional authorities to implement zoning regulations that support safe and responsible land use within RPZs.

Percent of Airports that have Runway Safety Areas (RSAs) on their Primary Runway that meet the Standards for their Current Airport Reference Code (ARC)

RSAs are another defined zone intended to enhance the safety of operations that veer off the runway. The RSA is a rectangular area that surrounds the runway on all sides, the dimensions of which are determined based on each runway's design code (RDC), the largest of which comprises the airport's ARC. For purposes of this analysis, the primary runway's RDC is assumed to be consistent with the airport's ARC since the primary runway is typically the largest of the available runways at an airport. While this performance measure is designed to assess primary runways only, RSAs are applicable to all runways and airport sponsors should work towards compliance for all RSAs. To achieve this performance measure, an airport's primary runway RSA must conform to the appropriate dimensions for its RDC and be maintained to the following standards:

1. Fully controlled by the airport/airport sponsor
2. Maintained clear of objects (except those fixed by function)
3. Capable of providing adequate access for surface vehicles during emergency situations
4. Graded to avoid potentially dangerous surface variations such as ruts or depressions
5. Drained by grading or storm sewers to prevent water accumulation

Table 14 summarizes system airports' performance during the 2008 SASP and 2018 SASP Update. The system improved from 59 percent in 2008 to 85 percent in 2017, adding eight additional airports over time. This increase is primarily attributable to the FAA's initiative to address all non-compliant RSAs at NPIAS airports across the U.S. Through this focused initiative, nonstandard RSAs at NPIAS airports nationwide were improved to meet dimensional standards or an equivalent level of safety to the extent practicable.

Table 14. Airports with Compliant RSAs for their Current ARC — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	92%	11	100%	2
CS-National			89%	8
Reliever	50%	4	75%	6
GA-Community	69%	20	89%	16
GA-Rural	46%	11	82%	14
GA-Basic	30%	3	85%	11
System-wide	**59%**	**49**	**85%**	**57**

Notes: [1]In 2008, the state system included 83 airports. RSA information was not available for the 13 privately owned airports and 10 publicly owned non-NPIAS and Native American airports. Therefore only 60 airports were considered in the analysis. [2]In 2018, privately owned airports were removed from the system and 67 airports are considered in this analysis.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Future System Performance

The target performance for this performance measure is that all publicly owned airports have a primary runway RSA that meets standards for its ARC (or RDC) (see **Table 15**). While this is an FAA mandate for all NPIAS airports, it is a critical safety feature applicable to all system airports, regardless of NPIAS inclusion. As shown in the table below, the same performance target was established in 2008. This issue is of medium priority for ADOT Aeronautics.

Table 15. Airports with Compliant RSAs for their Current ARC — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	92%	N/A	100%	100%
CS-National			89%	100%
Reliever	50%		75%	100%
GA-Community	69%		89%	100%
GA-Rural	46%		82%	100%
GA-Basic	30%		85%	100%
System-wide	**59%**	**100%**	**85%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Performance

Table 16 details the system airports that do not currently achieve this performance measure, as well as the appropriate RSA standards for their current primary runway ARC/RDC. Note that airports' compliance with this performance measure is based on responses received from airports during the inventory process. It is recommended that further analysis be conducted to determine the reason(s) for RSA non-compliance by airport to understand the magnitude of this issue on a statewide level and so appropriate corrective actions(s) can be identified by ADOT Aeronautics and/or airports.

Table 16. Needs by Airports with Primary Runway RSAs that Do Not Meet the Standards for Their Current ARCs

Associated City	Airport	FAA ID	Primary Runway ARC	Required RSA Length (ft.)	Required RSA Width (ft.)
Reliever					
Glendale	Glendale Municipal	GEU	B-II	300	150
Marana	Marana Regional	AVQ	C-II	1,000	500
GA-Community					
Marana	Pinal Airpark	MZJ	D-V	1,000	500
Sedona	Sedona	SEZ	B-II	300	150
GA-Rural					
Colorado City	Colorado City Municipal	AZC	B-II	300	150
Douglas	Cochise College	P03	B-I	240	120
Window Rock	Window Rock	RQE	B-II	300	150
GA-Basic					
Globe	San Carlos Apache	P13	C-II	1,000	500
Sells	Sells	E78	A-I	240	120

Sources: 2017 Data Inventory and Survey, FAA AC 150/5300-13A

To ensure that all airports have RSAs that meet the requirements for each runway's RDC, airports should examine their Airport Layout Plan (ALP) to ensure it reflects the FAA's latest RSA standards for their current and future RDC(s). Any deficiencies should be evaluated to determine the most appropriate corrective actions. Airports with RSAs that do not meet requirements based on each runway's RDC should update their ALP to reflect the proper dimensions and acquire any property that is not already under the its control. Airports that do not have sufficient property control over primary runway RSAs should actively work with adjacent owners to acquire the property if possible. If the property is controlled by the airport but insufficiently graded or kept clear of objects, the airport should identify the most appropriate corrective action(s) to achieve compliance.

Percent of Airports with Clear Approaches to Both Ends of the Primary Runway

Clear approaches to runways are critical for aircraft safety, especially during inclement weather conditions. Obstructions to a runway approach can include man-made structures, such as roads, fences, and buildings, as well as natural features including vegetation and topographic concerns. The FAA maintains records of these obstructions on the 5010 Airport Master Record which is updated on a three-year cycle where a site visit is conducted to each airport.

Currently, 28 percent of Arizona's system airports have clear approaches to their primary runway ends. This reflects a significant decrease as compared to the 2008 findings, which reported 51 percent of airports compliant with this performance measure (**Table 17**). This represents an overall loss of 23 airports over time, with particularly sharp decreases apparent in the middle classifications (Reliever, GA-Community, and GA-Rural).

Table 17. Airports with Clear Approaches to Their Primary Runway Ends — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	50%	6	0%	0
CS-National			78%	7
Reliever	75%	6	25%	2
GA-Community	55%	16	28%	5
GA-Rural	46%	11	18%	3
GA-Basic	30%	3	15%	2
System-wide	**51%**	**42**	**28%**	**19**

Notes: [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.

Sources: FAA 5010 2017, FAA 5010 2008

Future System Performance

As summarized in **Table 18**, 100 percent of system airports should maintain clear approaches to both ends of their primary runways, reflecting the same target established in 2008. This is a medium priority for ADOT Aeronautics. Although this performance measure is related to primary runways only, airport sponsors should work to clear approaches to all runway ends to enhance safety.

Table 18. Airports with Clear Approaches to Their Primary Runway Ends — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	50%	N/A	0%	100%
CS-National			78%	100%
Reliever	75%		25%	100%
GA-Community	55%		28%	100%
GA-Rural	46%		18%	100%
GA-Basic	30%		15%	100%
System-wide	**51%**	**100%**	**28%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Performance

Table 19 summarizes the types of obstructions present at system airports that do not currently meet this performance measure as available from their latest FAA Form 5010. Please note that this list reflects all obstructions at noncompliant airports and is not necessarily limited to an airport's primary runway.

Table 19. Needs by Airports Without Clear Approaches to their Primary Runway Ends to Achieve Future Performance Targets

Associated City	Airport	FAA Identifier	Type of Obstruction						
			Brush	Roads / Railroads	Trees	Utilities	Topography	Fences / Gates	Man-made Structures
Commercial Service-International									
Phoenix	Phoenix Sky Harbor International	PHX		✓		✓			✓
Tucson	Tucson International	TUS		✓			✓		✓
Commercial Service-National									
Bullhead City	Laughlin/Bullhead City International	IFP				✓	✓		
Prescott	Ernest A. Love Field	PRC		✓					
Reliever									
Chandler	Chandler Municipal	CHD				✓			
Glendale	Glendale Municipal	GEU		✓		✓		✓	
Marana	Marana Regional	AVQ		✓					
Mesa	Falcon Field	FFZ		✓	✓				✓
Phoenix	Phoenix Deer Valley	DVT					✓		✓
Scottsdale	Scottsdale	SDL			✓		✓		
GA-Community									
Benson	Benson Municipal	E95	✓						
Buckeye	Buckeye Municipal	BXK	✓						
Casa Grande	Casa Grande Municipal	CGZ	✓	✓	✓				
Cottonwood	Cottonwood Municipal	P52	✓				✓		
Lake Havasu City	Lake Havasu City	HII					✓		
Marana	Pinal Airpark	MZJ	✓						
Nogales	Nogales	OLS	✓						
Safford	Safford Regional	SAD	✓					✓	
Sedona	Sedona	SEZ						✓	
Springerville	Springerville Municipal	JTC						✓	
St. Johns	St. Johns Industrial Air Park	SJN						✓	✓
Wickenburg	Wickenburg Municipal	E25	✓				✓		
Willcox	Cochise County	P33	✓						
GA-Rural									
Bisbee	Bisbee Municipal	P04	✓		✓				
Chinle	Chinle Municipal	E91							
Douglas	Bisbee-Douglas International	DUG	✓		✓				
Douglas	Cochise College	P03	✓	✓				✓	
Douglas	Douglas Municipal	DGL	✓	✓					
Eloy	Eloy Municipal	E60	✓						
Gila Bend	Gila Bend Municipal	E63	✓				✓		
Holbrook	Holbrook Municipal	P14	✓	✓					
Maricopa	Ak-Chin Regional	A39		✓				✓	
San Manuel	San Manuel	E77	✓						
Taylor	Taylor	TYL	✓		✓	✓			
Whiteriver	Whiteriver	E24		✓	✓	✓	✓	✓	✓

Associated City	Airport	FAA Identifier	Type of Obstruction						
			Brush	Roads / Railroads	Trees	Utilities	Topography	Fences / Gates	Man-made Structures
Williams	H.A. Clark Memorial Field	CMR	✓		✓		✓		
Window Rock	Window Rock	RQE	✓		✓		✓	✓	
Winslow	Winslow-Lindbergh Regional	INW	✓		✓			✓	✓
		GA-Basic							
Bagdad	Bagdad	E51	✓						
Cibecue	Cibecue	Z95					✓		
Globe	San Carlos Apache	P13	✓						
Kayenta	Kayenta	0V7							✓
Kearny	Kearny	E67	✓	✓	✓			✓	
Polacca	Polacca	P10	✓					✓	
Seligman	Seligman	P23						✓	
Sells	Sells	E78	✓		✓		✓	✓	
Superior	Superior	E81	✓		✓				
Tombstone	Tombstone Municipal	P29	✓		✓				
Tuba City	Tuba City	T03					✓		

Source: FAA 5010 Master Record 2017

As a first step in improving system performance, each airport with an obstruction should conduct an evaluation to determine the level of control it has over the obstruction(s) affecting its facilities. An airport can have direct or complete control, exhibit partial control in which it can influence actions concerning an obstruction, or have no ability to remove or mitigate a runway obstruction. In cases where an airport possesses direct or partial control, actionable steps should be identified for removal or mitigation. In cases where an airport has no control, airports should work with the controlling entity to communicate safety concerns and properly mark or light obstructions such as buildings and utility lines. If removal or mitigation is not currently feasible, airports should identify potential future opportunities to improve performance, such as a change in property ownership or new funding sources that could be used to relocate existing infrastructure.

As highlighted in **Table 19**, brush and trees compose the majority of obstructions at Arizona's airports. This issue can be addressed with an appropriate vegetation management plan. This type of plan includes key procedural details about how vegetation will be properly maintained, such as the frequency of spraying and cutting, and the parties responsible for implementing each of its components. To assist airports in this process, ADOT Aeronautics should develop a vegetation management plan template that can be customized based on each airport's particular needs. Implementing a carefully crafted management plan can be one of the most effective steps to maintaining clear runway approaches.

Percent of Airports with Adopted Wildlife Plans in Accordance with Appropriate FAA Regulations

As part of their legal responsibility for maintaining a safe environment for aviation activities, airport sponsors must take appropriate steps to mitigate the threat of wildlife strikes at their facilities, including birds, large and small mammals, and reptiles. These steps may include a Wildlife Hazard Site Visit (Site Visit), Wildlife Hazard

Assessments (WHAs), and/or Wildlife Hazard Management Plans (WHMPs).[6] **Table 20** summarizes the current and historic performance of airports with adopted WHAs or WHMPs. As shown, the system has experienced a 10 percent increase in airports achieving this performance measures since 2008, with three additional airports completing one of these types of studies. While improvements are evident throughout the system, the highest classifications have experienced the greatest percent increases since 2008.

Table 20. Percent of Airports by Classification with an Adopted WHA or WHMP — Current/Historic Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	50%	6	100%	2
CS-National			67%	6
Reliever	25%	2	63%	5
GA-Community	21%	6	17%	3
GA-Rural	4%	1	18%	3
GA-Basic	0%	0	0%	0
System-wide	**18%**	**15**	**28%**	**18**

***Notes:** [1]This measure was evaluated as a system indicator in 2008. At that time, the state system included 83 airports. [2]In 2018, the system includes 67 airports.*

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Because wildlife strikes present a significant risk to aircraft, pilots, and passengers, the FAA encourages airports to evaluate their situation relative to wildlife. FAA's current guidance from FAA Order 5100.38D, *Airport Improvement Program Handbook* (September 30, 2014), notes that, "GA (and reliever) airports with fewer than 100 based jets or less than 75,000 annual operations may only need a wildlife hazard site visit." Depending on the results of the site visit, FAA will determine if the airport requires a WHA or WHMP. Part 139 airports are strongly encouraged to complete a WHA and are required to do so when one of the following triggering events occurs in the airport vicinity:[7]

1. An air carrier aircraft experiences multiple wildlife strikes
2. An air carrier aircraft experiences substantial damage from striking wildlife
3. An air carrier aircraft experiences an engine ingestion of wildlife
4. Wildlife of a size or in numbers capable of causing an event described in the events above are observed to have access to any airport flight pattern or aircraft movement area

[6] FAA Order 5100.38D, *Airport Improvement Program Handbook* (September 30, 2014) states that a Site Visit may be the most appropriate level of wildlife assessment at GA (including reliever) airports that experience relatively low levels of aviation activity. However, Site Visits were not documented as part of the 2018 SASP Update.

[7] Title 14 Code of Federal Regulations (CFR), Part 139.337, *Wildlife Hazard Management*, prescribes the specific reasons why a WHA must be conducted and what subject matter is minimally required. FAA AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans*, is currently in draft form and will likely provide additional guidance on this topic.

Based on the findings of the WHA, as well as the aeronautical activities of the airport and other pertinent information, the FAA may also require an airport to complete a more detailed WHMP. At a minimum, the FAA recommends that Part 139 airports develop and implement a plan to deal with any hazardous wildlife attractants or situations identified in the WHA.

Future System Performance

As a first step, it is recommended that all Part 139 airports minimally conduct a WHA to identify the types of hazards that exist at their facilities and areas in the airport environs that may attract wildlife, as well as develop an actionable plan to reduce the identified hazards to air carrier operations. The performance target for all other (i.e., non-Part 139) airports reflects those facilities that have already adopted some type of wildlife management study. These targets are provided in **Table 21**. The table also presents the number of airports in each classification recommended to achieve this measure in terms of their Part 139 status and as a ratio of the total number of airports in that classification. In 2008, this measure was evaluated for informational purposes only. Accordingly, future targets were not established. This measure is a medium priority for ADOT Aeronautics.

Table 21. Percent of Airports by Classification with an Adopted WHA or WHMP — Future Performance Targets

Classifications	2008 SASP		2018 SASP Update			
	Performance	Performance Target[1]	Performance	Future Performance Target[2]	Performance Targets in Terms of Part 139 Status: Part 139	Performance Targets in Terms of Part 139 Status: Non-Part 139
CS-International	50%	N/A	100%	100%	2/2	0/0
CS-National			67%	100%	9/9	0/0
Reliever	25%		63%	63%	0/0	5/8
GA-Community	21%		17%	28%	2/2	3/16
GA-Rural	4%		18%	18%	0/0	3/17
GA-Basic	0%		0%	0%	0/0	0/13
System-wide	**18%**		**28%**	**36%**	**13/13**	**11/54**

Notes: [1]In 2008, this measure was evaluated for information purposes only. As such, future performance targets were not established. [2] The Part 139 status of Sierra Vista-Libby Army Airfield's (FHU) is currently inactive. However, it is recommended that FHU adopt a wildlife hazard plan, as the airport could choose to re-activate its status in the future.

Source: Kimley-Horn 2018

Actions to Improve Performance

Table 22 summarizes the compliance of Arizona's 13 Part 139 airports with this performance measure. To achieve this performance measure, the five Part 139 airports currently without an adopted wildlife hazard plan should complete an appropriate study in accordance with FAA Order 5100.38D, *Airport Improvement Program Handbook* (September 30, 2014). It is important to note that two of these five airports are classified at GA-Community and do not currently provide scheduled commercial service. The status of Sierra Vista Municipal-Libby Army Airfield is currently listed as inactive; however, it is included here because the airport could re-activate its Part 139 status prior to the next update of the Arizona SASP.

Table 22. Needs by Airport for the Adoption of a WHA or WHMP to Achieve Future Performance Targets

Associated City	Airport	FAA Identifier	WHA and/or WHMP
Commercial Service-International			
Phoenix	Phoenix Sky Harbor International	PHX	✓
Tucson	Tucson International	TUS	✓
Commercial Service-National			
Bullhead City	Laughlin/Bullhead City International	IFP	✓
Flagstaff	Flagstaff Pulliam	FLG	✓
Grand Canyon	Grand Canyon National Park	GCN	✓
Page	Page Municipal	PGA	✓
Peach Springs	Grand Canyon West	1G4	×
Phoenix	Phoenix-Mesa Gateway	IWA	✓
Prescott	Ernest A. Love Field	PRC	×
Show Low	Show Low Regional	SOW	×
Yuma	Yuma International	NYL	✓
GA-Community			
Kingman	Kingman	IGM	×
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	×

Sources: Airport Data Inventory and Survey 2017, FAA Part 139 Airport Certification Status List (updated December 2017)

The FAA offers a number of resources to assist airports address wildlife hazard mitigation, including a comprehensive guide entitled, *Wildlife Hazard Mitigation: A Guide for Airport Personnel*.[8] This document outlines the legislative and regulatory policies pertaining to wildlife management at airports, as well as best practices regarding WHAs and WHMPs. As noted above, while WHAs and WHMPS are particularly pertinent for Part 139 certified airports, wildlife management must be a priority for all aviation facilities. As noted, GA airports can complete a Site Visit. A Site Visit entails a short, one- to three-day survey conducted by a qualified wildlife biologist that identifies potential hazards and strategies to mitigate those threats. The Site Visit may recommend that the airport conduct further study via a WHA or WHMP. Further guidance for airports regarding wildlife hazards is provided in FAA AC 150/5200-33B, *Hazardous Wildlife Attractants On or Near Airports*.[9]

Fiscal Responsibility

This section reviews the historical and future performance targets established for the three performance measures related to fiscal responsibility. Two of the measures improved at the system level. One measure is new to the 2018 SASP Update and historical data are unavailable to assess progress over time. In all cases, suggested actions to achieve future performance targets are provided by measure.

[8] Cleary, Edward C.; Dolbeer, Richard A. (2005). *Wildlife Hazard Management at Airports: A Manual for Airport Personnel*. FAA and the U.S. Department of Wildlife: Washington, DC. This document, as well as numerous other useful resources, is available online at faa.gov/airports/airport_safety/wildlife/ (accessed March 7, 2018).
[9] It is important to note that the land use standards provided in FAA AC 150/5200-33B are also applicable to airports that have received federal grant-in-aid assistance, including GA facilities. An update to this AC is currently in draft form (FAA AC 150/5200-33C).

Percent of Population Within 30 Minutes of an All-Weather Runway (Paved, Instrument Approach, Weather Reporting)

Airports with an all-weather runway provide residents, visitors, and businesses with access to aviation services during inclement weather conditions. This can be particularly valuable during Arizona's monsoon season, as well as during the winter months for northern and eastern Arizona. The follow criteria were utilized to define an all-weather runway:

1. Paved runway
2. Published instrument approach procedures (IAPs)
3. Weather report (i.e., AWOS or ASOS)

There has been a 16 percent increase in the percent of population residing within 30-minutes of an all-weather runway since 2008. This shift is primarily due to demographic changes, as population growth in Arizona's urban areas has outpaced rural locales, particularly within the Sun Corridor. Accordingly, this performance measure reflects the greater overall aviation coverage provided in urban areas.

Table 23 summarizes the percent of Arizona's population within 30 minutes of an all-weather runway in 2008 and 2017, as well as the total number of system airports that achieve this measure. Since 2008, three additional airports meet the criteria for an all-weather runway, growing from 38 percent in 2008 to 54 percent in 2017.

Table 23. Population within 30 Minutes of an All-Weather Runway — Historic/Current Performance

	2008 Performance[1]		2017 Performance[2]	
Classification	Percent Population Coverage	Number of Airports with an All-weather Runway	Percent Population Coverage	Number of Airports with an All-weather Runway
System-wide	**77%**	**33**	**93%**	**36**

***Notes:** [1]In 2008, the state system included 83 airports. Criteria for an all-weather runway included a paved runway, instrument approach, and AWOS. [2]In 2018, the system includes 67 airports. The 2018 criteria include a paved runway, instrument approach, and weather reporting (i.e., either AWOS or ASOS).*

Sources: Wilbur Smith and Associates 2008, Airport Inventory and Data Survey 2017, FAA 5010 2017, Kimley-Horn 2017

Future System Performance

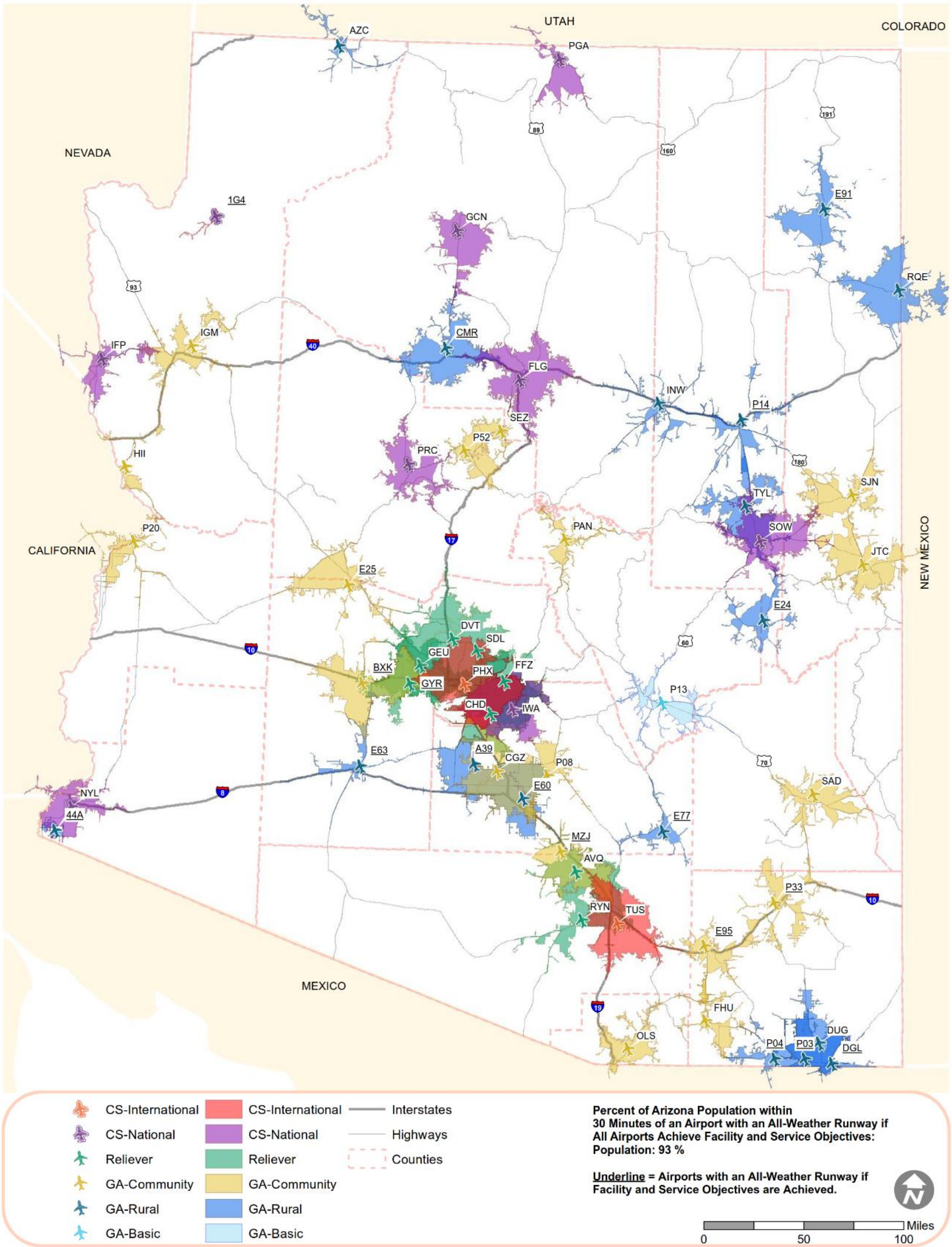
With 93 percent population coverage, the state is adequately served by airports with all-weather runways. However, it is recommended that all airports achieve their facility and service objectives, three of which are the criteria to achieve an all-weather runway. The three criteria established to evaluate this performance measure (paved runway, instrument approach, and weather reporting) are objectives for the top four classifications (i.e., Commercial Service-International through GA-Community). While the paved runway criterion is a "desired" objective for GA-Rural airports, all facilities are currently compliant. To determine the future performance target for this performance measure, the SASP Update evaluated how the percent population coverage would change if all system airports achieve their facility and service objectives.

Figure 2 shows that the percent of Arizona's population with 30-minute access to an all-weather runway would remain at 93 percent due to state population coverage, even if all system airports achieve their facility and service objectives. Based on this analysis, the future target for the percent of population with 30-minute access to an all-weather runway is established at 93 percent. As shown in **Table 24,** this is a nine percent increase from the 2008 target. This performance measure is a low priority for ADOT Aeronautics given that the existing all-weather coverage meets the established performance target of 93 percent.

Table 24. Population within 30 Minutes of an All-Weather Runway — Historic/Future Targets

	2008 SASP		2018 SASP Update	
Classification	Performance	Performance Target	Performance	Future Performance Target
System-wide	**77%**	**84%**	**93%**	**93%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017



Sources: 2017 Airport Inventory and Data Survey, Environmental Systems Research Institute (ESRI) Community Analyst 2016

Figure 2. Percent of Population within 30 Minutes of an Airport with an All-Weather Runway If All Airports Achieve Their Facility and Service Objectives

Actions to Improve Performance

As discussed above, all airports should achieve their facility and service objectives as a key first step in improving the population's access to an all-weather runway. **Table 25** lists those airports that do not currently provide an all-weather runway and their associated facility and service objective needs by classification. GA-Basic airports are excluded from the table, as their facility and service objectives are not sufficient to achieve this measure.

Table 25. Needs by Airports that Do Not Meet Facility and Service Objectives Associated with an All-Weather Runway

Associated City	Airport	FAA Identifier	Performance Measure Criteria					
			Runway Surface	Meets Criterion	Approach Type	Meets Criterion	Weather Reporting	Meets Criterion
CS-National (Objectives: Paved runway, approach procedures with vertical guidance (APV), weather reporting								
Peach Springs	Grand Canyon West	1G4	Paved	✓	Visual	×	AWOS	✓
Reliever (Objectives: Paved runway, non-precision approach [NPI], weather reporting)								
Goodyear	Phoenix Goodyear	GYR	Paved	✓	NPI	✓	-	×
GA-Community (Objectives: paved runway, non-precision approach, weather reporting)								
Benson	Benson Municipal	E95	Paved	✓	Visual	×	AWOS	✓
Buckeye	Buckeye Municipal	BXK	Paved	✓	Visual	×	AWOS	✓
Marana	Pinal Airpark	MZJ	Paved	✓	Visual	×	AWOS	✓
Wickenburg	Wickenburg Municipal	E25	Paved	✓	Visual	×	AWOS	✓
GA-Rural (Objectives: Paved runway [desired], non-precision or circling approach, weather reporting)								
Bisbee	Bisbee Municipal	P04	Paved	✓	Visual	×	-	×
Chinle	Chinle Municipal	E91	Paved	✓	Visual	×	-	×
Douglas	Douglas Municipal	DGL	Paved	✓	Visual	×	-	×
Douglas	Cochise College	P03	Paved	✓	Visual	×	-	×
Eloy	Eloy Municipal	E60	Paved	✓	Visual	×	-	×
Gila Bend	Gila Bend Municipal	E63	Paved	✓	Visual	×	-	×
Holbrook	Holbrook Municipal	P14	Paved	✓	Visual	×	AWOS	✓
Maricopa	Ak-Chin Regional	A39	Paved	✓	Visual	×	-	×
San Luis	Rolle Airfield	44A	Paved	✓	Visual	×	-	×
San Manuel	San Manuel	E77	Paved	✓	Visual	×	AWOS	✓
Whiteriver	Whiteriver	E24	Paved	✓	Visual	×	-	×
Wilcox	Cochise College	P33	Paved	✓	APV	✓	-	×
Williams	H.A. Clark Memorial Field	CMR	Paved	✓	Visual	×	AWOS	✓

Sources: Airport Inventory and Data Survey 2017, FAA 5010 Master Record, Kimley-Horn 2017

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Number of Airports with a Current (within 10 years) Master Plan

A current master plan aligns airport improvement projects with existing and realistic aviation demands. Additionally, master plans and/or ALP updates with narrative help airports communicate aviation demands to policymakers, airport users, and the general public. These documents allow airports to engage with the public to provide information on the airport's activities and can help to garner support on a broader scale. A community that understands and values its airport is more likely to participate in future planning efforts; generate fewer noise complaints; and offer its support in terms of controls, zoning, and other land use compatibility issues meant to protect the airport and its surroundings. Planning studies also offer the opportunity to thoroughly evaluate how a community's economic and demographic changes may impact an airport and its future needs.

At the inception of the 2018 SASP Update, a performance measure was established that defined "current" as "completed within the past five years." The same threshold was used during the 2008 SASP. As the 2018 SASP Update progressed, it became apparent that the five-year threshold neither accurately reflected the needs of Arizona's airports nor provided a realistic target moving forward. As a result, this performance measure has been revised moving forward to define a "current" master plan as "completed within the past 10 years." **Table 26** summarizes the percent of Arizona's airports that have completed a master plan within the past 10 years. Because the 2008 SASP evaluated master plans using a five-year timeframe, historic data on this performance measure are unavailable.

Table 26. Airports with a Current Master Plan (Within 10 Years) — Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	N/A	N/A	100%	2
CS-National			89%	8
Reliever			88%	7
GA-Community			89%	16
GA-Rural			82%	14
GA-Basic			38%	5
System-wide			**78%**	**52**

Notes: [1]The 2008 SASP assessed the airports with master plans within a five-year threshold. Therefore, historical performance data are unavailable for this performance measure. [2]In 2018, the analysis includes 67 system airports.

Source: 2017 Airport Inventory and Data Survey

Future System Performance

In addition to revising the frequency provided by this performance measure, the future performance target has also expanded the type of planning document considered appropriate for some classifications of airports.[10] Like a master plan, an ALP update with narrative evaluates current aviation demands, forecasts aviation activity through the planning horizon, and develops a list of recommended improvement projects. While more limited in scope, an ALP update with narrative accomplishes many of the same goals and objectives as a master plan. Furthermore, the FAA and ADOT Aeronautics require that a proposed project is depicted on an airport's current

[10] Data on ALP updates with narrative were not gathered during the airport inventory process. As a result, the evaluation of current performance only reflects master plans/master plan updates.

ALP to be eligible for federal and state funding—not for it to be included in a master plan. As such, the future target for this measure is recommended to be a master plan/master plan update every seven to ten years for the GA-Community and above classifications and an ALP with narrative for GA-Rural and GA-Basic airports during that same timeframe. This is of medium priority for ADOT Aeronautics.

Table 27. Airports with a Current Master Plan or ALP Update with Narrative (Within 10 Years) — Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	N/A	N/A	100%	100%
CS-National			89%	100%
Reliever			88%	100%
GA-Community			89%	100%
GA-Rural			82%	100%
GA-Basic			38%	100%
System-wide			**78%**	**100%**

Source: Kimley-Horn 2017

Actions to Improve Performance

Table 28 details system airports with a master plan that is older than 10 years. Moving forward, airports in the GA-Rural and GA-Basic classifications can complete an ALP update with narrative in lieu of a full master plan/master plan update for compliance with this performance measure. It is recommended that airports in the highest classifications (GA-Community and above) complete a master plan/master plan update every seven to 10 years to ensure that capital improvement projects align with existing and projected future aviation demands. Note that it is assumed that airports unable to determine the completion year of their latest master plans (i.e., “unknown”) fall outside of the 10-year threshold and are thus noncompliant with this performance measure.

Table 28. Needs by Airport with a Master Plan Beyond the 10-year Threshold

Associated City	Airport	FAA ID	Master Plan Year
Commercial Service-National			
Prescott	Ernest A. Love Field	PRC	2000
Reliever			
Phoenix	Phoenix Deer Valley	DVT	2001
GA-Community			
Cottonwood	Cottonwood Municipal	P52	2006
Sedona	Sedona	SEZ	2005
GA-Rural			
Taylor	Taylor	TYL	2005
Whiteriver	Whiteriver	E24	1998
Winslow	Winslow-Lindbergh Regional	INW	1998
GA-Basic			
Cibecue	Cibecue	Z95	Unknown
Clifton	Greenlee County	CFT	2000

Associated City	Airport	FAA ID	Master Plan Year
Globe	San Carlos Apache	P13	2007
Kearny	Kearny	E67	1994
Seligman	Seligman	P23	Unknown
Sells	Sells	E78	Unknown
Tombstone	Tombstone Municipal	P29	1999
Tuba City	Tuba City	T03	1997

Source: Airport Inventory and Data Survey 2017

As most airports utilize some form of grant funding to prepare master plans and ALP updates with narrative, completing these types of documents depends, in large part, on the state and FAA. In recent years, the FAA has funded the development of numerous planning documents for airports across the U.S. In addition to master plans and ALP updates, the FAA can work with airports to complete studies that evaluate the impact of changes to FAA guidelines and policies on elements such as taxiway geometry, runway incursion mitigation (RIM) issues, surveying standards, and wildlife, as well as significant changes to both commercial and GA activity. These types of evaluations encourage airports to stay current with existing and future needs, as well as the latest safety, security, and other standards established at the federal level.

Percent of Airports with a Pavement Condition Index (PCI) of 70 or Greater

Pavement condition is vital to the safe and efficient operation of aircraft and is therefore critical for the continued operation of an aviation facility. The current performance of airports' overall PCI and the PCI of the primary runway were evaluated during both the 2008 SASP and 2018 SASP Update. Since 2008, the overall PCI of all system airport pavements has decreased from 59 to 57 percent, although the change in the number of airports evaluated is significantly different and must be considered when comparing performance over time.

Based on discussions with the PAC and ADOT Aeronautics during the 2018 SASP Update, it became apparent that it is more appropriate to establish performance targets for individual pavement areas. Airports must prioritize improvement projects to those facilities most critical to aircraft operations; thus, establishing a single airport-wide goal does not provide an accurate depiction of an airport's pavement condition. While primary runways and taxiways should be maintained in excellent or good condition, it is possible for aprons to be maintained less frequently without significantly impacting performance or the safety and efficiency of operations.[11] As a result, PCI performance is reported separately with different targets for primary runways and taxiways and aprons. Accordingly, this performance measure was revised to establish a PCI target of greater or equal to 70 for primary runways and taxiways and greater or equal to 55 for aprons.

Table 29 presents the historic and current PCI ratings for airports' primary runways. The percent of airports with runways compliant with this performance measure has increased by 12 percent since 2008, although the total number of airports has remained fairly constant over time. The most significant gains from a system-wide perspective are apparent at Arizona's smallest airports. These gains are attributable to ADOT Aeronautics' continued focus on pavement preservation via the Airport Pavement Management System (APMS) Program (see **Chapter 2** and **Chapter 6** for further details about the APMS Program).

[11] While it is recognized that non-primary runways and taxiways should also be adequately maintained, this performance measure was established to specifically address primary facilities.

Table 29. Airports Meeting Primary Runway PCI Threshold (≥70) — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	75%	9	100%	2
CS-National			67%	6
Reliever	100%	8	100%	8
GA-Community	59%	17	67%	12
GA-Rural	38%	9	59%	10
GA-Basic	20%	2	46%	6
System-wide	**54%**	**45**	**64%**	**43**

Notes: [1]In 2008, the state system included 83 airports. Primary runway PCI data were unavailable for 32 airports (39 percent of system) due to private or Tribal ownership, as well as unpaved facilities. However, the analysis included all 83 airports. [2]In 2018, the state system includes 67 airports. Primary runway PCI values were unavailable for five airports, two of which are unpaved (Cibecue and Superior).

Sources: ADOT 2008, ADOT APMS Report 2017

Table 30 presents the current performance PCI ratings for airports' primary taxiways and aprons; historic data are unavailable for these pavement types. Like the primary runways presented above, the APMS Program has likely improved taxiways and aprons statewide, although the extent of the improvement is difficult to quantify due to the lack of historic data.

Table 30. Airports Meeting Primary Taxiway (≥70) and Apron PCI (≥55) Thresholds — Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]			
			Primary Taxiway (≥70)		Apron (≥55)	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	N/A	N/A	50%	1	100%	2
CS-National			89%	8	100%	9
Reliever			88%	7	88%	7
GA-Community			67%	12	67%	12
GA-Rural			47%	8	59%	10
GA-Basic			8%	1	23%	3
System-wide			**55%**	**37**	**64%**	**43**

Note: [1]In 2008, PCI ratings were not obtained for primary taxiways nor apron areas. As such, historical data are unavailable for comparison purposes. [2]In 2018, the state system includes 67 airports. Apron PCIs are unavailable for two airports, and two airports are unpaved (Cibecue and Superior).

Source: ADOT APMS 2017

Future System Performance

Because pavement is an airport's most vital asset, it is recommended that all applicable system airports achieve the recommended PCI value for each pavement area. This same performance target was established for primary runways in 2008. Please note that two GA-Basic airports are unpaved (Cibecue and Superior); therefore, future system-wide targets are reduced to 97 percent. **Table 31** presents the historic and future performance targets for the primary runway PCI rating. This performance measure is a high priority for ADOT Aeronautics.

Table 31. Airports Meeting Primary Runway PCI (≥70) Threshold — Historic/Future Performance Targets

Classifications	2008 SASP Performance	2008 SASP Performance Target	2018 SASP Update Performance	2018 SASP Update Future Performance Target
CS-International	75%	N/A	100%	100%
CS-National			67%	100%
Reliever	100%		100%	100%
GA-Community	59%		67%	100%
GA-Rural	38%		59%	100%
GA-Basic	20%		46%	85%
System-wide	**54%**	**100%**	**64%**	**97%**

Source: Kimley-Horn 2017

Table 32 presents the recommended future performance targets for the primary taxiway and apron PCI ratings. As previously noted, this was not a performance measure in 2008; therefore, historic performance targets were not established.

Table 32. Airports Meeting Primary Taxiway (≥70) and Apron PCI (≥55) Thresholds — Future Performance Targets

Classifications	2008 SASP Performance	2008 SASP Performance Target	2018 SASP Update Primary Taxiway (≥70) Performance	2018 SASP Update Primary Taxiway (≥70) Future Performance Target	2018 SASP Update Apron (≥55) Performance	2018 SASP Update Apron (≥55) Future Performance Target
CS-International	N/A	N/A	50%	100%	100%	100%
CS-National			89%	100%	100%	100%
Reliever			88%	100%	88%	100%
GA-Community			67%	100%	67%	100%
GA-Rural			47%	100%	59%	100%
GA-Basic			8%	85%	23%	85%
System-wide			**55%**	**97%**	**64%**	**97%**

Source: Kimley-Horn 2017

Actions to Improve Performance

Table 33 details each system airport's PCI rating by pavement area and indicates its compliance with the PCI thresholds established for this performance measure. Note that a rating of "unknown" indicates that an airport has the particular pavement area but the PCI rating is unknown, while a rating of "N/A" indicates that the airport does not have the particular pavement area. As indicated, two airports are unpaved.

ADOT Aeronautics' ongoing focus on pavement maintenance through the APMS Program has significantly improved the condition of airport pavement in Arizona since the 2008 SASP. By continuously monitoring pavements and prioritizing maintenance projects based on actual need, this program provides an efficient and effective process to support aviation in Arizona. It is recommended that ADOT Aeronautics continue this innovative program to maintain pavement quality over time.

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Table 33. Needs by Airport to Achieve PCI Thresholds Per Pavement Area

Associated City	Airport	Primary Runway (≥70)		Primary Taxiway (≥70)		Apron (≥55)	
		PCI Rating	Meets Threshold	PCI Rating	Meets Threshold	PCI Rating	Meets Threshold
Commercial Service-International							
Phoenix	Phoenix Sky Harbor International	93	✓	92	✓	80	✓
Tucson	Tucson International	73	✓	68	×	67	✓
Commercial Service-National							
Bullhead City	Laughlin/Bullhead City International	97	✓	82	✓	70	✓
Flagstaff	Flagstaff Pulliam	100	✓	82	✓	93	✓
Grand Canyon	Grand Canyon National Park	69	×	75	✓	76	✓
Page	Page Municipal	92	✓	77	✓	65	✓
Peach Springs	Grand Canyon West	86	✓	91	✓	87	✓
Phoenix	Phoenix-Mesa Gateway	89	✓	89	✓	90	✓
Prescott	Ernest A. Love Field	73	✓	77	✓	70	✓
Show Low	Show Low Regional	52	×	63	×	68	✓
Yuma	Yuma International	Unknown	Unknown	78	✓	82	✓
Reliever							
Chandler	Chandler Municipal	84	✓	83	✓	61	✓
Glendale	Glendale Municipal	76	✓	62	×	76	✓
Goodyear	Phoenix Goodyear	91	✓	73	✓	71	✓
Marana	Marana Regional	100	✓	71	✓	53	×
Mesa	Falcon Field	79	✓	Unknown	-	Unknown	-
Phoenix	Phoenix Deer Valley	77	✓	77	✓	76	✓
Scottsdale	Scottsdale	80	✓	75	✓	78	✓
Tucson	Ryan Field	79	✓	88	✓	84	✓
GA-Community							
Benson	Benson Municipal	90	✓	70	✓	79	✓
Buckeye	Buckeye Municipal	100	✓	59	×	61	✓
Casa Grande	Casa Grande Municipal	75	✓	83	✓	52	×
Coolidge	Coolidge Municipal	50	×	73	✓	37	×
Cottonwood	Cottonwood Municipal	99	✓	55	×	69	✓
Kingman	Kingman	72	✓	75	✓	54	×

Associated City	Airport	Primary Runway (≥70)		Primary Taxiway (≥70)		Apron (≥55)	
		PCI Rating	Meets Threshold	PCI Rating	Meets Threshold	PCI Rating	Meets Threshold
Lake Havasu City	Lake Havasu City	65	×	51	×	50	×
Marana	Pinal Airpark	94	✓	80	✓	23	×
Nogales	Nogales	63	×	72	✓	79	✓
Parker	Avi Suquilla	65	×	75	✓	65	✓
Payson	Payson	98	✓	61	×	53	×
Safford	Safford Regional	95	✓	64	×	73	✓
Sedona	Sedona	100	✓	81	✓	72	✓
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Unknown	×	87	✓	83	✓
Springerville	Springerville Municipal	76	✓	81	✓	58	✓
St. Johns	St. Johns Industrial Air Park	65	×	62	×	78	✓
Wickenburg	Wickenburg Municipal	80	✓	89	✓	79	✓
Wilcox	Cochise County	79	✓	75	✓	67	✓
GA-Rural							
Bisbee	Bisbee Municipal	85	✓	21	×	30	×
Chinle	Chinle Municipal	32	×	45	×	35	×
Colorado City	Colorado City Municipal	91	✓	87	✓	87	✓
Douglas	Bisbee-Douglas International	62	×	33	×	36	×
Douglas	Cochise College	80	✓	69	×	25	×
Douglas	Douglas Municipal	27	×	82	✓	26	×
Eloy	Eloy Municipal	76	✓	48	×	69	✓
Gila Bend	Gila Bend Municipal	73	✓	77	✓	81	✓
Holbrook	Holbrook Municipal	34	×	97	✓	62	✓
Maricopa	Ak-Chin Regional	61	×	66	×	64	✓
San Luis	Rolle Airfield	85	✓	90	✓	63	✓
San Manuel	San Manuel	85	✓	82	✓	94	✓
Taylor	Taylor	84	✓	76	✓	91	✓
Whiteriver	Whiteriver	72	✓	62	×	69	✓
Williams	H.A. Clark Memorial Field	100	✓	77	✓	69	✓
Window Rock	Window Rock	13	×	14	×	13	×
Winslow	Winslow-Lindbergh Regional	60	×	68	×	51	×
GA-Basic							
Ajo	Eric Marcus Municipal	64	×	56	×	41	×

Associated City	Airport	Primary Runway (≥70)		Primary Taxiway (≥70)		Apron (≥55)	
		PCI Rating	Meets Threshold	PCI Rating	Meets Threshold	PCI Rating	Meets Threshold
Bagdad	Bagdad	70	✓	58	×	63	✓
Cibecue	Cibecue	Unpaved	-	Unpaved	-	Unpaved	-
Clifton	Greenlee County	68	×	63	×	44	×
Globe	San Carlos Apache	100	✓	63	×	61	✓
Kayenta	Kayenta	100	✓	39	×	46	×
Kearny	Kearny	51	×	N/A	-	48	×
Polacca	Polacca	6	×	N/A	-	29	×
Seligman	Seligman	83	✓	77	✓	45	×
Sells	Sells	Unknown	-	N/A	-	N/A	-
Superior	Superior	Unpaved	-	Unpaved	-	Unpaved	-
Tombstone	Tombstone Municipal	70	✓	57	×	Unknown	-
Tuba City	Tuba City	81	✓	52	×	49	×

Source: ADOT APMS 2017

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Economic Support

This section reviews the historical and future performance targets established for the three performance measures related to economic support. Between 2008 and 2017, one performance measure improved, while one declined. One performance measure was not evaluated during the 2008 SASP, so historical results are unavailable for comparison. Suggested actions to achieve performance targets are provided by measure.

Percent of Airports with 24/7 Fuel

Fuel can often provide the largest source of revenue at an airport: increasing its availability can prove to be a valuable investment. At GA facilities in particular, fuel via a self-serve terminal can increase overall sales. Fuel can be cheaper at a self-serve terminal as compared to an FBO and can be more convenient, especially for pilots of smaller aircraft with relatively small fuel tanks. 24/7 (24 hours a day/7days a week) fuel via a self-serve terminal can also save staffing costs while expanding service to those pilots who operate at night. Adding 24/7 Jet A will also draw larger aircraft with a greater demand for fuel. This performance measure evaluated those airports offering either 24/7 AvGas or Jet A, typically provided by a credit card reader or the availability of FBO services at all times.

The percent of airports with 24/7 fuel has increased by 17 percent from 2008, in part due to a reduction in the number of system airports. Yet despite this change, four more system airports now offer this service as compared to 2017, with 42 airports offering this service today as compared to 38 in 2008. **Table 34** summarizes the current and historic availability of 24/7 fuel at system airports.

Table 34. Airports with 24/7 Fuel — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	67%	8	100%	2
CS-National			78%	7
Reliever	88%	7	100%	8
GA-Community	72%	21	61%	11
GA-Rural	8%	2	71%	12
GA-Basic	0%	0	15%	2
System-wide	**46%**	**38**	**63%**	**42**

Notes: [1]In 2008, the state system included 83 airports. Any type of fuel provided 24/7 applies. [2]In 2018, the system includes 67 airports. Any type of fuel provided 24/7 applies.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Future System Performance

Because of the many economic, safety, security, and other benefits associated with 24/7 fuel for airports and their users, it is recommended that all airports in the four largest classifications achieve this measure. Additionally, it is recommended that the 12 GA-Rural and two GA-Basic airports that currently provide 24/7 fueling continue to do so in the future. As such, the system-wide target has been established at 76 percent—a 24 percent increase since 2008 (**Table 35**). This difference is due to a significantly different recommendation developed in 2008. At that time, the SASP recommended that all Commercial Service and Reliever airports

provide both 24/7 AvGas and Jet A (20 airports total), with no associated targets established for smaller GA facilities. This is a medium priority for ADOT Aeronautics.

Table 35. Airports with 24/7 Fuel — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target[1]	Performance	Future Performance Target[2]
CS-International	67%	N/A	100%	100%
CS-National			78%	100%
Reliever	88%		100%	100%
GA-Community	72%		61%	100%
GA-Rural	8%		71%	71%
GA-Basic	0%		15%	15%
System-wide	**46%**		**63%**	**76%**

Notes: [1]The 2008 SASP recommended that all Commercial Service and Reliever airports provide both 24/7 AvGas and Jet A. [2]The 2018 SASP Update recommends that an airport can provide any type of 24/7 fuel to be compliant with this measure.

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Performance

Table 36 lists the nine airports that require the installation of any type of 24/7 fuel to achieve the future performance target established for this measure.

Table 36. Needs by Airport to Achieve Performance Targets Established for 24/7 Fuel Availability

Associated City	Airport	FAA Identifier	24/7 Availability	
			JetA	AvGas
Commercial Service-National				
Bullhead City	Laughlin/Bullhead City International	IFP	×	×
Show Low	Show Low Regional	SOW	×	×
GA-Community				
Kingman	Kingman	IGM	×	×
Marana	Pinal Airpark	MZJ	×	×
Nogales	Nogales	OLS	×	×
Parker	Avi Suquilla	P20	×	×
Sedona	Sedona	SEZ	×	×
St. Johns	St. Johns Industrial Air Park	SJN	×	×
Willcox	Cochise County	P33	×	×

Source: 2017 Airport Inventory and Data Survey

While airports only need to offer one type of fuel for compliance with this measure (i.e., either Jet A or AvGas), airports that offer both are able to more effectively serve the needs of all users. Because aircraft fuel is not interchangeable between aircraft types, airports that only provide one type of fuel are limited in terms of the aircraft and pilots they are capable of serving. Accordingly, it is suggested that airports in the top four classifications provide both Jet A and AvGas to optimally serve the aviation community. This suggestion builds upon with the 2008 performance target, which recommended that all Commercial Service and Reliever airports provide both types of fuel.

Table 37 summarizes the fuel offerings at the system airports within the top classifications that only provide one type of 24/7 fuel, as well as the associated improvement project to address this issue. Grand Canyon West is the only airport in this group that only provides 24/7 Jet fuel. Note that airports listed in Table 36 would also require the installation of both types of fuel for this suggested target to be achieved (18 airports total).

Table 37. Needs by Airports Providing One Type of Aviation Fuel to Achieve Performance Suggestion

Associated City	Airport	FAA Identifier	24/7 Availability		Recommendation
			JetA	AvGas	
Commercial Service-National					
Peach Springs	Grand Canyon West	1G4	✓	×	Add AvGas
Prescott	Ernest A. Love Field	PRC	×	✓	Add JetA
Reliever					
Chandler	Chandler Municipal	CHD	×	✓	Add JetA
Marana	Marana Regional	AVQ	×	✓	Add JetA
Tucson	Ryan Field	RYN	×	✓	Add JetA
GA-Community					
Buckeye	Buckeye Municipal	BXK	×	✓	Add JetA
Casa Grande	Casa Grande Municipal	CGZ	×	✓	Add JetA
Cottonwood	Cottonwood Municipal	P52	×	✓	Add JetA
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	×	✓	Add JetA

Source: 2017 Airport Inventory and Data Survey

Offering fuel 24 hours a day, seven days a week can be an important draw for pilots, particularly those who fly for business purposes or emergency response outside of normal business hours. Despite these advantages, improving performance may be a challenge. While some types of existing fueling equipment can be retrofitted with credit card readers, funding sources to construct a new fuel farm are limited. Due to statutory restrictions, state funds cannot be used to construct a revenue-producing project. While FAA grant money can be used, these types of projects are not prioritized by the agency. As a result, many Arizona airports may have to depend on a new or existing FBO to provide 24/7 fuel. Airport sponsors could incorporate a requirement for 24/7 fuel into lease terms. Additionally, because funding is the greatest obstacle to improved performance, ADOT could work with legislators to address the existing policy hurdles. The Airport Loan Program could also be reinstated, which gave airports access to funds that could be applied to revenue-producing projects before the program was put on-hold due to funding limitations (see **Chapter 2** for details).

Percent of Airports that are Recognized in Local/Regional Growth Plans

Inclusion in local/regional growth plans, including local comprehensive and regional transportation plans, indicates a community's support for its airport, as well as the unique interplays that occur between an airport and the surrounding vicinity. For example, general plans that recognize the safety and noise concerns associated with airports can recommend zoning codes that align with land use compatibility regulations and best practices. It is also important for airports to understand planned land use and demographic changes within surrounding areas, as this can affect future aviation demands. Coordinated planning efforts between airports and their surrounding communities are vital for ensuring an airport can effectively meet the needs of all users while supporting the safety, security, and economic vitality of the entire region. Note that local comprehensive and regional transportation plans serve different functions, and may be completed by different governmental agencies. As such, they have been addressed independently in the analysis that follows.

Since 2008, the percent of airports recognized in local comprehensive plans has decreased by three percent, for an overall reduction of 12 airports. GA-Community and GA-Rural airports witnessed some improvement in terms of percentage, although a fewer number of airports are compliant with this measure across all classifications. **Table 39** summarizes the historic and current performance of system airports recognized in local comprehensive plans.

Table 38. Airports Recognized in Local Comprehensive Plans — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	83%	10	100%	2
CS-National			56%	5
Reliever	100%	8	75%	6
GA-Community	69%	20	78%	14
GA-Rural	50%	12	59%	10
GA-Basic	30%	3	31%	4
System-wide	**64%**	**53**	**61%**	**41**

Notes: [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Inclusion of airports in regional transportation plans decreased more severely than in local comprehensive plans, with a 27 percent system-wide decline between 2008 and 2017. In 2008, 56 airports reported inclusion in a regional transportation plan, while only 27 airports reported so in 2017. The middle classifications (GA-Community and GA-Rural) experienced the most severe reductions, while GA-Basic airports reported a 13 percent increase over time—the only improvement evident amongst the classifications. **Table 39** summarizes historic and current performance of airports recognized in regional transportation plans.

The system-wide reductions evident for both local comprehensive plans and regional transportation plans may be attributable to the way the data were presented on the Airport Inventory and Data Survey, as it is unlikely that a local or regional planning agency would have included an airport in the past, then excluded it in subsequent plan updates. Furthermore, some airports, particularly those in the most rural areas of the state, may be located in areas without local comprehensive and/or regional transportation plans.

Table 39. Airports Recognized in Regional Transportation Plans — Historic/Current Performance

Classifications	2008 Performance[1]		2017 Performance[2]	
	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS-International	67%	8	100%	2
CS-National			44%	4
Reliever	100%	8	88%	7
GA-Community	48%	14	44%	8
GA-Rural	33%	8	18%	3
GA-Basic	10%	1	23%	3
System-wide	**67%**	**56**	**40%**	**27**

Notes: [1]In 2008, the state system included 83 airports. [2]In 2018, the system includes 67 airports.

Sources: Airport Inventory and Data Survey 2008, Airport Inventory and Data Survey 2017

Future Performance Targets

An airport's inclusion in local comprehensive and regional transportation plans provides a layer of protection against encroachment and is an important element of multimodal planning. It can also indicate a community's understanding of the role its airport plays in future growth and development from economic and quality-of-life perspectives. This can often be accomplished relatively easily with few resources by contacting the local municipal planning department and sharing interest in participating in future planning efforts. Accordingly, the suggested target for this performance measure remains at 100 percent for both local comprehensive and regional transportation plans, as shown in **Table 40** and **Table 41** (respectively). This performance measure is of medium priority for ADOT Aeronautics.

Table 40. Airports Recognized in Local Comprehensive Plans — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	83%	N/A	100%	100%
CS-National			56%	100%
Reliever	100%		75%	100%
GA-Community	69%		78%	100%
GA-Rural	50%		59%	100%
GA-Basic	30%		31%	100%
System-wide	**64%**	**100%**	**61%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Table 41. Airports Recognized in Regional Transportation Plans — Historic/Future Performance Targets

Classifications	2008 SASP		2018 SASP Update	
	Performance	Performance Target	Performance	Future Performance Target
CS-International	67%	N/A	100%	100%
CS-National			44%	100%
Reliever	100%		88%	100%
GA-Community	48%		44%	100%
GA-Rural	33%		18%	100%
GA-Basic	10%		23%	100%
System-wide	**67%**	**100%**	**40%**	**100%**

Sources: Wilbur Smith and Associates 2008, Kimley-Horn 2017

Actions to Improve Future Performance

Table 42 details the airports that are not currently included in a local comprehensive plan, regional transportation plan, or neither.

Table 42. Needs by Airport for Recognition in Comprehensive Growth Plan and/or Regional Transportation Plan to Achieve Performance Targets

Associated City	Airport	FAA Identifier	Comprehensive Growth Plan	Regional Transportation Plan
		Commercial Service-National		
Bullhead City	Laughlin/Bullhead City International	IFP	✓	×
Flagstaff	Flagstaff Pulliam	FLG	×	✓
Grand Canyon	Grand Canyon National Park	GCN	×	×
Page	Page Municipal	PGA	×	×
Peach Springs	Grand Canyon West	1G4	×	×
Prescott	Ernest A. Love Field	PRC	✓	×
		Reliever		
Glendale	Glendale Municipal	GEU	×	✓
Tucson	Ryan Field	RYN	×	×
		GA-Community		
Casa Grande	Casa Grande Municipal	CGZ	✓	×
Cottonwood	Cottonwood Municipal	P52	×	×
Marana	Pinal Airpark	MZJ	✓	×
Nogales	Nogales	OLS	✓	×
Parker	Avi Suquilla	P20	×	×
Payson	Payson	PAN	✓	×
Safford	Safford Regional	SAD	✓	×
Sedona	Sedona	SEZ	×	✓
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	FHU	×	×
St. Johns	St. Johns Industrial Air Park	SJN	✓	×
Wickenburg	Wickenburg Municipal	E25	✓	×

Associated City	Airport	FAA Identifier	Comprehensive Growth Plan	Regional Transportation Plan
		GA-Rural		
Bisbee	Bisbee Municipal	P04	✓	×
Chinle	Chinle Municipal	E91	×	×
Colorado City	Colorado City Municipal	AZC	✓	×
Douglas	Douglas Municipal	DGL	✓	×
Douglas	Cochise College	P03	×	×
Eloy	Eloy Municipal	E60	×	×
Gila Bend	Gila Bend Municipal	E63	✓	×
Holbrook	Holbrook Municipal	P14	✓	×
Maricopa	Ak-Chin Regional	A39	✓	×
San Manuel	San Manuel	E77	✓	×
Taylor	Taylor	TYL	×	×
Whiteriver	Whiteriver	E24	×	×
Window Rock	Window Rock	RQE	×	×
Winslow	Winslow-Lindbergh Regional	INW	×	×
		GA-Basic		
Ajo	Eric Marcus Municipal	P01	×	×
Bagdad	Bagdad	E51	×	×
Kayenta	Kayenta	0V7	✓	×
Kearny	Kearny	E67	×	×
Polacca	Polacca	P10	×	×
Seligman	Seligman	P23	×	×
Sells	Sells	E78	×	×
Superior	Superior	E81	×	×
Tombstone	Tombstone Municipal	P29	×	×
Tuba City	Tuba City	T03	×	×

Source: Airport Inventory and Data Survey 2017

To achieve the performance targets established for this measure, airports and airport sponsors should actively engage with all pertinent planning authorities to ensure their facilities are included in local and regional plans. This process can be quite simple and require a minimal level of coordination by airports. During this process, airports and local and regional planners have the opportunity to consider how aviation impacts the community, both currently and over time. Notably, proposed or planned surface transportation system improvements may affect airport access for people and goods. Any access issues can be proactively identified and mitigated before they become a problem for either the airport or the community. Anticipated airport growth can also impact the type and density of development proposed in areas in the vicinity of the airport. Engaging with local and regional planning authorities also provides airports with the opportunity to discuss airport land use compatibility and offer input on proposed land use controls/zoning.

Percent of Airports with the Facilities to Support Jet Aircraft

Having the attributes to support jet aircraft typically allows an airport to engage in those aviation activities with the greatest economic benefits, including corporate/business aviation and air cargo. Additionally, jet aircraft are generally used to provide scheduled commercial service and support wildland firefighting activities. As such, this performance measure provides a baseline for airports seeking to expand their ability to produce revenue,

increase their economic impact, and participate in the most demanding types of aviation activities. The criteria evaluated as part of this analysis are as follows:

1. At least a 5,000-foot long runway
2. Published IAP
3. Conventional hangar space
4. Availability of jet fuel

As shown in **Table 43**, 51 percent of Arizona's system airports meet the criteria to support jet aircraft (33 facilities). Aligning with the criteria used to develop the airport classifications, nearly all of these airports are within the top four classifications. This measure was not utilized in 2008; accordingly, historical data are not available for comparison purposes.

Table 43. Airports with Facilities to Support Jet Aircraft — Current Performance

	2008 Performance[1]		2017 Performance[2]	
Classifications	Percent Compliance	Number of Airports	Percent Compliance	Number of Airports
CS– International	N/A	N/A	100%	2
CS-National			78%	8
Reliever			88%	7
GA-Community			78%	13
GA-Rural			18%	3
GA-Basic			0%	0
System-wide			**51%**	**33**

Notes: [1]This was not a performance measure in 2008. [2]In 2018, the system includes 67 airports. The criteria include a paved runway of at least 5,000 feet in length, published IAP, conventional hangar space, and jet fuel.

Sources: Sky Vector 2017, Airport Inventory and Data Survey 2017

Future System Performance

Jet aircraft provide a multitude of benefits for users, the airports that support them, and the entire community. As such, it is recommended that all airports in the four largest classifications meet the established criteria to support jet aircraft activity, as well as some GA-Rural airports due to their locations across the state. The inclusion of GA-Rural airports enhances Arizona's access, mobility, and emergency preparedness and response for residents and visitors while opening markets to business opportunities outside of the state's urban centers.

Table 44 summarizes the future performance target for airports meeting the criteria to support jet aircraft. As previously noted, this was not a performance measure in 2008, so an associated performance target is not available for comparison purposes. This is a medium priority for ADOT Aeronautics.

Table 44. Airports with Facilities to Support Jet Aircraft — Future Performance Target

Classifications	2008 SASP Performance	2008 SASP Performance Target	2018 SASP Update Performance	2018 SASP Update Future Performance Target
CS-International	N/A	N/A	100%	100%
CS-National			78%	100%
Reliever			88%	100%
GA-Community			78%	100%
GA-Rural			18%	59%
GA-Basic			0%	0%
System-wide			**51%**	**70%**

Source: Kimley-Horn 2018

Actions to Improve Performance

If all airports achieve their facility and service objectives, significant improvement would be achieved for this measure. For the highest four classifications, a published IAP and Jet A are recommended service objectives, and many facilities already meet the runway and hangar criteria. If all airports in these classifications meet their facility and service objectives, six additional airports would achieve this measure to increase system-wide performance to 58 percent. **Table 45** details the performance measure needs at airports recommended to achieve this performance measure. For GA-Rural airports to meet the performance target, 10 of the 17 airports will need to support jet aircraft (note that seven GA-Rural airports are suggested for improvement based on geographic coverage and are reflected in the table). The airports that would achieve the measure if they meet their facilities and service objectives are denoted with an asterisk. Airports that already achieve this measure are not included.

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Table 45. Needs by Airport to Meet the Criteria to Support Jet Aircraft to Achieve Performance Targets

Associated City	Airport	FAA Identifier	Performance Measure Criteria								Recommended Improvements
			Runway Length (ft.)	Meets Criterion	Approach Type	Meets Criterion	Hangars (number)	Meets Criterion	Jet A Availability	Meets Criterion	
					Commercial Service-National						
Peach Springs	Grand Canyon West	1G4	5,000	✓	Visual	×	0	×	Yes	✓	Publish IAP, Install hangar
					Reliever						
Chandler	Chandler Municipal*	CHD	4,401	×	Non-Precision	✓	46	✓	Yes	✓	Lengthen runway
					GA-Community						
Benson	Benson Municipal*	E95	4,002	×	Visual	×	2	✓	Yes	✓	Lengthen runway, Publish IAP
Buckeye	Buckeye Municipal*	BXK	5,500	✓	Visual	×	4	✓	No	×	Publish IAP, Install Jet A
Cottonwood	Cottonwood Municipal*	P52	4,252	×	Non-Precision	✓	6	✓	Yes	✓	Lengthen runway
Marana	Pinal Airpark*	MZJ	6,849	✓	Visual	×	3	✓	Yes	✓	Publish IAP
Wickenburg	Wickenburg Municipal*	E25	6,101	✓	Visual	×	1	✓	Yes	✓	Publish IAP
					GA-Rural						
Chinle	Chinle Municipal	E91	6,902	✓	Visual	×	0	×	Yes	✓	Publish IAP, Install hangars
Colorado City	Colorado City Municipal	AZC	6,300	✓	Visual	×	2	✓	Yes	✓	Publish IAP
Gila Bend	Gila Bend Municipal	E63	5,200	✓	Visual	×	38	✓	No	×	Publish IAP, Install Jet A
Holbrook	Holbrook Municipal	P14	6,698	✓	Visual	×	1	✓	No	×	Publish IAP, Install Jet A
San Manuel	San Manuel	E77	4,207	×	Visual	×	0	×	No	×	Lengthen runway, Publish IAP, Install hangars, Install Jet A
Whiteriver	Whiteriver	E24	6,350	✓	Visual	×	0	×	No	×	Publish IAP, Install hangars, Install Jet A

Associated City	Airport	FAA Identifier	Performance Measure Criteria								Recommended Improvements
			Runway Length (ft.)	Meets Criterion	Approach Type	Meets Criterion	Hangars (number)	Meets Criterion	Jet A Availability	Meets Criterion	
Williams	H.A. Clark Memorial Field	CMR	6,000	✓	Visual	×	2	✓	No	×	Publish IAP, Install Jet A

Note: These airports would achieve the performance measure if they met their facility and service objectives.

Sources: Airport Inventory and Data Survey 2017, Sky Vector 2017

Summary of Performance Measures

Figure 3 summarizes the current performance and future performance targets of Arizona's 67 system airports using the 12 performance measures established for the 2018 SASP Update.[12]

[12] Three performance measures were split into multiple components for evaluation (control/zoning and airport disclosure maps, pavement-area-specific PCI ratings, and local comprehensive plans and regional transportation plans). As a result, Figure 3 presents the results for the 16 components of the 12 performance measures of the 2018 SASP Update.

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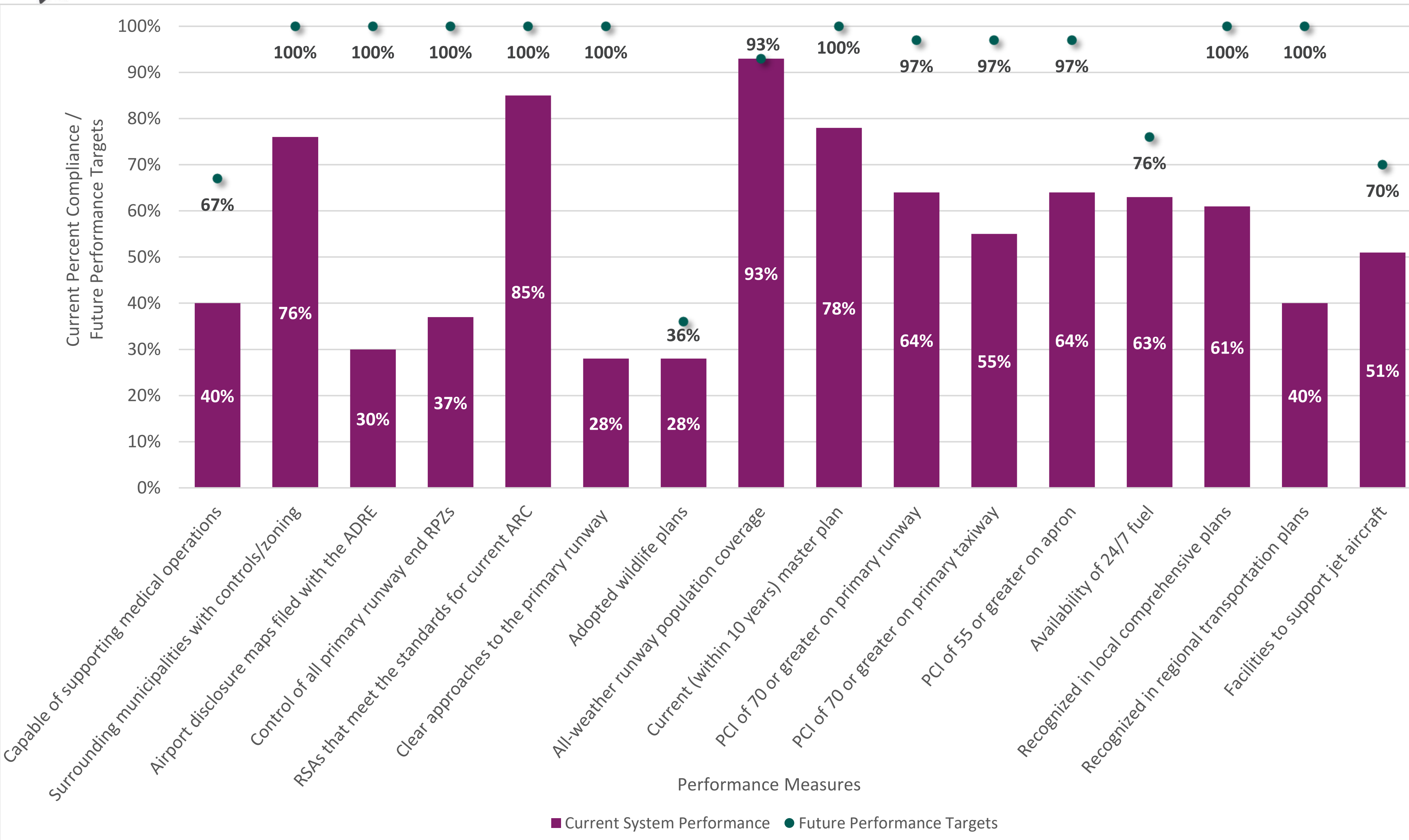

Source: Kimley-Horn 2018

Figure 3. Summary of Current System-wide Performance and Future System-wide Performance Targets

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SUMMARY

This chapter compared the current performance of each measure with the performance results from the 2008 SASP as well as developed future targets and priority actions to achieve those targets. Potential outside influences were noted for consideration in the evaluation of potential future system needs. Action items were also identified, including those requiring action by policymakers, ADOT Aeronautics, and the individual airports and sponsors. Practical and actionable information was presented for ADOT Aeronautics Group's use in informing decision-making and effective monitoring over time. The chapter highlights the strengths of the system and helps to pinpoint specific opportunities where significant improvement can be achieved. Most immediately, this information will serve as one of the key inputs for the evaluation of needs presented in **Chapter 8** and the recommendations that are summarized in **Chapter 9**.

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CHAPTER EIGHT: AIRPORT PROJECT COSTS AND ALTERNATIVE SCENARIOS

INTRODUCTION

Maintaining and expanding the facilities in Arizona's aviation system to meet user needs requires significant resources. One of the purposes of this 2018 State Aviation System Plan (SASP) Update is to identify the projects needed to maintain a safe and efficient aviation system and to meet the needs of future aviation system users. **Chapter 7** introduced several recommended actions to satisfy the current and anticipated system needs. Building upon the actions recommended in Chapter 7, this chapter includes an assessment of the costs associated with those recommended actions, including meeting facility and service objectives and meeting performance measures. Additionally, individual airport master plans, Airport Layout Plans (ALPs) with Narrative Reports, and capital improvement plans (CIPs) are analyzed so that the costs to complete projects outside of the SASP Update recommendations are also considered. This chapter provides a holistic look at the costs associated with system maintenance and expansion to meet future demand, and two scenarios for implementation.

SASP UPDATE-RELATED PROJECT COSTS

Projects recommended to meet facility and service objectives and system performance measures are evaluated in this section. These are projects that are a direct result of SASP Update recommendations. **Chapter 5** introduced the facility and service objectives established for each airport in the system based on their airport classification. **Chapter 1** presented the 2018 SASP Update performance measures and **Chapter 6** presented current system-wide performance in meeting those measures. The next two sections address the costs associated with meeting airport objectives and meeting system performance measures, respectively.

Facility and Service Objective Recommendation Costs

The facility and service objectives of the 2018 SASP Update represent the components of an airport with the greatest potential to significantly impact the type and amount of activity that can occur there. The following analysis summarizes the system-wide costs associated with meeting (1) airside facility objectives, (2) landside facility objectives, and (3) landside service objectives. This does not include the costs associated with meeting system performance measures (which is discussed in the section immediately following).

Airside Facility Objectives

Table 1 depicts the airside facility objectives established for airports in each of the six airport classifications. **Table 2** presents the costs associated with meeting each airside facility objective and **Figure 1** illustrates the composition of those needs. Costs associated with meeting runway-related objectives (length, width, surface) represent nearly 70 percent of the total airside facility objective costs, followed by taxiway-related objective (type and width) costs at nearly 18 percent.

Table 1. Airside Facility Objectives by Classification

	Minimum Objectives by Airport Classification					
	Commercial Service-International	Commercial Service-National	Reliever	General Aviation (GA)-Community	GA-Rural	GA-Basic
ARC*	Consistent with master plan	Consistent with master plan	C-III	B-II	B-I	A-I
Runway Length	Consistent with master plan	Consistent with master plan	Accommodate 75% of large aircraft at 90% useful load	Accommodate 75% of large aircraft at 60% useful load	Accommodate 75% of small airplanes	Maintain existing
Runway Width	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards	To meet ARC standards
Runway Surface	Asphalt/paved	Asphalt/paved	Asphalt/paved	Asphalt/paved	Asphalt/paved (desired)	Gravel/dirt (minimum)
Taxiway Type and Width	Consistent with master plan	Consistent with master plan	Full parallel Width per ARC	Full or partial parallel Width per ARC	Full or partial parallel, connectors, or turnarounds Width per ARC	None
Instrument Approach Procedures	Precision (desired) Near-precision (minimum)	Precision (desired) Near-precision (minimum)	Near-precision (desired) Non-precision (minimum)	Non-precision	Non-precision or circling	None
Visual Aids	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Lighted wind cone Segmented circle REILs VGSIs	Rotating beacon Wind cone Segmented circle VGSIs	Wind sock
Runway and Taxiway Lighting	HIRL/HITL (desired) MIRL/MITL (minimum)	HIRL/HITL (desired) MIRL/MITL (minimum)	MIRL/MITL	MIRL/MITL	MIRL/MITL	Reflectors
Approach Lighting Systems	ALS	ALS	ALS (desired)	None	None	None

Acronyms:

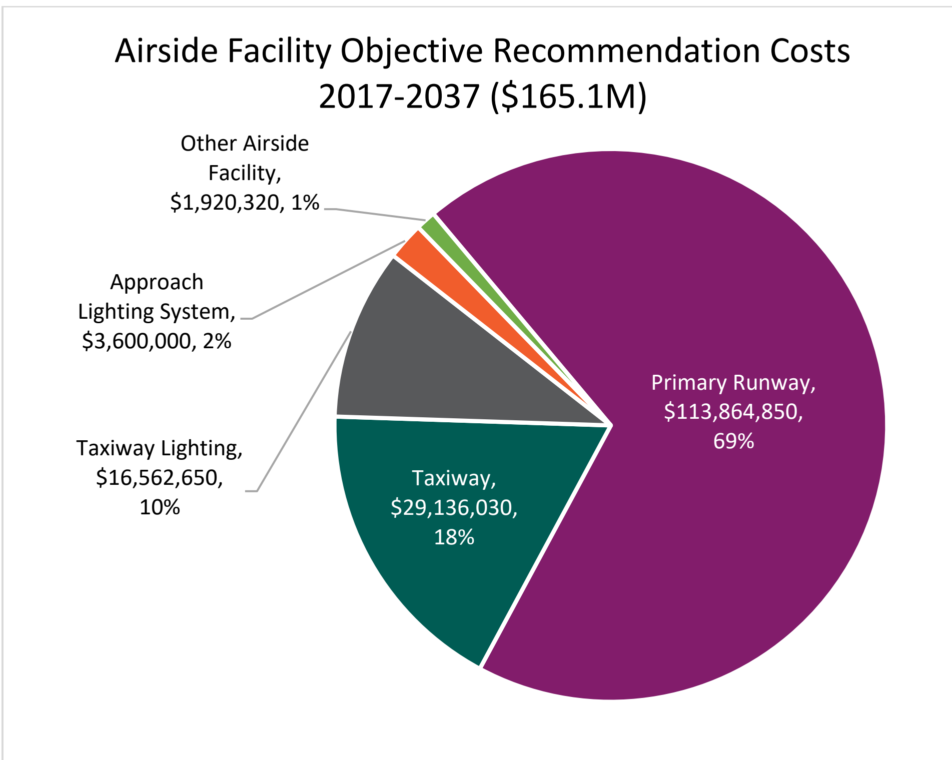
ALS = Approach lighting system
ARC = Airport reference code
FBO = Fixed-base operator
HIRL = High-intensity runway lights
HITL = High-intensity taxiway lights
MIRL = Medium-intensity runway lights
MITL = Medium-intensity taxiway lights
REILs = Runway-end indicator lights
VGSIs = Visual glide slope indicators

Source: Kimley-Horn

Table 2. Airside Facility Objective Recommendation Costs 2017-2037

Recommendation	Total Estimate Cost	% of Total
ARC	N/A	–
Primary Runway Length, Width, Surface	$113,864,850	69.0%
Primary Taxiway Type and Width	$29,136,030	17.6%
Instrument Approach	$325,000	0.2%
Rotating Beacon	$125,000	0.1%
Wind Indicator	$20,000	0.0%
Segmented Circle	$80,000	0.0%
Runway End Indicator Lights	$560,000	0.3%
Visual Glideslope Indicators	$220,000	0.1%
Runway Lighting	$590,320	0.4%
Taxiway Lighting	$16,562,650	10.0%
Approach Lighting System	$3,600,000	2.2%
Airside Facilities Total	**$165,083,850**	**100%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 1. Composition of Airside Facility Objective Recommendation Costs 2017-2037

Landside Facility Objectives

Table 3 presents the landside facility objectives established for airports in each of the six airport classifications. **Table 4** depicts the costs associated with meeting each landside facility objective and **Figure 2** illustrates the composition of those needs. Costs associated with meeting the hangar objectives represent over 85 percent of the total landside facility objective costs, followed by airport fencing and controlled access objective costs at over 10 percent.

Table 3. Landside Facility Objectives by Classification

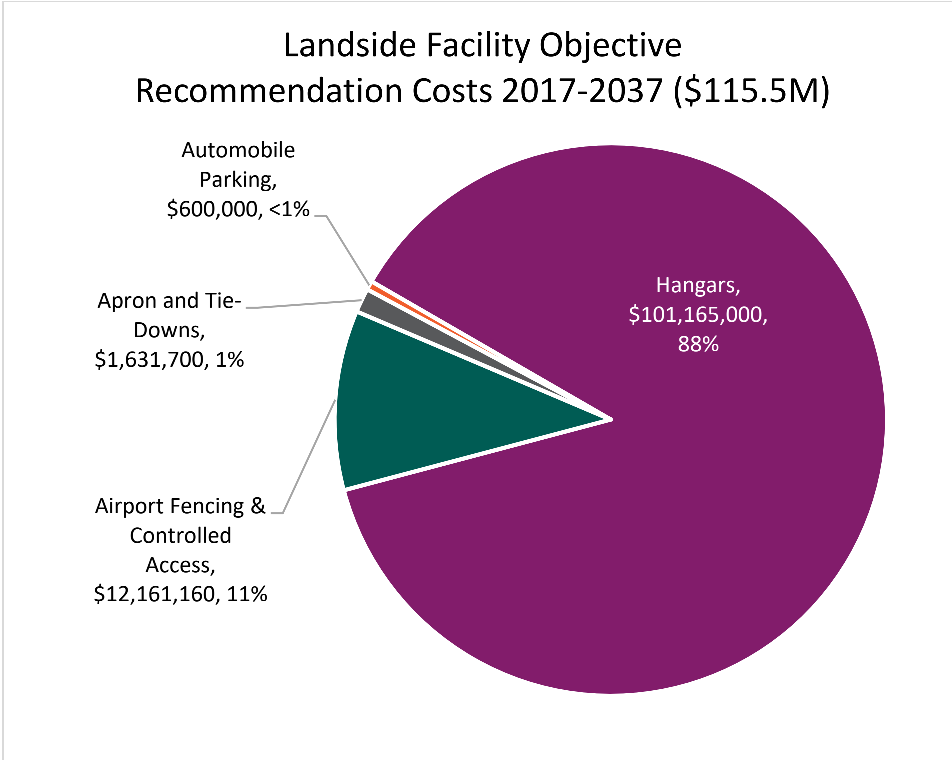
Minimum Objectives by Airport Classification						
	Commercial Service-International	Commercial Service-National	Reliever	GA-Community	GA-Rural	GA-Basic
Airport Fencing	Perimeter fencing Controlled access	Perimeter fencing Controlled access	Perimeter fencing Controlled access	Perimeter fencing	Perimeter fencing	Perimeter fencing (desired)
Aprons and Tie-Downs	N/A	N/A	Apron (25% of based fleet and 75% for transient)	Apron (40% of based fleet and 50% for transient)	Apron (50% of based fleet and 25% for transient)	Apron
Hangars	N/A	N/A	Hangars (75% of based fleet and 25% overnight)	Hangars (60% of based fleet and 25% overnight)	Hangars (50% of based fleet and 25% for transient)	
Terminal Buildings	N/A	N/A	Terminal with pilot's lounge	Terminal with appropriate facilities		
Auto Parking	Yes	Yes	Yes	Yes	Yes	Yes

Source: Kimley-Horn

Table 4. Landside Facility Objective Recommendation Costs 2017-2037

Recommendation	Total Estimate Cost	% of Total
Airport Fencing and Controlled Access	$12,161,160	10.5%
Apron and Tie-Downs	$1,631,700	1.4%
Hangars	$101,165,000	87.5%
Terminal Buildings	$0	0.0%
Auto Parking	$600,000	0.5%
Landside Facilities Total	**$115,557,860**	**100%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 2. Composition of Landside Facility Objective Recommendation Costs 2017-2037

Landside Service Objectives

Table 5 shows the landside service objectives established for airports in each of the six airport classifications. **Table 6** presents the costs associated with meeting each landside service objectives for which a cost could be determined. For many of the services, whether it's a new service provider such as an FBO or air taxi/charter or ground transportation, the costs would be borne by the provider. **Figure 3** illustrates the composition of the costs for the landside service needs that have a hard cost associated with them that might be borne by the airport. Costs associated with meeting the deicing objectives represent just over a third of the total landside service objective costs, followed by AvGas fueling objective costs at 19 percent.

Table 5. Landside Service Objectives by Classification

	Minimum Objectives by Airport Classification					
	International	Commercial Service-National	Reliever	GA-Community	GA-Rural	GA-Basic
Automated Weather Reporting	Yes	Yes	Yes	Yes	Yes	
FBO*			Yes	Yes		
Air Taxi/Charter*	Yes	Yes	Yes			

Minimum Objectives by Airport Classification						
	International	Commercial Service-National	Reliever	GA-Community	GA-Rural	GA-Basic
Aircraft Rental*		Yes	Yes	Yes		
Aircraft Maintenance*	Yes	Yes	Yes	Yes		
Avionics Sales and Service*	Yes	Yes	Yes			
Aircraft Fuel - AvGas	Yes	Yes	Yes	Yes	Yes	
Aircraft Fuel - JetA	Yes	Yes	Yes	Yes		
Deicing	Yes	Yes				
Oxygen	Yes	Yes	Yes	Yes		
Snow Removal	As needed	As needed				
Ground Transp.*	Yes	Yes	Yes	Yes	Yes	Yes
On-Site Rental Car*	Yes	Yes				
Internet Access	Yes	Yes	Yes	Yes		
Phone Access	Yes	Yes	Yes	Yes	Yes	Yes
Restroom	Yes	Yes	Yes	Yes	Yes	
U.S. Customs*	Yes	Yes	Yes			

Note: These services do not have a hard cost that can be applied, therefore these services were not costed.

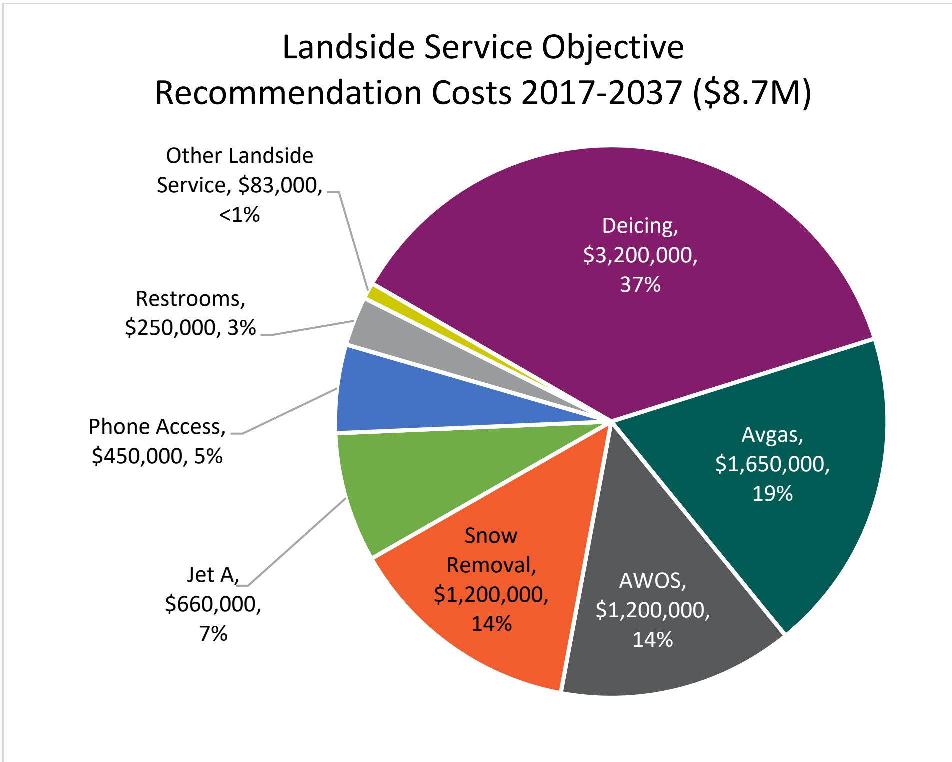
Source: Kimley-Horn

Table 6. Landside Service Objective Recommendation Costs 2017-2037

Recommendation	Total Estimate Cost	% of Total
Automated Weather Reporting	$1,200,000	13.8%
FBO*	N/A	-
Air Taxi/Charter*	N/A	-
Aircraft Rental*	N/A	-
Aircraft Maintenance*	N/A	-
Avionics Sales and Service*	N/A	-
AvGas	$1,650,000	19.0%
Jet A	$660,000	7.6%
Deicing	$3,200,000	36.8%
Oxygen	$23,000	0.3%
Snow Removal	$1,200,000	13.8%
Ground Transportation*	N/A	-
On-Site Rental Car*	N/A	-
Internet Access	$60,000	0.7%
Phone Access	$450,000	5.2%
Restrooms	$250,000	2.9%
U.S. Customs Facility*	N/A	-
Landside Services Total	**$8,693,000**	**100%**

Note: These services do not have a hard cost that can be applied, therefore these services were not costed.

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

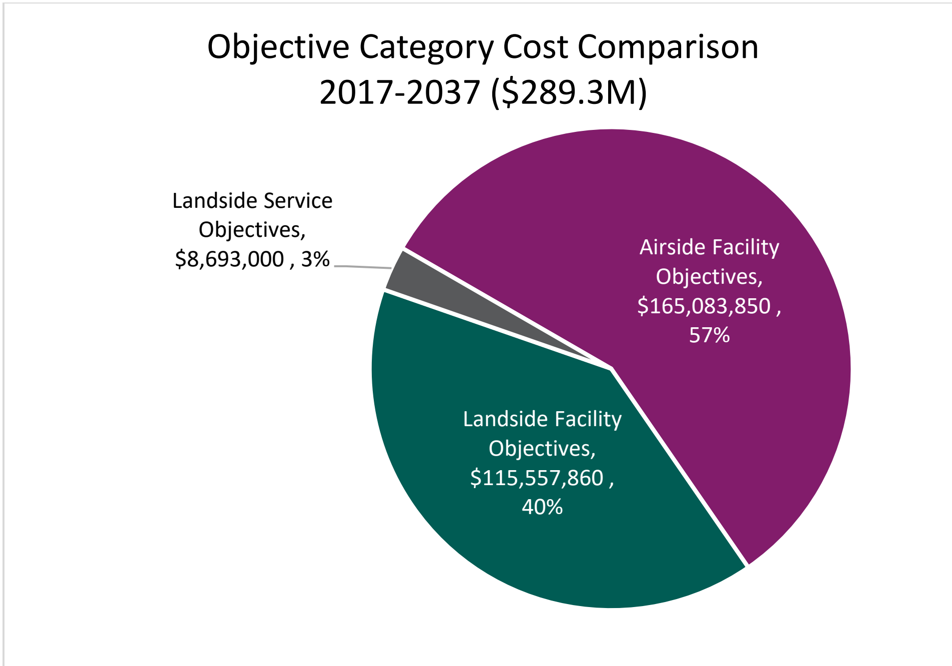
Figure 3. Composition of Landside Service Objective Recommendation Costs 2017-2037

When the three objective categories are summed (as shown in **Table 7** and **Figure 4**), the costs associated with achieving the airside facility objectives make up nearly 60 percent of the total objective project related costs at over $165 million. Landside facility objectives come in second at over $115 million, or nearly 40 percent. Costs associated with landside service objectives are much lower at only 3 percent, or just over $8.5 million, however it is important to note that a number of the landside service objectives could not be costed, as footnoted in **Table 5**.

Table 7. Objective Category Cost Comparison 2017-2037

Recommendation	Total Estimate Cost	% of Total
Airside Facility Objectives	$165,083,850	57.1%
Landside Facility Objectives	$115,557,860	39.9%
Landside Service Objectives	$8,693,000	3.0%
Total	**$289,334,710**	**100%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 4. Total Objective Recommendation Costs by Category 2017-2037

Performance Measure Recommendation Costs

In addition to the project costs associated with SASP airports achieving their individual facility and service objectives (approximately $290 million), there are costs associated with projects that are needed to help the system achieve the performance measures established in **Chapter 1**. For a detailed listing of airports currently not meeting each of the established performance measures, see **Chapter 7**.

Table 8 summarizes the costs associated with achieving SASP Update performance measures, and **Figure 5** illustrates the composition of those needs. As shown, pavement maintenance on primary runways to keep them at or above a Pavement Condition Index (PCI) of 70 equates to more than 62 percent of the costs associated with achieving system performance measures, followed by taxiway pavement maintenance at over 20 percent. There are three performance measures that are “capabilities” focused, meaning an airport must have specific facilities/services in place to meet the needs of the performance measure (such as runway length, weather reporting, non-precision approach, etc.). Since the facilities and services needed to meet these three performance measures are similar and overlap in many cases, a total “capabilities” cost was calculated to account for these needs without duplication, amounting to 2.3 percent of the total performance measure recommendation costs. While duplication between costs to achieve performance measures has been eliminated, it is important to note that some of the project costs to achieve system performance measures are also captured in project costs to achieve system facility and service objectives.

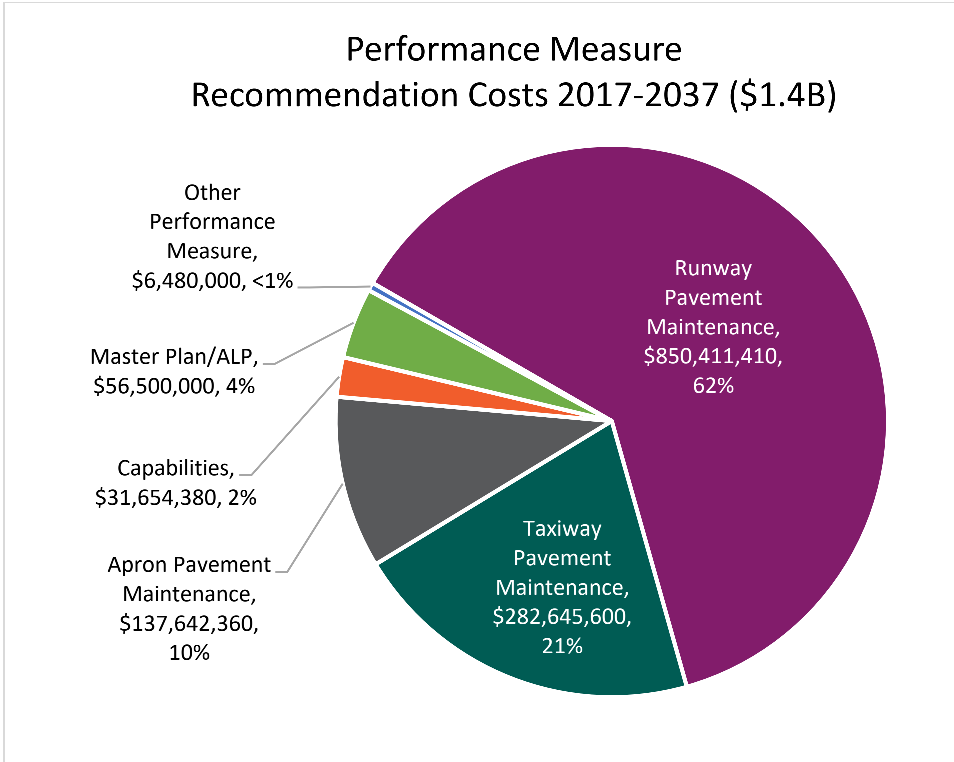
Table 8. Performance Measure Recommendation Costs 2017-2037

2017 Performance Measure	2017 Performance	Future Performance Target	Total Estimate Cost	% of Total
Surrounding Municipalities with Controls/Zoning	76%	100%	No cost	0.0%
Airport Disclosure Maps Filed with the Arizona Department of Real Estate (ADRE)	30%	100%	No cost	0.0%
Control of all Primary Runway End Runway Protection Studies (RPZs)*	37%	100%	N/A*	-
Runway Safety Areas (RSAs) that Meet the Standards for Current ARC*	85%	100%	N/A*	-
Clear Approaches to the Primary Runway*	28%	100%	N/A*	-
Adopted Wildlife Plans	28%	36%	$5,760,000	0.4%
Current (w/in 10 years) Master Plan	78%	100%	$56,500,000	4.1%
PCI of 70 or Greater on Primary Runway	64%	97%	$850,411,410	62.3%
PCI of 70 or Greater on Primary Taxiway	55%	97%	$282,645,600	20.7%
PCI of 55 or Greater on Apron	64%	97%	$137,642,360	10.1%
Availability of 24/7 Fuel	63%	76%	$720,000	0.1%
Recognized in Local Comprehensive Plans	61%	100%	No cost	0.0%
Recognized in Regional Transportation Plans	40%	100%	No cost	0.0%
Capabilities Total (with no duplicate projects or costs)	N/A	N/A	$31,654,380	2.3%
Total Performance Measure Recommendation Costs			**$1,365,333,750**	**100.0%**

Capability Performance Measure	2017 Performance	Future Performance Target	Total Estimate Cost**	% of Total
Capable of Supporting Medical Operations (4,000+ft runway, 24/7 fuel, non-precision approach [NPI] approach, weather)	40%	67%	$16,620,000	N/A
All-Weather Runway Population Coverage (paved runway, published instrument approach procedure [IAP], weather)	90%	93%	$11,042,500	N/A
Facilities to Support Jet Aircraft (5,000+ft runway, published IAP, hangar space, jet fuel)	51%	70%	$30,324,380	N/A

Notes: *these recommendations do not have a hard cost that can be applied, therefore these recommendations were not costed
*****these costs assume all facility and service objectives have been met, but include duplicate projects between "capability" performance measures, and therefore should not be summed.***

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 5. Composition of Performance Measure Recommendation Costs 2017-2037

NON SASP UPDATE-RELATED PROJECT COSTS

Most airports conduct annual CIP exercises to evaluate, plan, and budget for needed projects, including planning, design, and construction activities. Additionally, airports conduct a longer-term planning exercise when they develop or update their airport master plan or ALP and associated narrative. These longer-term planning documents also serve as a tool to plan and budget for projects needed at the airport. As part of the SASP Update, available master plans, ALPs and associated narrative reports, and airport CIPs were reviewed and all projects documented. The projects recommended to meet facility and service goals and performance measures were compared to the projects identified in airport master plans, ALP narrative reports, and CIPs to identify and remove any duplicate projects from the analysis. The result of this analysis is a listing of additional projects that airports are planning for and will need resources to complete, outside of the recommendations stemming from the SASP Update (objective- or performance measure-related).

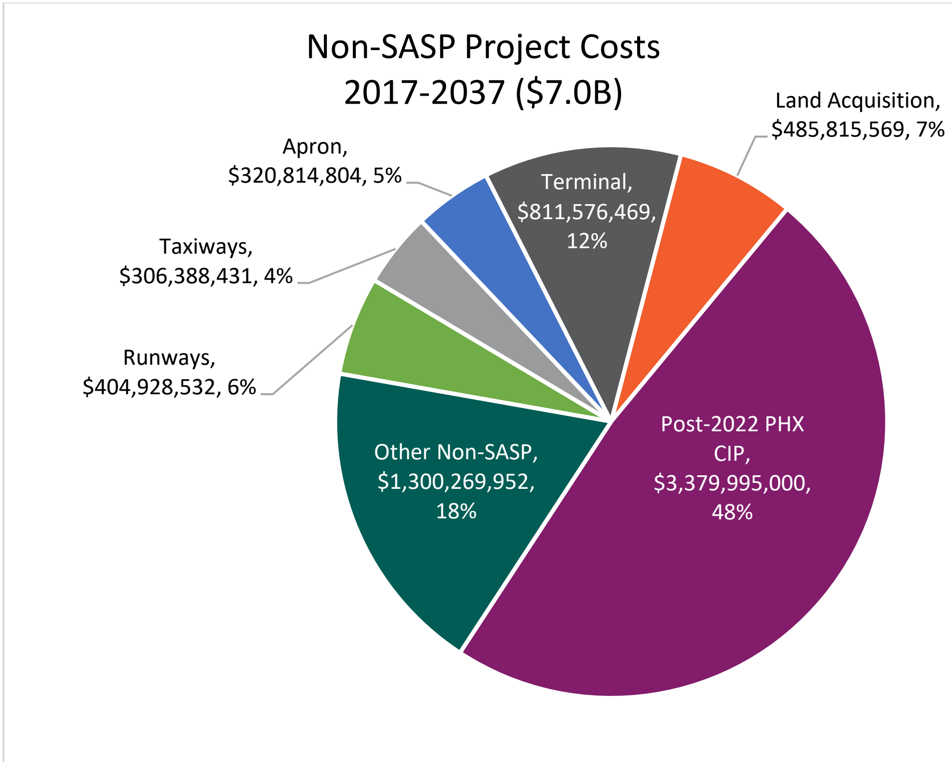
Table 9 lists these additional non-SASP Update projects by project type, including the costs associated with each based on information available from each airport. **Figure 6** illustrates the composition of those project costs. Non-SASP Update projects identified for Phoenix Sky Harbor comprise nearly half of these additional identified project costs, followed by terminal projects at 11.5 percent.

Table 9. Non-SASP Update Related Project Costs 2017-2037

Project Type	Cost	% of Total
ARC	$7,893,000	0.1%
Runways	$404,928,532	5.8%
Taxiways	$306,388,431	4.4%
IAP	$6,719,700	0.1%
Visual Aids	$13,879,100	0.2%
Airfield Lighting/Signage	$13,375,615	0.2%
Fencing	$5,671,120	0.1%
Apron	$320,814,804	4.6%
Hangars	$55,737,332	0.8%
Terminal	$811,576,469	11.6%
Utilities	$67,742,500	1.0%
Roads/Parking/Access	$169,155,360	2.4%
Misc. Landside	$98,442,791	1.4%
Weather Reporting	$2,133,000	0.0%
Fuel Farm	$49,481,947	0.7%
Snow Removal	$1,810,000	0.0%
Wash Rack	$2,949,000	0.0%
RSA/RPZ/Object Free Area (OFA)	$13,794,800	0.2%
Environmental	$62,607,015	0.9%
Land Acquisition	$485,815,569	6.9%
Other	$728,877,672	10.4%
Post-2022 PHX CIP	$3,379,995,000	48.2%
Non-SASP Update Project Total	**$7,009,788,757**	**100.0%**

Note: Post-2022 PHX CIP costs are assumed to be eligible for federal, state, and local funding

Source: Airport master plans, CIPs, ALPs, Kimley-Horn and CDM Smith



Source: Airport master plans, CIPs, ALPs, Kimley-Horn and CDM Smith

Figure 6. Composition of Non-SASP Update Project Costs 2017-2037

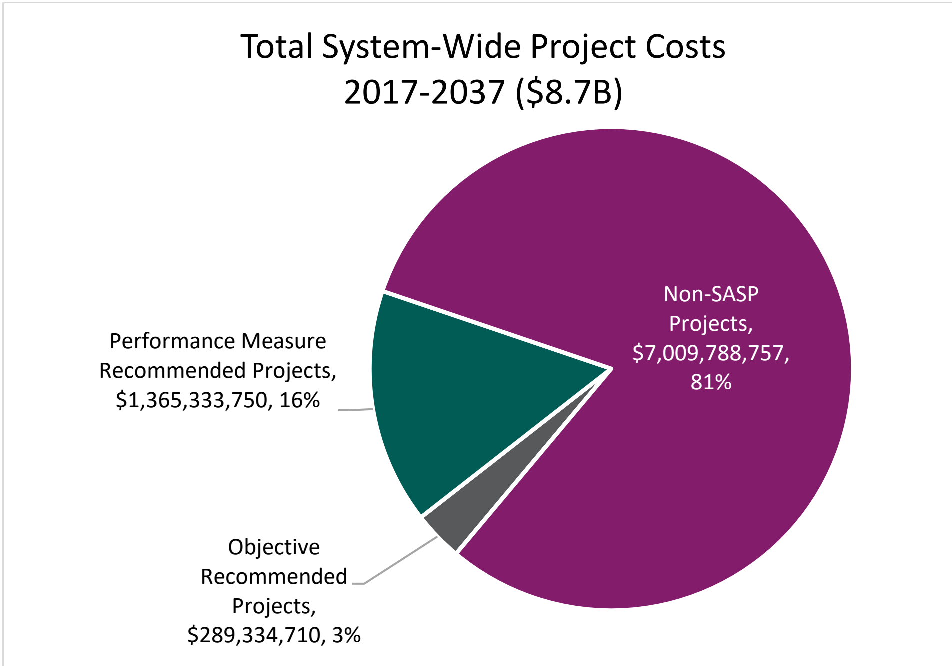
TOTAL PROJECT COSTS AND ALTERNATIVE SCENARIOS

By combining the objective recommendation costs, the performance measure recommendation costs, and the additional project costs from airports' long-range planning documents (identified as "non-SASP Update" projects), a total funding needs amount over the 20-year planning period is identified. **Table 10** includes the total system-wide needs costs between objective costs, performance measure costs, and non-SASP Update project costs. As best possible, duplicate project costs were removed. When combined, a total of nearly $8.7 billion is needed to implement the SASP Update and non-SASP Update recommended projects across the system in the next two decades. **Figure 7** illustrates the composition of project costs, showing over 80 percent of costs coming from non-SASP Update projects, approximately 16 percent associated with performance measure recommendations, and just over 3 percent associated with objective recommendations.

Table 10. Total System-Wide Project Costs 2017-2037

Recommendation	Total Estimate Cost	% of Total
Objective Recommended Projects	$289,334,710	3.3%
Performance Measure Recommended Projects	$1,365,333,750	15.8%
Non-SASP Update Projects	$7,009,788,757	80.9%
Total	**$8,664,457,217**	**100%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

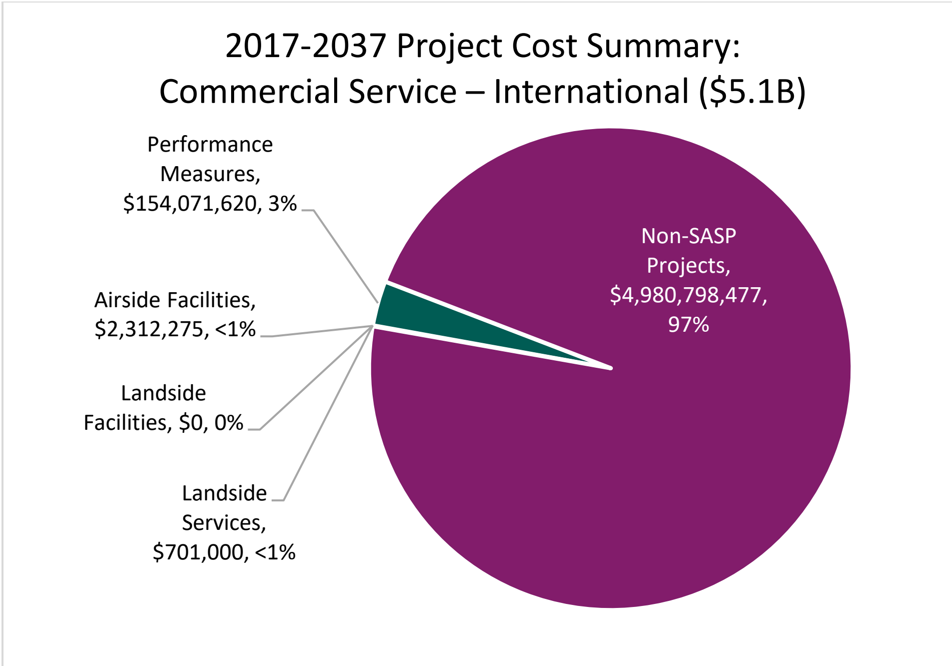
Figure 7. Total System-Wide Project Costs 2017-2037

The costs associated with objective recommendations, performance measure recommendations, and non-SASP Update projects varies between airport classifications, as listed in **Table 11**. Commercial Service-International comprises nearly 60% of the total system-wide project costs, with each subsequent classification comprising smaller and smaller percentages. **Figure 8** through **Figure 14** illustrate the composition of project costs by airport classification. It is interesting to note that the percentage of non-SASP Update project costs at the Commercial Service-International, Commercial Service-National, and Reliever airports are all substantially more than the costs of meeting objectives and performance measure recommendations. For GA-Community, it is nearly half non-SASP Update compared to other objectives and recommendations costs from the SASP Update. For GA-Rural and GA-Basic, the SASP Update performance measure recommendations are the largest portion of the costs.

Table 11. Total System-Wide Project Costs by Airport Classification 2017-2037

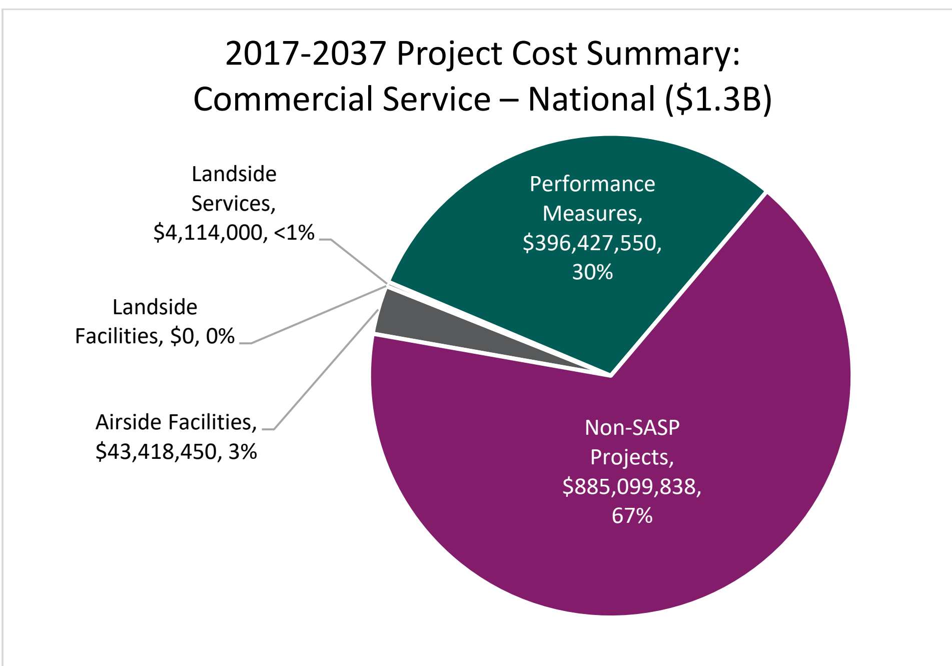
Recommendation	Total Estimate Cost	% of Total
Commercial Service-International	$5,137,883,372	59.3%
Commercial Service-National	$1,329,059,838	15.3%
Reliever	$1,062,309,450	12.3%
GA-Community	$668,715,539	7.7%
GA-Rural	$298,862,081	3.4%
GA-Basic	$167,626,937	1.9%
Total	**$8,664,457,217**	**100%**

Source: Kimley-Horn and CDM Smith



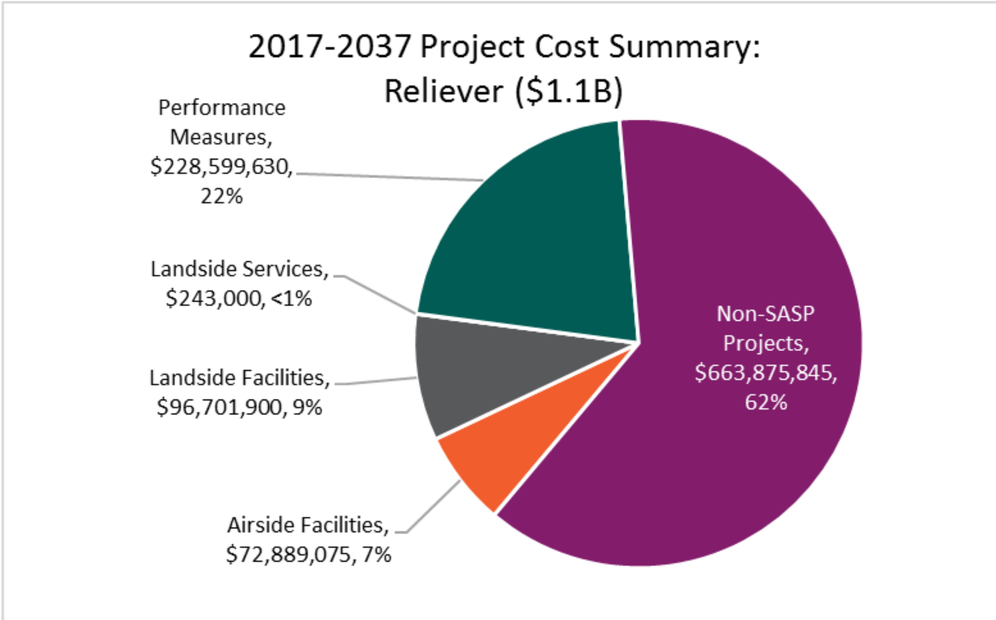
Source: Kimley-Horn and CDM Smith

Figure 8. Commercial Service-International Project Costs 2017-2037



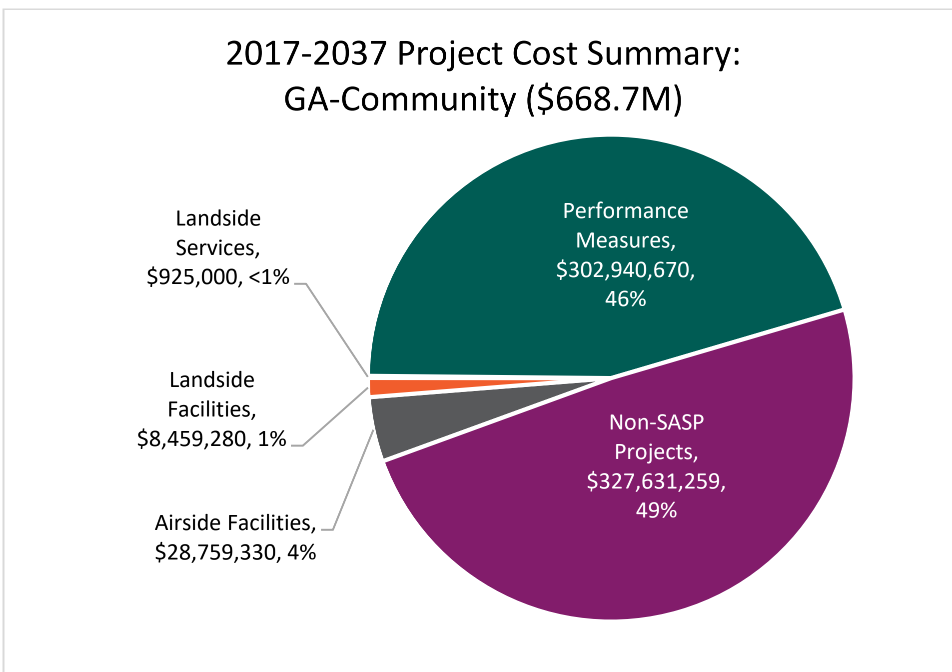
Source: Kimley-Horn and CDM Smith

Figure 9. Commercial Service-National Project Costs 2017-2037



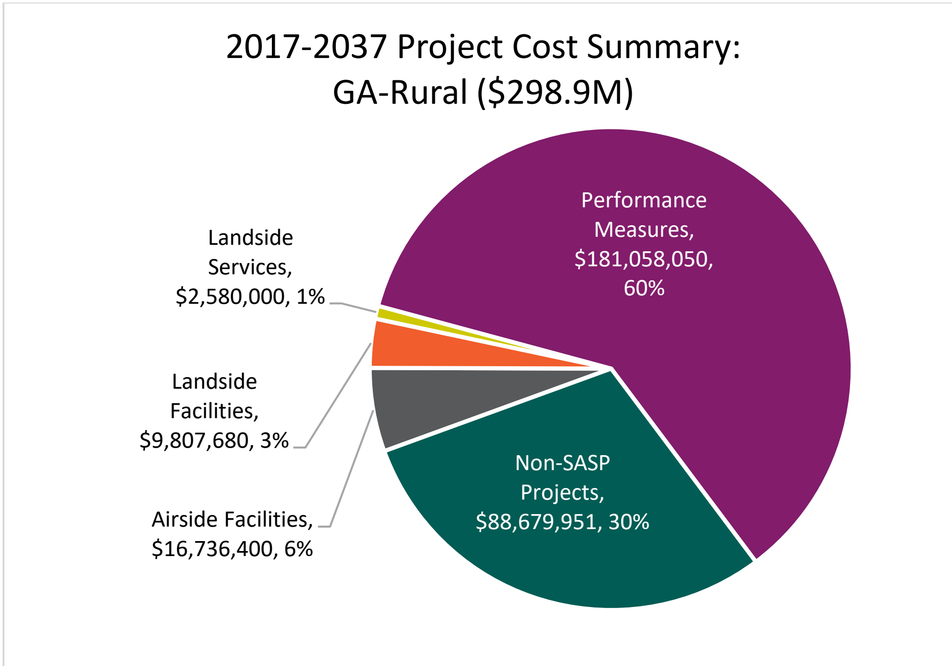
Source: Kimley-Horn and CDM Smith

Figure 10. Reliever Project Costs 2017-2037



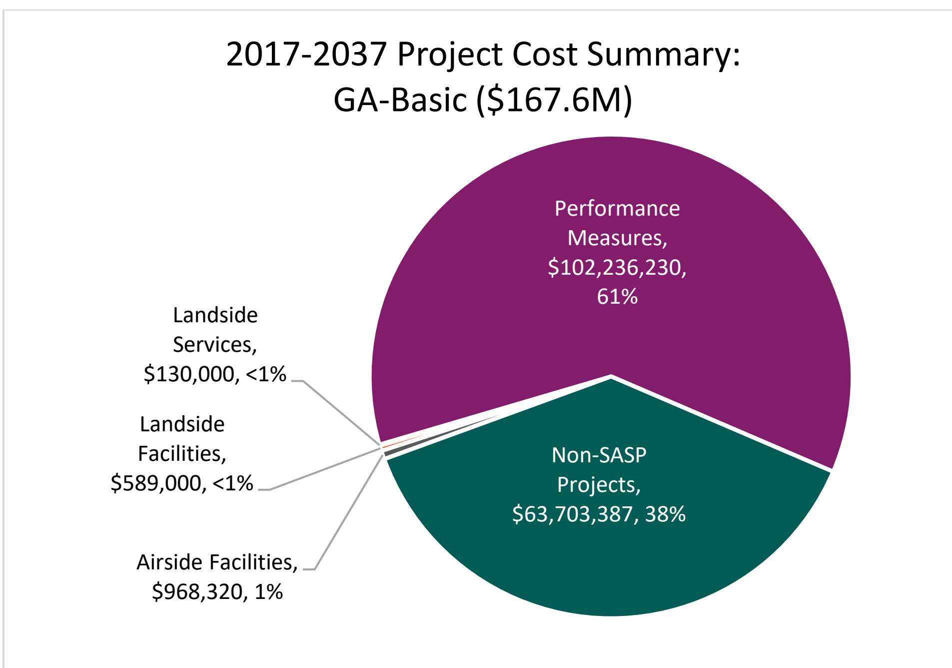
Source: Kimley-Horn and CDM Smith

Figure 11. GA-Community Project Costs 2017-2037



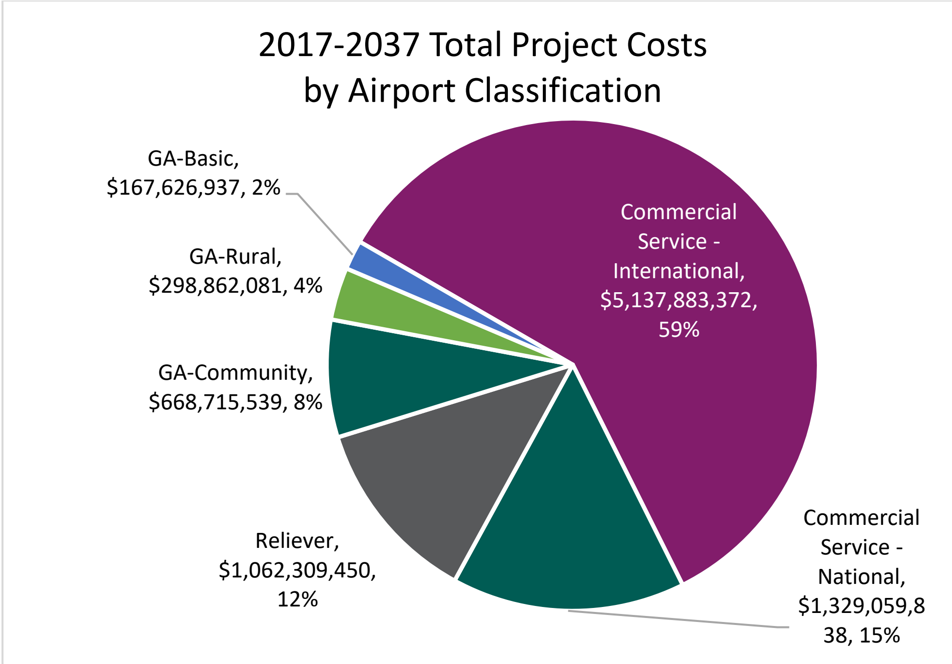
Source: Kimley-Horn and CDM Smith

Figure 12. GA-Rural Project Costs 2017-2037



Source: Kimley-Horn and CDM Smith

Figure 13. GA-Basic Project Costs 2017-2037



Source: Kimley-Horn and CDM Smith

Figure 14. Total Project Costs by Airport Classification 2017-2037

Since funding resources are limited, two implementation scenarios are examined. The first scenario is one of maintenance and preservation. Only the projects needed to meet facility and service objectives or to maintain and preserve existing infrastructure are included. The second scenario is one of expansion and capacity, that includes projects that are needed to expand capacity at SASP airports *plus* all the projects in scenario #1 since those expansion projects must also be maintained. Each scenario is described in more detail in the following sections.

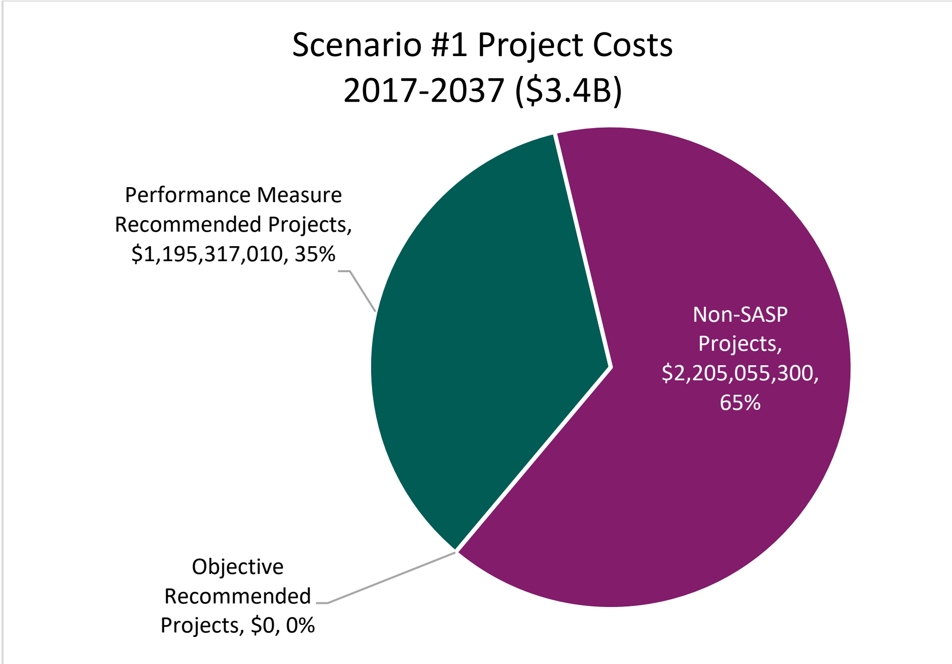
Scenario #1 Maintenance and Preservation

Table 12 lists the facility and service objective recommended project costs, performance measure recommended project costs, and any non-SASP Update project costs for maintenance and preservation projects only (such as pavement repair, obstruction removal, building improvements, etc.). There are no objective recommended projects that fall into this scenario. The majority of the costs needed in this scenario come from non-SASP Update projects (nearly 65%) and projects related to performance measures (over 35%). **Figure 15** illustrates the composition of projects in the maintenance scenario.

Table 12. Scenario #1 System-Wide Project Costs 2017-2037

Recommendation	Total Estimate Cost	% of Total
Objective Recommended Projects	$0	0.0%
Performance Measure Recommended Projects	$1,195,317,010	35.2%
Non-SASP Update Projects	$2,205,055,300	64.8%
Total	**$3,400,372,310**	**100.0%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 15. Scenario #1 Project Costs 2017-2037

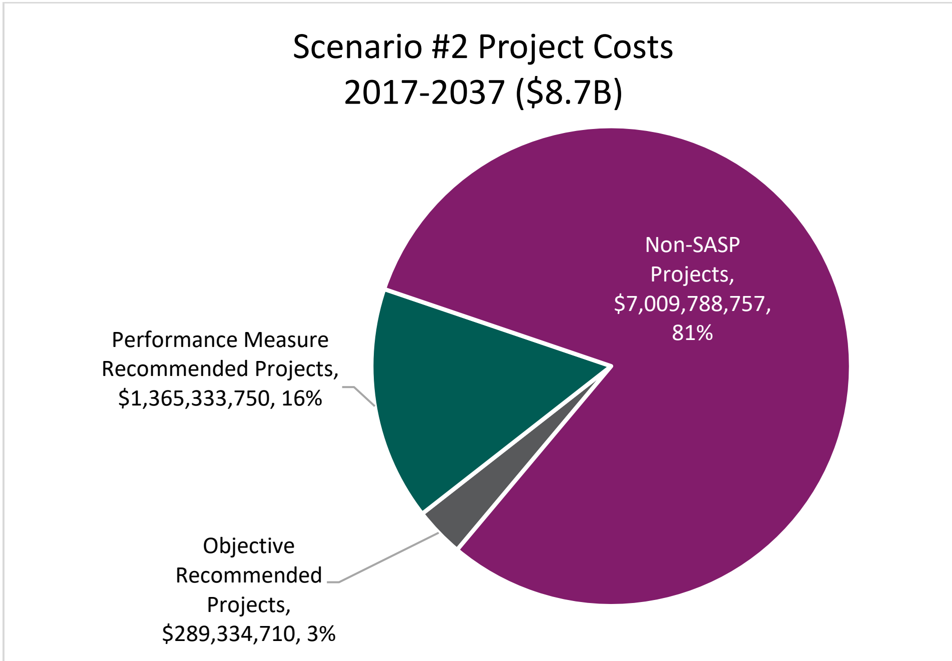
Scenario #2 Expansion (Including Maintenance and Preservation)

Table 13 lists the facility and service objective recommended project costs, performance measure recommended project costs, and any non-SASP Update project costs for expansion/capacity projects (such as runway extensions, terminal expansion, hangar construction, etc.) and maintenance and preservation projects from scenario #1. Similar to scenario #1, the majority of the costs needed in this scenario come from non-SASP Update projects (over 80 percent). Projects related to performance measures comprise nearly 16 percent. **Figure 16** illustrates the composition of projects in the expansion scenario.

Table 13. Scenario #2 System-Wide Project Costs 2017-2037

	Recommendation	Total Estimate Cost	% of Total
Maintenance and Preservation (from Scenario #1)	Objective Recommended Projects	$0	0.0%
	Performance Measure Recommended Projects	$1,195,317,010	35.2%
	Non-SASP Update Projects	$2,205,055,300	64.8%
	Total	**$3,400,372,310**	**100%**
Expansion	Objective Recommended Projects	$289,334,710	5.5%
	Performance Measure Recommended Projects	$170,016,740	3.2%
	Non-SASP Update Projects	$4,804,733,457	91.3%
	Total	**$5,264,084,907**	**100%**
Scenario #2 – Maintenance and Preservation and Expansion	Objective Recommended Projects	$289,334,710	3.3%
	Performance Measure Recommended Projects	$1,365,333,750	15.8%
	Non-SASP Update Projects	$7,009,788,757	80.9%
	Total	**$8,664,457,217**	**100%**

Source: Kimley-Horn and CDM Smith



Source: Kimley-Horn and CDM Smith

Figure 16. Scenario #2 Project Costs 2017-2037

SUMMARY

Analyzing system performance in meeting facility and service objectives and system performance measures in previous chapters highlighted areas with room for improvement moving forward. A holistic view of system-wide needs is achieved by identifying and costing projects needed to improve performance and evaluating projects already planned for by individual airports in their master plans, ALPs, and CIPs. This chapter focuses on the financial needs and recommendations that have been discussed in previous chapters, along with non-SASP Update related projects. With a total 20-year need of over $8.5 billion–$3.5 billion of which is needed just to maintain infrastructure already in place—the financial needs of the airports are great. The findings of this chapter will serve as a tool for the Arizona Department of Transportation (ADOT) to make the most effective and efficient use of resources, leveraging available funding and sharing the importance of continued federal, state, and local funding to maintain a safe aviation system in Arizona.

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CHAPTER NINE: RECOMMENDED PLAN AND POLICIES

INTRODUCTION

The recommended plan utilizes all data gathered in earlier tasks and other additional data sources to provide a list of prioritized strategies for enhancing aviation in Arizona. Though much of the data collection for this study occurred in 2017 and requested data reflecting end of year 2016 activity, and there have inevitably been changes to input data for the performance measures, these changes would likely not involve impacts to the overall recommendations of this plan. Previous chapters analyzed the future needs for the state's aviation system, as well as the associated costs to implement recommendations to meet those needs. This chapter provides an overview of the significant results of the analyses that led to the development of recommendations. These recommendations are consistent with the State Aviation System Plan (SASP) Update's goals for safety and security, fiscal responsibility, and economic support.

The SASP Update provides a 20-year outlook (through 2036) for Arizona's aviation needs. This system plan was designed to ensure Arizona's ability to meet the current and future needs of aviation throughout the state and identified the roles and characteristics of existing and new aviation facilities across Arizona. Industry trends and changes to communities have been met with Arizona's airports' continued evolution. While the SASP Update provides general facility and service objectives in addition to statewide recommendations, all of which serve collectively as a guide for the continued, sustainable development of Arizona's aviation system, individual airport master planning processes are needed to identify facility-specific design, planning, and environmental requirements. This plan does not dictate specific plans or projects for individual airports – rather, that is accomplished through local processes and is driven by local needs, opportunities, capabilities, and decisions. However, for any local airport project to be funded, eligibility and justification must be demonstrated prior to consideration for funding on either a state or federal level if Federal Aviation Administration (FAA) funding will be sought.

This system plan provides Arizona with the guidance and tools necessary to monitor airports' abilities to meet customer and user needs today and in the future. It also provides the ability to measure the performance of Arizona's airport system and assess the impacts of the state's investments in increasing the system's performance. While **Chapter 8** identifies $1.65 billion in funding needs throughout 2036 just to meet the facility and service objectives and system performance measures of the SASP Update, an additional $7.0 billion will be required during that same timeframe to address airport-specific projects identified at the local level but not identified in the SASP Update.

All of this information may be used by the FAA to inform the National Plan of Integrated Airport Systems (NPIAS), a biannual report provided to Congress that identifies nationwide funding needs for those aviation facilities deemed significant to the national air transportation system.

Through the establishment of performance measures and system indicators, the Arizona Department of Transportation (ADOT) can track and measure changes in the performance of the aviation system. Additionally, by engaging in continuous planning and conducting special studies as follow-on efforts to complement the SASP Update, ADOT can also contribute to improving the statewide system and each individual airport's ability to sustainably meet future needs. Policy recommendations and strategic project prioritization guidance contained

in this chapter provides guidance for ADOT's consideration in future business processes and decisions to ensure that aviation funding and policy decisions are effective and appropriate to facilitate the success of Arizona's aviation system.

SUMMARY OF SASP UPDATE PROJECT RECOMMENDATIONS

As identified in previous chapters, the goals of the SASP Update are as follows:

1. **Safety and security.** Arizona should maintain a safe and secure airport system as measured by compliance with applicable safety and security standards while supporting health and safety-related services and activities.
2. **Fiscal responsibility.** Arizona should implement cost-effective investment strategies to meet current and projected demand while remaining adequately accessible to Arizona's citizens, visitors, and businesses.
3. **Economic support.** Arizona should advance a system of airports that promotes Arizona's economic growth and development.

Numerous performance measures were examined and calculated in **Chapter 6** of the SASP Update. While all performance measures serve a purpose in evaluating Arizona's aviation system and telling the story of the system's ability to meet current and future needs, this section examines some key performance measures directly tied to the three system goals and compares them to the performance levels established in the 2008 SASP. Based on this comparison, recommendations for each performance measure are provided. Some of these recommendations involve education and outreach efforts by ADOT Aeronautics while some are tied directly to specific airport projects or follow-on studies. **Table 1** summarizes 2008 compared to 2016 performance in terms of the percentage of airports meeting each performance measure, as well as provides the 2016 performance target for each one.

Table 1. Highlights of SASP Findings

	Performance Measure	2008 Performance	2016 Performance	Performance Target
Safety and Security	Percent of airports capable of supporting medical operations	40%	40%	67%
	Percent of airports with controls/zoning	60%	76%	100%
	Percent of airports with airport disclosure maps	35%	30%	100%
	Percent of airports controlling all primary runway end runway protection zones (RPZs)	60%	30%	100%
	Percent of airports with compliant runway safety areas (RSAs) for their current airport reference code (ARC)	59%	85%	100%
	Percent of airports with clear approaches to their primary runway ends	51%	28%	100%
	Percent of airports by classification with an adopted wildlife hazard assessments (WHAs) or wildlife hazard management plans (WHMPs)	18%	28%	36%
Fiscal Responsibility	Percent of population within 30 minutes of an all-weather runway	77%	90%	93%
	Percent of airports with a current (10 years) master plan	N/A	78%	100%
	Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	54%	64%	97%
	Percent of airports with a primary taxiway PCI of 70 or greater	N/A	55%	97%
	Percent of airports with an apron PCI of 55 or greater	N/A	64%	97%
Economic Support	Percent of airports offering 24/7 fuel	46%	63%	76%
	Percent of airports that are recognized in local growth plans	64%	61%	100%
	Percent of airports that are recognized in regional growth plans	67%	40%	100%
	Percent of airports with the facilities to support jet aircraft	N/A	51%	70%

Source: Kimley-Horn

Safety and Security

Ensuring a safe and secure airport system is paramount to ADOT Aeronautics. Performance measures related to safety and security assessed during this update include:

1. **Percent of airports capable of supporting medical operations.** Medical flights offer access to patients in need of specialized or emergency medical care, as well as transport of healthcare personnel to rural areas to provide care. These services are particularly important for residents of remote and/or Tribal communities without nearby access to medical facilities. Providing a network of airports to connect medical professionals with patients is one of the most important functions an aviation system can provide. The analysis showed that 40 percent of Arizona's airports are capable of supporting medical operations as detailed in **Chapter 6**, on par with 2008's 40 percent. The performance target for this metric is 67 percent.[1] ADOT Aeronautics should continue to work with the state's airports to improve the support capabilities related to medical operations. A working relationship to promote conversation regarding medical operator needs may be necessary between ADOT, Arizona airports, and medical operators. Such conversation could heighten awareness of medical operator needs and ADOT resources, and promote further discussion of future facilities development at airports that are capable of, and support, medical operations.

2. **Percent of airports with surrounding municipalities that have adopted airport compatibility zoning.** Protecting the land use and airspace around an airport is critical to an airport's long-term viability. In general, the objective of airport compatible land use is to promote development that is considered compatible with airports and preclude incompatible uses such as residential areas, schools, hospitals, and churches near airports. While aircraft noise is one of the most recognized incompatibility concerns, issues such as future airport expansion potential, the safety of people and property (both in the sky and on the ground), and environmental impacts also influence the types of development and activities considered compatible with airport operation and development. The analysis showed that 76 percent of Arizona's airports currently report that they have local zoning in place to ensure surrounding land use compatibility with the airport. This is up from 60 percent of airports from the 2008 SASP. The performance target for this is 100 percent. Arizona's system showed improvement from 2008 to 2016 in meeting this performance measure and is steadily approaching the performance target. ADOT and local communities should work together to ensure appropriate local zoning is in place to ensure the protection of Arizona's airports. This would be supported by Special Study #1, *Comprehensive Statewide Land Use/RPZ Study,* discussed later in this chapter.

[1] As noted in Chapter 7, this target includes all airports in the four largest categories (CS-International, CS-National, Reliever, GA-Community), along with the three GA-Rural and one GA-Basic airports that currently meet the criteria.

3. **Percent of airports with airport disclosure maps.** In Arizona, political subdivisions of the state that operate a public airport are also responsible for complying with Arizona Revised Statute (A.R.S.) 28-8485.[2] This statute mandates that airports must identify the area surrounding its facility on an airport disclosure map to notify existing or potential property owners that the area is subject to aircraft noise and overflights. The study's analysis showed that 30 percent of Arizona's airports reported compliance with A.R.S. 28-8485's requirement to develop an airport disclosure map according to data provided by airports. This is a decrease from 2008's 35 percent compliance rate and is likely attributed to the way the information was reported on the Airport Inventory Data Survey Form, as these maps do not expire and it is unlikely that an airport would remove it from the agency. The performance target for this is 100 percent. Airport disclosure maps provide a mechanism for communicating to relevant audiences the extents of potential airport impacts such as noise and overflights whereas the ordinance-related measure ties to protecting the airport itself in aspects such as encroachment, land use compatibility, and the protection of navigable airspace. Though independent of each other and with different purposes, the two performance measures are complementary and should be considered by airports and ADOT Aeronautics in conjunction with each other. Similar to the previous performance measure related to airport zoning, Special Study #1 could aid airports and ADOT Aeronautics in increasing compliance with this performance target. Additionally, ADOT Aeronautics should continue to work with airports to ensure airport disclosure maps are developed and disseminated to appropriate audiences.

4. **Percent of airports controlling all primary runway end RPZs.** The FAA has defined several key safety areas on and adjacent to runways. According to FAA AC 150/5300-13 (change 1), the RPZ's ability to enhance safety "is best achieved through airport owner control over RPZs. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities" (FAA 2012, p. 71). From a safety perspective, RPZs are established and maintained to enhance pilot safety in critical times of flight (i.e., take-off and landing). A positively controlled RPZ is not just designated land, but a maintained and well-kept zone, free of obstacles to promote safe flying. In 2012, the FAA released *Interim Guidance on Land Uses Within a Runway Protection Zone.* This guidance further clarified allowable land uses and provided interim policy guidance to airports, resulting in a change in understanding of what was acceptable to FAA in terms of land uses in RPZs. The guidance resulted in better, more accurate reporting and monitoring on the part of airports as well as a better overall understanding of acceptable land uses inside RPZs throughout the aviation industry. In 2008, 60 percent of all Arizona airports were reported to control the RPZs for their primary runways' ends according to data provided by the airports. This dropped to 30 percent in this update based data from airports collected in 2017. The reduction in the compliance is likely a result of airports gaining

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[2] Political subdivisions of the state that operate a public airport can also designate all property within the vicinity of an airport as an airport influence area after a notice and a hearing (A.R.S. 28-8485). The area must be exposed to aircraft noise and overflight with a day-night average sound level of 65 decibels or higher or be within such a geographic distance from an existing runway that it is exposed to aircraft noise and overflights. Once the area has been identified, the airport influence area must be recorded with the office of the county recorder in which the property is located. Airport disclosure maps are obligatory, while airport influence areas are established at the discretion of the airport owner.

a better understanding of how this data should be reported and what allowable land uses and activities are. The drop therefore reflects airports more accurately reporting their data and conditions. The performance target for this is 100 percent. Special Study #1, a Comprehensive Statewide Land Use/RPZ Study, discussed later in this chapter, would also likely increase statewide compliance with this performance target as RPZs are studied in more detail.

5. **Percent of airports with compliant RSAs for their current ARC.** The RSA is required by FAA to be cleared, drained, and graded in a way that removes all potentially hazardous topography, prevents water accumulation, is free of objects except those that need to be located in the RSA because of their functions (such as certain navigational aids [NAVAIDs]), and capable of supporting snow removal and aircraft rescue and firefighting (ARFF) equipment under dry conditions. Additional items that may result in a noncompliant RSA include insufficient property ownership of the RSA area and lack of surface vehicle access. An RSA that meets these standards and has the proper dimensions is considered compliant according to the FAA. 2016 data showed a notable increase in the percentage of airports that reported RSA compliance for their current ARC, up to 85 percent compliance compared to 59 percent in the 2008 study. This reflects the FAA's emphasis on RSA compliance, including providing significant funding for RSAs throughout the U.S. The performance target for this is 100 percent. RSA compliance requires in-depth analysis to identify deficiencies and mitigation or corrective action options. As such, ADOT should recommend careful consideration of RSA compliance in the local airport master planning process to identify and mitigate/correct RSA deficiencies which would lead to increased statewide compliance with this performance target.

6. **Percent of airports with clear approaches to their primary runway ends**. Obstructions can include human-made infrastructure, such as buildings, transmission lines, and cell phone towers, as well as natural features like hills, mountains, and vegetation. Airports should maintain clear approaches to all runway ends to the greatest extent feasible to optimize aircraft safety, especially during less-than-ideal weather conditions. Accordingly, many airports implement obstruction removal programs to combat, prevent, or alleviate the negative effects of obstructions, which often include (but are not limited to) a vegetation management plan. Data collected during this study from FAA sources such as the FAA Form 5010-1 indicated that 28 percent of Arizona's airports have clear approaches to their primary runway ends, down from 51 percent in the 2008 SASP. Since 2008, fewer airports have maintained controlled approaches while the FAA has simultaneously emphasized the importance of clear approaches. Clear approaches are a critical safety component of airports as aircraft are arriving and departing the runway environment. The performance target for this is 100 percent. Both Special Study #1, Comprehensive Statewide Land Use/RPZ Study, and increased consideration of approach clearing in the local airport master planning process would increase statewide compliance with this performance measure. Additionally, prioritizing funding for clearing airport approaches would also aid in increasing the achievement of this performance target.

7. **Percent of airports by classification with an adopted WHA or WHMP.** Wildlife can present serious safety risks to airport operations, potentially endangering aircraft and their occupants, as well as the wildlife. Due to the rural nature of many of Arizona's airports, wildlife hazards are a frequent concern. In northern and eastern Arizona, large mammals including elk and deer can be extremely

dangerous if present on an airfield. Cows in aircraft movement areas have also been reported across the state. Airports can perform wildlife hazard site visits to understand what threats exist for their property or develop WHAs and WHMPs to develop a strategy for mitigating these threats. The FAA requires WHAs at FAA Part 139-certified airports. Airports may also be required to develop a WHMP. While such plans are only required for Part 139 airports, they are strongly encouraged for all airports. Approximately 28 percent of airports reported having an adopted WHA or WHMP in 2016, up from 18 percent in 2008. The performance target for this is 36 percent.[3] The performance target for this measure is low compared to others as the need for these varies tremendously by airport. FAA currently only requires a WHA for Part 139 airports, while other airports are recommended to conduct them based on elements such as reported bird strikes or other wildlife concerns. Special Study #9, *Statewide General Aviation Wildlife Hazard Analysis,* could aid statewide efforts in increasing airports' abilities to meet this performance target by assessing wildlife hazard planning and mitigation strategies and providing a statewide roadmap for implementing planning and operational efforts aimed at reducing wildlife hazards throughout Arizona.

While great efforts have been undertaken to improve the safety and security of Arizona's aviation system, opportunities for increased performance remain. As the safety and security of airports continue to be of utmost importance to ADOT, there should be continued coordination and effort made to meet each of the identified performance targets with all of Arizona's airports.

Fiscal Responsibility

Maintaining an airport system that is financially responsible and sustainable is important in ensuring the continued ability to meet the demands of the users and customers of Arizona's aviation system. By implementing strategic, focused investment strategies to maximize the cost-effectiveness of Aeronautics' program, ADOT can successfully aid Arizona's airports in meeting current and future demand while also ensuring system access for the state's citizens, businesses, and visitors. Performance measures related to fiscal responsibility assessed during this update include:

1. **Percent of population within 30 minutes of an all-weather runway.** All-weather runways provide access to an aviation facility at all times, which can be especially important in rural areas that depend on airports for emergency response, access, and economic activities such as air cargo, agricultural support, and corporate/business aviation. They are also useful in situations where pilots have an emergency and need to land, especially during inclement weather. For purposes of the SASP Update, an all-weather runway was defined as being paved and having at least an instrument approach procedure (IAP) and weather reporting capability. Airports that are equipped with these three components allow pilots to land and take-off during times of inclement weather. In 2008, 77 percent of Arizona's population was determined to be within a 30-minute drive of an all-weather runway as described in **Chapter 6** of the SASP Update. This number rose to 93 percent in 2016 reaching the performance target of 93 percent[4]. The increase in population residing within

[3] As noted in Chapter 7, this target includes all Part 139 airports and all non-Part 139 airports that have already adopted some type of wildlife management study.
[4] As noted in Chapter 7, 93 percent is all system airports achieving their facility and service objectives.

30-minutes of an all-weather runway is primarily due to demographic changes, as population growth in Arizona's urban areas has outpaced rural locales, particularly within the Sun Corridor. ADOT Aeronautics should continue to monitor population growth and density trends statewide and compare them to the state's identified all-weather runways and should also monitor enhancements at airports that provide them with all-weather capabilities. Additionally, an assessment of airports that do not have a single all-weather runway should be considered to identify opportunities to increase statewide coverage.

2. **Percent of airports with a current (10 years) master plan.** Airport master plans provide a comprehensive assessment of an airport's ability to accommodate existing and future demands and identify short-, medium-, and long-term development needs. The completion of an airport master plan demonstrates the sponsor's commitment to responsible airport investment by ensuring resources are allocated in a manner that meets current and future needs. Additionally, inclusion in an FAA-approved master plan or airport layout plan (ALP) is typically an eligibility criterion for federal and state funding for capital improvement projects. A current master plan also indicates a community's engagement in and support for its airport. According to data compiled during the SASP Update, 78 percent of Arizona's airports have master plans or airport layout plans with narrative reports that are considered current (completed or updated within the last 10 years). This is not an item that was measured in 2008. The statewide performance target for this is 100 percent. As such, ADOT Aeronautics should continue to fund master plans and/or airport layout plans with narrative reports and work with all airport sponsors to encourage the update of these plans on a continuous cycle.

3. **Percent of airports with a primary runway PCI of 70 or greater.** Pavement condition is critical to the safe and efficient operation of aircraft at airports, and its upkeep is often one of the most significant capital investments an airport makes. The PCI is an industry standard for measuring and rating airport pavements so that maintenance and repair can be planned and implemented at the appropriate time during its lifecycle. PCI is expressed on a scale from 0 (failed pavement) to 100 (new pavement in perfect condition). Pavement with a PCI of 70 or greater is considered to be in "good" condition and therefore 70 serves as the threshold for this performance measure for runways and taxiways. The threshold for apron PCI was set at 55 due to the fact that the PCI of an apron has less impacts on aircraft operations than the PCI of runways and taxiways. Arizona's system has seen a slight increase in the percent of airports with a primary runway PCI of 70 or greater, up from 2008's 54 percent to 64 percent in 2016, compared to a performance target of 97 percent.[5] The majority of this improvement can be tied to ADOT's Arizona Pavement Preservation Program (APPP) and its ability to help airports with pavement maintenance projects that help extend the useful life of the pavement and maintain higher PCIs. These results show that the APPP is working as intended and the investment of over $45 million since the program's start in 2005 has

[5] As noted is Chapter 7, two GA-Basic airports are unpaved, therefore, future system-wide targets are reduced from 100 percent to 97 percent.

been well spent. As noted in **Chapter 8**, the estimated cost to achieve this performance target is more than $845 million over the next 20 years. ADOT Aeronautics should continue to fund and prioritize primary runway pavement maintenance projects to ensure the ability of Arizona's airports to meet the demands of users. By continuing to monitor airfield pavement through Airport Pavement Management System (APMS) inspections and using those survey results to identify and prioritize pavement preservation projects to be funded through the APPP, ADOT can continue to increase compliance with this performance measure and ensure airports' abilities to provide their customers with adequate pavement throughout the state.

4. **Percent of airports with a primary taxiway PCI of 70 or greater.** While not a measure recorded in 2008 (only primary runways and overall pavement PCI), it was determined as part of this SASP Update that 55 percent of Arizona's primary taxiways had a PCI of 70 or greater. **Chapter 8** estimated the cost to achieve the performance target of 97 percent to be over $334 million.[6] Primary taxiway pavement maintenance should be prioritized immediately behind primary runway pavement maintenance to ensure the adequacy of Arizona's airports' pavement. The current APPP includes taxiway maintenance projects based on the importance of preserving the PCIs of the taxiway system.

5. **Percent of airport with an apron PCI of 55 or greater.** This update shows that 64 percent of Arizona's airports' aprons have a PCI of 55 or more with a performance target of 97 percent.[7] This measure was also not tracked in the 2008 study. Combined with the previous two performance measures, Special Study #6, *Airport Pavement Management Plan (Continuous),* will continue to help ADOT Aeronautics identify pavement maintenance and preservation needs and develop a prioritized project roadmap to ensure the viability of airfield pavement at Arizona's airports. The APPP can then be used to implement APMS recommendations and assist airports with pavement maintenance projects that are critical to the longevity of the investments in airport pavements throughout Arizona.

Pavement management is of particular note in this goal category as all three pavement-related performance measures are below the targets. As such, airports and ADOT should prioritize pavement management and the funding of pavement maintenance and rehabilitation projects to ensure adequate safety and access to Arizona's airports as well as to protect the historical financial investment in airfield pavement across the state.

[6] As noted in Chapter 7, two GA-Basic airports are unpaved (Cibecue and Superior); therefore, future system-wide targets are reduced to 97 percent.
[7] As noted in Chapter 7, two GA-Basic airports are unpaved (Cibecue and Superior); therefore, future system-wide targets are reduced to 97 percent.

Economic Support

Airports serve not only as transportation hubs but also as microeconomies. Arizona's statewide airport system should be planned and developed in a way to maximize airports' capabilities of serving as economic engines at the local, regional, and statewide levels and to serve as an important cog in Arizona's overall economic development wheel. Performance measures related to economic support assessed during this update include:

1. **Percent of airports offering 24/7 fuel.** The widespread availability of fuel is an important driver of aviation activity. Access to fuel 24 hours per day, seven days per week allows aircraft to fly at non-peak hours and adds a layer of safety for pilots in emergency situations when aircraft require immediate re-fueling. The benefits of 24/7 fuel also extend to community safety and resiliency, as aircraft can re-fuel during times of disaster when they are needed to transport people, goods, and services. Additionally, 24/7 fuel helps attract both based and transient aircraft operators who need quick access to fuel on-demand and increases the overall revenue generating potential of an airport through increased fuel sales, support of tenants and transient users, and the multiplier effects of increased fuel sales. 2016 data shows that 63 percent of Arizona's airports offer fuel 24 hours a day, seven days per week, up from 46 percent of the airports in 2008. The current percentage is nearing the performance target of 76 percent.[8] ADOT should continue to monitor opportunities for increasing statewide fuel availability as demand requires it. Additionally, ADOT should evaluate the potential to utilize state airport funding for the installation of self-service card readers at airport fueling facilities that do not already have that capability, thus increasing the availability of fuel throughout the state. 24/7 fuel services at airports benefit local economies. When local airports are able to sell more fuel, it benefits other airport businesses by opening them up to further opportunities. 24/7 fuel availability also helps to improve opportunity for airport revenue by providing aircraft and aircraft operators with a greater incentive to use their facilities.

2. **Percent of airports that are recognized in local growth plans.** An airport's inclusion in local or regional growth plans indicates community support by recognizing the facility's role in future growth and economic development, as well as applicable multimodal transportation goals. Being recognized in local or regional plans is a sign of stability and support within an airport's community. Airports that are included in these types of plans are also typically more likely to be located in areas with controls or zoning designed to promote airport compatible land uses, which increase the airport's long-term viability and potential. There was a slight decline from 2008's 64 percent to 2016's 61 percent. When compared to the performance target of 100 percent, there is an opportunity for ADOT to continue working with local airport sponsors and local planning partners to increase statewide consideration of airports in local growth plans. Often, great success can be found in this arena through increased outreach and education to non-aviation partners at the local level. Airport Cooperative Research Program (ACRP) Project 03-31/Web Resource 1, *Aligning Community Expectations with Airport Roles*, available at https://crp.trb.org/acrp0331/, is an excellent resource

[8] As noted in Chapter 7, the 76 percent target includes all airports in the four largest classifications as well as the 12 GA-Rural and two GA-Basic airports that currently provide 24/7 fueling.

for aviation stakeholders to communicate the roles, responsibilities, and capabilities of airports to non-aviation partners.

3. **Percent of airports that are recognized in regional growth plans.** The reported 40 percent in 2016 is a sharp decline from the 67 percent of airports noted as being recognized in regional growth plans in 2008. The sharp decline is attributable to the way data were presented on the Airport Inventory and Data Survey, as it is unlikely that a local or regional planning agency would have included an airport in the past, then excluded it in subsequent plan updates. As with the percent of airports recognized in local growth plans, the performance target is 100 percent, providing opportunity for increased engagement at the regional level, similar to the need for such at the local level. Engagement with regional agencies such as metropolitan planning organizations and others through the options noted in the previously referenced ACRP project is recommended for airports and should be encouraged by ADOT. As is the case with local growth plans, inclusion of airports in regional growth plans provides mutual opportunities to airports and their regions. Coordination through regional growth plans can increase the opportunities for economic gain at airports and the regions they serve.

4. **Percent of airports with the facilities to support jet aircraft.** The ability to support jet aircraft is important for airports hoping to attract and support more demanding aviation activity such as corporate flights and air cargo. Nationally, the FAA projects the largest increase in general aviation (GA) activity to be in jet aircraft, especially for business use. Though not reported in 2008's study as a performance measure, 51 percent of Arizona's airports currently have the facilities required to generally support jet operations, as detailed in **Chapter 6**. The performance target for this is 70 percent[9]. Providing support for jet aircraft comes with significant economic benefits. Generally, jet aircraft carry more passenger (transporting more potential customers) and purchase fuel in greater quantities. Providing facilities that are capable of supporting jet aircraft also enable regional and national connections of larger scale to be made between the airport and community it serves, thus providing the chance for a local economic web to benefit from expansion. ADOT and individual airports should continue to monitor opportunities and the associated demand for increased statewide jet service capabilities, recognizing that the facilities identified in the SASP Update are general and that individual airports need to evaluate their own needs during master planning processes. The master planning process is an individual airport's opportunity to identify demand and trends specific to the local area and can be used to assist in planning for future development to support new or increased jet operations. Additionally, outreach to Arizona based aircraft charter companies or national fractional ownership companies may provide greater insight to the plans of the jet operators in an effort to plan for facilities development at airports that the industry deems most appropriate.

[9] As noted in Chapter 7, the 70 percent target includes all airports in the four largest classifications as well as some GA-Rural airports due to their locations across the state.

Protecting Arizona's airports to ensure their ability to serve as economic generators and provide a public service is as important at the statewide level as it is at the local level. Ensuring that proper consideration is given to protect the historical public investment in aviation throughout the state and providing opportunities for airports to enhance services and facilities highlights the need for coordinated, continuous planning at all levels. ADOT should continue to educate and work with local and regional partners—aviation and non-aviation—to leverage the state's airports' abilities to enhance the overall economic and transportation systems throughout Arizona. While capacity is not one of the current performance measures for the SASP Update, identifying current and future demand on the system, recognizing capacity shortfalls, and planning for capacity increases where relevant supports airports' abilities to serve as economic engines at the local and regional levels as well as allows the entire state system to provide connectivity and economic benefits to all of Arizona.

While not a performance measure, another critical element of economic support is providing sufficient airfield capacity for aircraft to operate without experience delay. The FAA provides specific guidance regarding airfield capacity and when additional capacity should be considered by airports. A subsequent analysis of the SASP Update's projected demand compared to estimated annual capacity for the state's airports is provided to address this important factor.

Highlights of SASP Update Performance Measure Recommendations

Table 2 summarizes the recommendations identified for the SASP Update's performance measures.

Table 2. Highlights of SASP Update Performance Measure Recommendations

	Performance Measure	Recommendations for Consideration
Safety and Security	Percent of airports capable of supporting medical operations	Continue to work with the state's airports to improve the support capabilities related to medical operations.
Safety and Security	Percent of airports with controls/zoning	– ADOT and local communities should work together to ensure appropriate local zoning is in place to ensure the protection of Arizona's airports – Conduct Special Study #1, Comprehensive Statewide Land Use/RPZ Study
Safety and Security	Percent of airports with airport disclosure maps	– ADOT should continue to work with airports to ensure airport disclosure maps are developed and disseminated to appropriate audiences – Conduct Special Study #1, Comprehensive Statewide Land Use/RPZ Study
Safety and Security	Percent of airports controlling all primary runway end RPZs	Conduct Special Study #1, Comprehensive Statewide Land Use/RPZ Study
Safety and Security	Percent of airports with compliant RSAs for their current ARC	ADOT should recommend careful consideration of RSA compliance in the local airport master planning process to identify and mitigate/correct RSA deficiencies
Safety and Security	Percent of airports with clear approaches to their primary runway ends	– Increased consideration of approach clearing in the local airport master planning process – Prioritize funding for clearing airport approaches – Conduct Special Study #1, Comprehensive Statewide Land Use/RPZ Study
Safety and Security	Percent of airports by classification with an adopted WHA or WHMP	Conduct Special Study #9, Statewide GA WHA
Fiscal Responsibility	Percent of population within 30 minutes of an all-weather runway	– Continue to monitor population growth and density trends statewide and compare them to the state's identified all-weather runways – Monitor airport enhancements at that provide all-weather capabilities – Conduct an assessment of airports that do not have a single all-weather runway should be considered to identify opportunities to increase statewide coverage
Fiscal Responsibility	Percent of airports with a current (10 years) master plan	Continue to fund master plans and work with all airport sponsors to encourage the update of airport master plans on a continuous cycle
Fiscal Responsibility	Percent of airports with a primary runway PCI of 70 or greater	Continue to fund a statewide airfield pavement inspection program and prioritize primary runway pavement maintenance projects to ensure the ability of Arizona's airports to meet the demands of users
Fiscal Responsibility	Percent of airports with a primary taxiway PCI of 70 or greater	Prioritize taxiway pavement maintenance immediately behind primary runway pavement maintenance as part of ADOT's pavement preservation program to ensure the adequacy of Arizona's airports' pavement
Fiscal Responsibility	Percent of airports with an apron PCI of 55 or greater	Prioritize apron maintenance as part of ADOT's pavement preservation program
Economic Support	Percent of airports offering 24/7 fuel	– Monitor opportunities for increasing statewide fuel availability as demand requires it – Consider dedicating a portion of the state's airport funding to the installation of self-service card readers at airport fueling facilities that do not already have that capability, thus increasing the wider availability of fuel throughout the state, including airports that do not have full-time fixed base operator services
Economic Support	Percent of airports that are recognized in local growth plans	Work with local airport sponsors and local planning partners to increase statewide consideration of airports in local growth plans

Performance Measure		Recommendations for Consideration
	Percent of airports that are recognized in regional growth plans	Work with regional agencies to increase statewide consideration of airports in regional growth plans
	Percent of airports with the facilities to support jet aircraft	Monitor opportunities and the associated demand for increased statewide jet service capabilities and facilitate outreach to jet aircraft charter and national fractional ownership companies

Source: Kimley-Horn

FUTURE NPIAS CONSIDERATIONS

FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems,* identifies the requirements to be included in the NPIAS. Inclusion in the NPIAS is important as it relates to an airport's eligibility for funding from the FAA to meet future needs. Appendix C details an analysis of Arizona's eight non-NPIAS system airports and their ability to meet the current criteria for consideration for inclusion in the NPIAS. At this time, there are no immediate NPIAS-related changes to the status of any of Arizona's airports. However, Ak-Chin Regional Airport should be monitored for potential future upgrade to a Reliever facility assuming FAA maintains this identification in future updates of the NPIAS.

Based on the FAA Order and a 2015 FAA report, *Evaluating the Formulation of the National Plan of Integrated Airport Systems,* there are potentially 16 Arizona airports that could be reclassified by the FAA in the next edition of the NPIAS, to be released in the fall of 2018. These 16 airports are:

1. Bagdad
2. Bisbee Douglas International
3. Bisbee Municipal
4. Chinle Municipal
5. Cibeque
6. Eric Marcus Municipal
7. Gila Bend Municipal
8. Greenlee County
9. H. A. Clarke Memorial Field
10. Kayenta
11. Pinal Airpark
12. Polacca
13. San Manuel
14. Tuba City
15. Whiteriver
16. Window Rock

Examining classification and based aircraft requirements for NPIAS eligibility, all 16 of these airports fall short of current NPIAS inclusion requirements. Entry criteria requires airports to have at least 10 based aircraft in order to be included in NPIAS plans. If any or all of these airports were to lose NPIAS status, federal funding could be at jeopardy as being in the NPIAS is a requirement to be eligible to receive FAA funding. That would place a greater financial burden on ADOT's State Aviation Program which provides grant funding for all publicly owned airports in the state. For airports that receive FAA funding, these airports are eligible for up to $150,000 in grants per year from the FAA as part of a non-primary entitlement (NPE) program and ADOT provides only a match for these funds, the same as the airport sponsor. If these airports are no longer eligible for FAA funding, they would look to ADOT to assist with project grant funding which would increase the funding requests to ADOT greatly. If ADOT were unable to provide grant funding, the communities that these facilities serve would be at risk of decreased aviation services since a major funding source would no longer be available, thus impacting each airport's ability to initiate preservation and development projects.

While these airports might not meet current NPIAS eligibility criteria, there are possible mitigating circumstances that would support their continued inclusion in the NPIAS. For example, Pinal Airpark was just recently added to the NPIAS and time should be allotted for a prolonged and sustained demand level to be established. Window Rock provides important connectivity to and supports medical activity-related operations for the Navajo Nation. Airport-specific considerations such as these should be taken into account by both ADOT and the FAA when examining NPIAS eligibility.

While there is nothing ADOT can directly do to influence potential FAA policy changes related to the NPIAS and the subsequent impacts to Arizona's airports' eligibility, ADOT should continue to monitor both the activity at these airports as well as evolving FAA guidance on NPIAS eligibility to understand potential future impacts to Arizona's airports. Many of the airports identified above are in Cochise County. The Cochise County Airport Needs Study discussed later in this chapter outlines a potential approach for ADOT to consider related to these airports. The results of the Cochise County Airport Needs Study could aid in identifying potential NPIAS changes or reclassifications for those facilities.

A full analysis of NPIAS considerations related to SASP airports is included in **Appendix C**.

IMPLEMENTATION OF SASP UPDATE RECOMMENDATIONS

Implementing SASP Update recommendations requires additional coordination, planning, and monitoring as time progresses, utilizing the results of the SASP Update to assist in future decision making. The following summarizes some of the implementation-related needs.

Aviation System Manager (ASM) Database Coordination

The ASM Database provides a mechanism for ADOT to input, organize, and monitor data relevant to statewide aviation management and coordination and to collect and assess Airport Capital Improvement Program (ACIP) information. ADOT has discussed replacing ASM with another system that is being implemented throughout the agency, however, until that system is in place, ASM should continue to be updated. An up-to-date ASM Database will ease transition to a new system with current information.

To ensure that the ASM or its replacement remains relevant and functional, ADOT Aeronautics should consider working with airport sponsors to update data at regular intervals and to track and report relevant data from the ASM. Continued updates will not only assist ADOT in making funding and policy decisions on a continuous basis but will also aid data collection efforts for future studies, such as an economic impact study or any future SASP updates. Data from the SASP Update has been provided to ADOT for integration into ASM or its replacement.

Continuous Planning and System Performance Monitoring

Continuous planning is as important as continuous data management. Staying engaged with Arizona's aviation sponsors, partners, and stakeholders is a key element in planning and developing a balanced, viable, and sustainable system of airports. ADOT should remain engaged with relevant partners at the local, regional, and statewide levels to maximize input into statewide aviation decisions and plans and to ensure continued engagement in Arizona's airports. Not only will continuous planning assist in statewide aviation decisions, it will help identify industry trends, obstacles, and opportunities that can be addressed by ADOT and its partners at the forefront as a result of continuous planning. A crucial aspect of continuous planning is system performance monitoring. Great effort has been expended throughout the SASP Update to validate, assess, and set targets for performance measures. By monitoring the performance of the aviation system, ADOT can continuously analyze the success and efficacy of all aspects of this SASP Update. There are four key items ADOT should consider related to continuous planning and system performance monitoring:

1. **Annual Data Updates.** Airport-specific data informing SASP Update performance measures and indicators should be updated annually. The ADOT ASM should serve as the warehouse for all this data. ADOT should consider developing and distributing an annual survey to airport sponsors to update SASP Update-related information, similar to what has been done in the past with airport updates of the ACIPs.

2. **Future State Aviation System Plans.** This SASP Update examines the demand and requirements of Arizona's aviation system over the next 20 years. The national and global aviation environment is rapidly changing, with the introduction of new aircraft types, users, fleet mixes, service providers, and regulations. As part of continuous planning process, updating the SASP every five years would allow ADOT to continuously monitor both state and national aviation trends, the conditions and demands impacting Arizona's aviation system, and the current and future needs. The next SASP update should be initiated in 2022 with planned completion in mid-2023.

3. **Master Plans and ALPs with Narrative.** As detailed in **Chapter 6**, master plan/ALP currency is a performance measure utilized to evaluate Arizona's aviation system. It was noted that only 78 percent of airports have a master plan that was updated within the last 10 years. The goal is to have all airports with a master plan updated within the last 10 years. ADOT should place an emphasis on funding master plan/ALP updates to bring all of Arizona's airports into compliance with this performance measure. Additionally, ADOT Aeronautics should track master plans/ALPs to identify a 10-year roadmap for updates and work with airport sponsors to develop a plan to continuously update these important studies.

4. **Surprise Airport (Auxiliary 1) Feasibility Study.** The City of Surprise is exploring the potential to develop Luke Air Force Base's (AFB) Auxiliary 1 (Aux 1) field as a joint use facility. Aux 1 is currently a remote location that is used for "point in space approaches", without the ability to land aircraft as there is no permanent infrastructure. Luke AFB officials indicate that their primary goal is to preserve Aux 1's role in supporting the mission of the U.S. Air Force. Luke AFB officials indicated a willingness to explore the potential development with the City as long as this goal remains at the forefront of all future discussions and plans. ADOT should consider being involved in future analyses conducted by the City of Surprise related to the development of Aux 1. The SASP Update has not identified a geographic need in this region given the current number of airports in the region. A general capacity constraint has been identified relative to ILS training capabilities, however, these training requirements specific to utilizing an ILS, an outdated technology compared to newer to global positioning systems (GPS), may change and therefore not needed. ADOT should continue monitoring the efforts and coordinating with the City regarding the airport's potential development.

Special Studies

There are numerous follow-on studies or projects that can effectively assist ADOT Aeronautics in implementing the recommendations of the SASP Update. These special studies, described below, will help ADOT address emerging trends and continuing issues as well as help plan and develop Arizona's airport system in the near future.

1. **Comprehensive Statewide Land Use/RPZ Study (Special Study #1).** In order to protect people and objects on the ground in the event of aircraft under- or overshooting the runway, the FAA identifies a safety area off the end of each runway known as the RPZ. Airport sponsors are encouraged to ensure RPZ compliance with federal guidelines through fee simple ownership of the RPZ or through other means that give the sponsor control (avigation easements, zoning restrictions, etc.). Since ensuring primary runway RPZ compliance is a SASP Update performance measure with a performance target of 100% and an actual compliance rate of 30%, ADOT Aeronautics should consider undertaking a detailed statewide land use/RPZ study to examine not only the ownership, control, and compliance for Arizona's airports' RPZs but also to assess statewide land use compatibility as it relates to airports. Through this, ADOT should develop an inventory of incompatible land uses, land ownership data, and airport hazard zoning ordinances in order to identify a roadmap for addressing deficiencies at the local and statewide levels. This study ties directly to some of the performance measures from the "Safety and Security" goal:

   - Percent of airports with controls/zoning
   - Percent of airports with airport disclosure maps
   - Percent of airports controlling all primary runway end RPZs
   - Percent of airports with clear approaches to their primary runway ends

By conducting this study, ADOT could identify opportunities to enhance performance for each of these measures and develop a roadmap to coordinate future land use and protection efforts. Additionally, the FAA is finalizing a new advisory circular dedicated to airport land use compatibility. A draft of this advisory circular was released for public comment in 2012. ADOT should defer final development of this study's approach and methodology until after the release of this advisory circular to ensure new guidance is considered.

2. **Demand/Capacity Study (Special Study #2).** As shown on the following page, an analysis of airports' annual service volume (ASV) compared to their current and SASP Update projected levels of demand was performed. It is important to recognize that ASV is a high-level approach to examining capacity and that for many airports, capacity is better evaluated on an hourly basis, including commercial service airports such as Phoenix Sky Harbor International and Tucson International. The ASV analysis revealed that 10 Arizona airports have or are expected to experience demand/capacity (D/C) ratios exceeding 60 percent which is the threshold at which planning for capacity improvements should start being studied. By 2036, it is anticipated that seven airports will have a D/C ratio greater than 80 percent, the point at which capacity improvement construction should begin according to this high-level approach to evaluating capacity. These seven airports include three airports that are projected to have D/C ratios greater than 100 percent. ADOT Aeronautics should consider working with the airports to undertake a more in-depth study of demand/capacity of the airports identified on the following page as having higher than 60 and 80 percent D/C ratios. While the identification of airport-specific projects to increase capacity is more appropriate for the airport master planning process at the local level, ADOT can focus on issues beyond a single airport on a regional basis, providing assistance to airports in facilitating the discussion. Topics such as underused capacity at airports surrounding these capacity-constrained airports, opportunities for regional capacity shifting, or development of new airports, such as a new facility that is being studied in Surprise, to add capacity to the system, as well as individual airport projects that could be considered are all relevant to this analysis.

3. **Table 3** summarizes D/C ratios for the 10 airports with demand/capacity concerns from an ASV perspective.

Table 3. Demand / Capacity Analysis

FAA ID	Associated City	Airport Name	Demand		ASV	D/C Ratios	
			2016	2036		2016	2036
GYR	Goodyear	Phoenix Goodyear	123,334	209,310	206,000	60%	102%
GCN	Grand Canyon	Grand Canyon National Park	108,043	128,001	210,000	51%	61%
AVQ	Marana	Marana Regional	90,252	153,170	188,000	48%	81%
FFZ	Mesa	Falcon Field	263,118	446,550	472,000	56%	95%
1G4	Peach Springs	Grand Canyon West	130,300	130,300	131,625	99%	99%
PHX	Phoenix	Phoenix Sky Harbor Int’l	440,643	619,146	685,000	64%	90%
PRC	Prescott	Ernest A. Love Field	254,342	272,198	355,000	72%	77%
SDL	Scottsdale	Scottsdale	158,295	268,650	218,500	72%	123%
FHU	Sierra Vista	Sierra Vista Municipal	135,869	230,590	215,000	63%	107%
NYL	Yuma	Yuma Int’l	193,663	200,879	299,000	65%	67%

Demand/Capacity Ratios < 60% ≥ 60%; ≤ 79% ≥ 80%

Source: Kimley-Horn

It is also of note that the SASP Update operational demand estimates for 2036 will continue to be reevaluated by airports, and as appropriate, by FAA for those airports for which FAA prepares forecasts including all airports with air traffic control towers. Changes to the demand levels will impact the projected capacity constraints. Many of the airports have recently or are underway with airport master plans that are evaluating the capacity needs of the individual airports and airport-specific decisions on capacity needs will dictate the ultimate recommendations for each airport.

While capacity is not one of the current performance measures for the SASP Update, identifying current and future demand on the system, recognizing capacity shortfalls, and planning for capacity increases where relevant supports airports’ abilities to serve as economic engines at the local and regional levels as well as allows the entire state system to provide connectivity and economic benefits to all of Arizona.

Arizona is among the national leaders in numerous pilot training categories. ADOT should consider including an assessment of flight training demand and capacity in areas with heavy flight training activity such as the Sun Corridor.[10] During the Project Advisory Committee (PAC) meetings and

[10] The Sun Corridor is typically defined as the area generally spanning six counties running from the middle of Yavapai County in central Arizona through western Cochise County to the south.

various public workshops, flight training demand was raised as an item for consideration. Specifically, capacity for runways with an Instrument Landing System (ILS) was noted as pilots seeking to obtain an instrument landing certification require ILS runway access. During the inventory of the state system, it was noted that 11 airports currently have an ILS for their primary approach. Of those, 2 (Ernest A. Love Field and Grand Canyon National Park) have projected 2030 D/C ratios greater than 60% and an additional 4 (Phoenix Sky Harbor International, Ryan Field, Sierra Vista Municipal, and Tucson International) have projected 2030 D/C ration greater than 80%. Phoenix Sky Harbor International and Tucson International have 2030 D/C ratios of 132% and 118%, respectively, although it should be noted that these two airports focus on hourly capacity and not annual capacity given their commercial service activity and have undertaken or are underway with individual airport master plans that would address airport-specific capacity concerns at a more granular level.

In addition to identifying capacity improvements at these facilities, ADOT Aeronautics and individual airports should consider monitoring opportunities for installing ILSs at airports where it would be beneficial in terms of providing additional access during inclement weather as well as to meet regional demand for ILSs in support of flight training needs. An increase in ILSs throughout the state could serve to increase the economic impact of individual airports and the system as a whole as increased flight training could be brought to the state, increasing economic development opportunities and overall growth in the state. Understanding ILS technology is outdated, it is possible that flight training requirements may change from practicing ILS approaches to GPS based Area Navigation (RNAV) approaches. In this event, a similar analysis of GPS approach capability could be conducted to determine system-wide availability.

In addition to flight training demand/capacity and ILS accessibility, technological changes that will soon be implemented should be examined for potential impacts on Arizona’s flight training industry. Equipment called Automated Dependent Surveillance-Broadcast (ADS-B) is used to identify aircraft using satellite-based navigation. The FAA has set a January 1, 2020, deadline for aircraft to be compliant with certain ADS-B equipage requirements in order to fly in certain airspace. This is likely to impact pilots and flight training providers across the country. A study to identify how the ADS-B mandate could impact AZ’s flight training environment including how potential different outcomes may impact many airports in the system.

4. **UAS Safety and Integration Study (Special Study #3):** By some estimates there are over 1 million unmanned aerial systems (UAS) operating in the United States today, compared to less than 250,000 active GA aircraft. UAS represents a major and fast-growing facet of aviation, a trend that is not going away. In fact, the uses of UAS are increasing as federal regulations are becoming less restrictive and the applications and availability of UAS are growing daily. ADOT Aeronautics should examine the potential to leverage ADOT’s existing “Airports of Arizona” geographic information system (GIS) located at http://adot.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=2526932c847e4f8d84d3e1195e316282 by developing a GIS-based UAS coordination and

deconfliction tool. This tool would connect UAS users to Arizona's airports to provide a mechanism to aid in the safe integration and coordination of UAS operations throughout the state. The system could allow UAS users to notify airport sponsors about UAS use requests throughout the state. Additionally, ADOT should consider working with airport sponsors, the FAA, and UAS industry groups to develop outreach and educational materials for UAS operators, including a safe UAS use brochure in a section of the ADOT website. Continued coordination with stakeholders in UAS operations would serve to increase the safe and efficient integration of UAS and also allow UAS to serve as yet another aviation-specific economic contributor in Arizona. It is critical that UAS integration is conducted in a safe manner with manned aviation activities such that it promotes economic growth and doesn't inhibit the current contributions of manned activity to the state's economy. The outreach materials should summarize federal requirements related to UAS, best management practices/tips for UAS users, and links to FAA, state, and industry group resources related to the safe and efficient integration of UAS in the broader aviation system.

5. **Arizona Airports Economic Impact and Economic Development Study (Special Study #4).** The last economic impact study completed for Arizona's aviation system was published in 2012. Since 2012 there have been many changes in the aviation industry and emerging trends continue to shape aviation and further its economic impact. ADOT should consider conducting a new aviation economic impact study for the state, focusing on direct, indirect, and induced (multiplier) impacts, as well as jobs and payroll supported by aviation. The study should examine both the statewide impacts as well as those attributable to individual airports. In addition to airport-specific economic impact data, the study should examine the impacts of specific aspects of aviation, including flight training/education, tourism/commercial passenger service, air cargo, airport construction, and military aviation. In addition to economic impact, ADOT should consider assessing the economic development potential and business suitability of the state's airports to enhance the financial capabilities of airports throughout the system. This portion of the study would examine airports as cogs in Arizona's economic development wheel and quantify both the current development as well as the economic development potential of each individual airport as well as the state system as a whole. Understanding the economic development strengths, weaknesses, opportunities, and threats of Arizona's airport system will help to better maximize the business development potential of the system and each airport. The results of such an effort would feed statewide and local business development efforts.

6. **Obstruction Mitigation Program Study (Special Study #5).** An airport approach is a glide slope meant to provide landing aircraft with clear airspace on approach to an airport. One of the performance measures discussed earlier in this chapter was the percentage of airports with clear approaches to their primary runway ends. Based on a high-level analysis using general data obtained from airports' FAA Form 5010-1 Master Records, it was determined that 28% of airports had clear approaches to both ends of their primary runway. ADOT should consider developing a methodology and roadmap for identifying and mitigating noncomplying runway ends. This would involve a review

of current master plans compared to approach surveys to identify approaches that are not cleared. Once an inventory of noncompliant approaches is completed, a plan to either bring those approaches into compliance or mitigate those unable to be cleared should be developed. This information would also inform local airport master plans and help populate safety-related airport projects designed to improve access to Arizona's airports. This study should be tied to Special Study #1, *Comprehensive Statewide Land Use/RPZ Study,* to develop a model airport protection zoning ordinance covering both land uses as well as heights/navigable airspace protection.

7. **Airport Pavement Management System Plan (Continuous) (Special Study #6).** Maintaining primary runways and taxiways to a minimum Pavement Condition Index (PCI) of 70 and airport aprons to a minimum PCI of 55 are current SASP Update performance measures. In addition to being SASP Update performance measures, pavement management is something required of all airports in both state and FAA grant assurances. ADOT has engaged in continuous pavement management monitoring through the APMS, with the most recent round of inspections occurring in 2017, and has funded pavement preservation projects through the APPP. The APMS informs the APPP by providing strategic, prioritized pavement maintenance needs for funding through APPP. APPP aids airports in meeting their grant assurances which require proper pavement maintenance. Improving pavement condition throughout the state also assists economic development as higher quality pavement serves to increase business aviation traffic and the associated economic benefits that come with that, as well as achieve the performance measure set out as part of the SASP Update. ADOT should consider continuing to perform airport pavement management inspections to identify the PCI of Arizona's airports' runways, taxiways, and aprons to both quantify the condition of the pavement as well as develop a prioritized pavement-specific project list and develop a roadmap for maintaining and preserving pavement throughout the state. Inspection data should continue to be summarized by airport and provided to airport sponsors for consideration in the development of ACIPs.

   It should be noted that if there was an unlimited budget the 2018 APMS Update indicated the cost of pavement preservation would be over $209 million for the period 2019-2024, an average of nearly $35 million per year. This estimate does not include pavement maintenance needs associated with Phoenix Sky Harbor International and Tucson International airports. ADOT is currently budgeting for approximately $5 million per year on the APPP, significantly less than the average annual need.

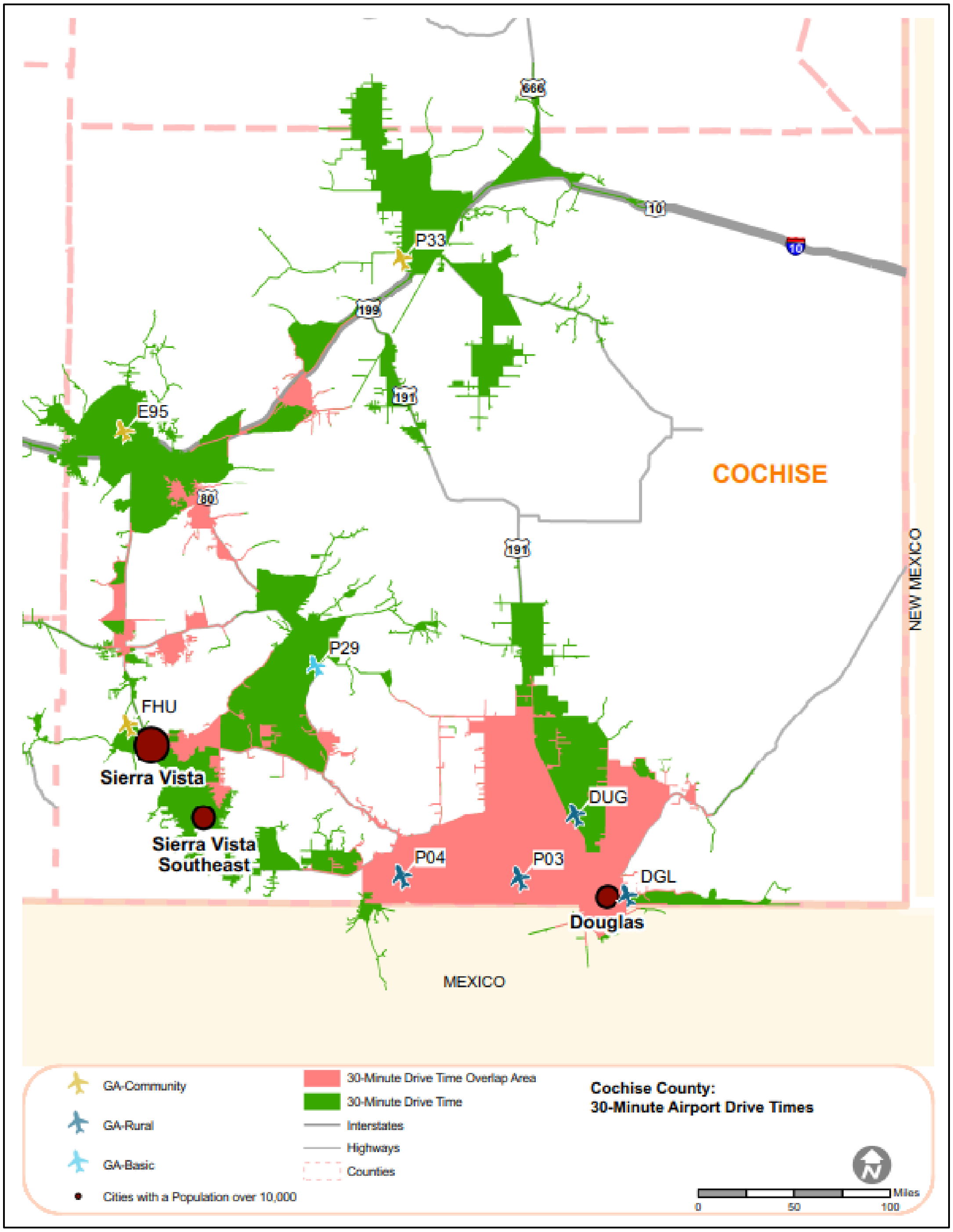
8. **Cochise County Airport Needs Study (Special Study #7).** Cochise County has eight public-use airports within its boundaries: seven publicly owned and one joint civilian/military (Joint-Use) airport. Of these eight, five are included in the latest 2017-2021 NPIAS and thus eligible for federal Airport Improvement Program (AIP) grant funding. **Table 4** Identifies the eight system airports in Cochise County.

Table 4. System Airports in Cochise County

FAA ID	Associated City	Facility Name	Owner	NPIAS Status	Based Aircraft		Annual Operations	
					2016	2036	2016	2036
E95	Benson	Benson Municipal	City of Benson	GA / Local	44	55	16,700	28,340
P04	Bisbee	Bisbee Municipal	City of Bisbee	GA / Unclassified	28	35	2,900	4,920
P03	Douglas	Cochise College	Cochise College	Non-NPIAS	15	19	47,050	47,810
DGL	Douglas	Douglas Municipal	City of Douglas	Non-NPIAS	12	15	2,600	4,410
DUG	Douglas Bisbee	Bisbee Douglas International	Cochise County	GA / Basic	5	6	25,820	43,820
FHU	Fort Huachuca - Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	US Army Intelligence Center	GA / Local	51	63	135,870	230,590
P29	Tombstone	Tombstone Municipal	City of Tombstone	Non-NPIAS	4	5	350	360
P33	Willcox	Cochise County	Cochise County	GA / Local	24	30	10,000	16,970

Sources: Airport Inventory and Data Form, FAA NPIAS 2017-2021, Kimley-Horn

Figure **1** shows the eight airports in the county along with population centers and 30-minute drive time buffers, highlighting areas with overlapping access to multiple airports. With Cochise County's 2016 population of 130,000, this is a high number of public-use airports serving a relatively low population. There are currently 183 based aircraft according to data compiled during the SASP Update compared to 253 registered aircraft according to FAA records, indicating that 70 aircraft are stored outside the county. There were an estimated 241,290 annual operations cumulatively in Cochise County in 2016, with over 56 percent of those operations occurring at Sierra Vista Municipal-Libby Army Airfield. Also of note is that Bisbee Douglas International, a NPIAS airport, has fewer based aircraft than the non-NPIAS airports Douglas Municipal and Cochise College. Bisbee Municipal, also a NPIAS airport, has many based aircraft, but the estimated number of annual operations is similar to that at Douglas Municipal, a non-NPIAS airport. It is important to note that Sierra Vista Municipal-Libby Army Airfield is the only airport with an air traffic control tower, therefore the only airport with accurate operational data.



Source: Kimley-Horn 2018, ESRI Community Analyst 2018

Figure 1. Cochise County Airports

ADOT should consider a two-pronged approach to evaluating and assisting the airports in Cochise County, consisting of a needs study and increased coordination with the airport sponsors in the county. As Sierra Vista Municipal-Libby Army Airfield is a Joint-Use facility, it should not be

considered in this analysis. This study would provide an in-depth analysis of the seven remaining facilities to determine if all are needed or if, based on drive time analyses and an assessment of regional aviation demands and needs, some of these facilities can be removed from funding consideration. Operational counting would be an important component of this study, as well as meetings with based aircraft owners and other users at each individual airport. Specifically, the analysis should revolve around the three non-NPIAS airports as well as Bisbee Municipal which, although in the NPIAS, was identified by the FAA as having no eligible project costs in the 2017-2021 period. This analysis should consider areas of the region with an over-capacity of aviation services or infrastructure. ADOT should consider serving as a facilitator between the sponsors of the seven airports with an end goal of identifying those airports with the best potential to serve the users and population centers in the county and to identify which airports represent the best options for long-term investments. This two-pronged approach would provide ADOT with the best opportunity to maximize limited funding, while focusing investment for the FAA, ADOT, and the airport sponsors.

9. **Runway Incursion Mitigation (RIM) Study (Special Study #8).** Per the FAA, airfield geometry has been identified as a primary contributing factor for runway incursions (instances of the unauthorized presence of an aircraft, vehicle, or pedestrian on a runway). The FAA analyzed over six years of national runway incursion data (2007 to 2013) and developed an inventory of locations at airports where risk factors might contribute to a runway incursion. **Table 5** details Arizona airports included in the FAA's RIM analysis, last updated in February 2018. To address the existing issues, the FAA initiated a comprehensive multi-year RIM program to identify, prioritize, and develop strategies to help airport sponsors mitigate risk at these locations. While the FAA has primarily prioritized RIM studies at small to large hub airports, ADOT Aeronautics should stress the importance of runway incursion prevention at all system airports and promote RIM analyses during each airport's master plan and/or ALP.

Table 5. Arizona Airport Runway Incursion Data from the FAA's Runway Incursion Management Program

FAA ID	Associated City	Facility Name	Location	NPIAS Classification	Asset Category	Part 139	Cumulative Runway Incursions (Pilot & Vehicle / Pedestrian Deviations)	Peak CY Annual Runway Incursions (Pilot & Vehicle / Pedestrian Deviations)
DVT	Phoenix	Phoenix Deer Valley Airport	Runway 7R-25L / Taxiway B9 Intersection	Reliever	National	N	26	5
DVT	Phoenix	Phoenix Deer Valley Airport	Taxiway B5 between Taxiway B and Runway 7R-25L	Reliever	National	N	8	2
DVT	Phoenix	Phoenix Deer Valley Airport	Hold short bar on Taxiway A4 at approach end of Runway 7L	Reliever	National	N	11	3
PHX	Phoenix	Phoenix Sky Harbor International	Taxiway F between G5 and G8	Large	N/A	Y	4	3
PHX	Phoenix	Phoenix Sky Harbor International	Runway 25R	Large	N/A	Y	5	2
IWA	Phoenix	Phoenix-Mesa Gateway Airport	Taxiway V / Taxiway B / Runway 12R Intersection	Small	N/A	Y	9	3
IWA	Phoenix	Phoenix-Mesa Gateway Airport	Runway 12C	Small	N/A	Y	6	2
PRC	Prescott	Ernest A. Love Field	Runway 3R-21L / Taxiway C4-D4 Intersection	Non-primary Commercial	Regional	Y	8	4
PRC	Prescott	Ernest A. Love Field	Runway 3L Approach End	Non-primary Commercial	Regional	Y	17	4
PRC	Prescott	Ernest A. Love Field	Runway 3R-21L / Taxiway C2 / E Intersection	Non-primary Commercial	Regional	Y	11	3
TUS	Tucson	Tucson International	Taxiway D between Runway 11L and 11R	Medium	N/A	Y	33	10
TUS	Tucson	Tucson International	Runway 29R	Medium	N/A	Y	9	3

Source: FAA's Runway Incursion Management Program Current Inventory of Locations, February 2018

10. **Statewide GA WHA Study (Special Study #9).** While airports certificated for air carrier operations under Federal Aviation Regulation (FAR) Part 139 have regimented wildlife planning and mitigation requirements, the requirements for GA airports are much less definitive. The FAA has recently started to prioritize GA wildlife planning and fund studies related to assessing and mitigating wildlife hazards at GA airports. The initial examination of wildlife at airports can be conducted either through wildlife site visits (WSVs) or WHAs. Historically, ADOT has offered funding for GA airport WHAs. While some Arizona airports took advantage of this opportunity, few took the results and conducted a full WHMP. ADOT should consider continuing to fund WSVs and WHAs at GA airports throughout the state. Airports should consider taking the results of the WSVs and WHAs and developing WHMPs if appropriate.

POLICY RECOMMENDATIONS

As discussed in **Chapter 2: Review of Current Policy**, the Arizona state aviation system is governed according to A.R.S., State Transportation Board (STB) Aviation Policies, and the ADOT Five-Year Development Program. The following policy recommendations are organized relative to these separate, but related components.

Arizona Revised Statutes Title 28 – Chapter 25 Aviation

Aircraft and airports are specifically addressed in A.R.S. Title 28, Chapter 25, Aviation. Chapter 25 addresses issues ranging from organization and powers of the ADOT Aeronautics Group to aircraft operations, registration and taxation, and dealers; airports; airport zoning and regulation; and joint power airport authorities.

A.R.S. Title 28, Chapter 25, Article 2 identifies the Aeronautics Division. Through changes at ADOT, Aeronautics was made part of the Multimodal Planning Division, therefore changing it to a Group instead of a separate ADOT division. A.R.S. Title 28, Chapter 25 should be amended to reflect the current status of the Aeronautics Group.

Compatible Land Use Planning and Disclosure

As identified in **Chapter 7**, 76 percent of system airports actively engage with their local municipal planning department, zoning commission, and/or city council to enact local controls for land use protections for safety and noise issues that can affect communities surrounding airports, as well as affiliated encroachment concerns. In addition, 30 percent of system airports fulfill their statutory requirement to file airport disclosure maps with the Arizona Department of Real Estate (ADRE).

In order to comply with statutory requirements and maintain land use compatibility, it is recommended that ADOT work closely with the airports, local planning and zoning authorities, and airports to educate all parties on how to file, and the importance of filing airport disclosure maps. To streamline compatible land use, especially for rural cities who may have finite resources and limited aviation expertise, ADOT can provide assistance through development and provision of a universal document template to facilitate effective land use planning. The template should be shared with the Arizona State Land Department, city planners, league of cities, towns, and counties, and any other agency who may be charged with airport land use compatibility. Furthermore, to effectively communicate land use planning around airports, ADOT should provide regular workshops at the Arizona Airports Association (AzAA) semi-annual conferences and opportunities for communication of the importance of compatible land use planning at the annual Aviation Day at the Capitol.

In 2006, the Arizona legislature passed Proposition 207, the "Private Property Rights Protection Act," now codified as A.R.S. 12-1134. In addition to other stipulations regarding private property rights, A.R.S. 12-1134 requires the government to compensate private land owners when a decrease in property value occurs due to regulatory restrictions. ADOT and local airport sponsors should be aware of Proposition 207's applicability and potential implications when developing and enacting airport land use restrictions. Considerations of Proposition 207 should be examined prior to establishing new or amended airport land use compatibility requirements.

Arizona STB Aviation Policies

The STB has broad authority to plan and develop Arizona's transportation systems with jurisdiction over the state's highways, airports, bicycle and pedestrian facilities, and other modal infrastructure. The powers and duties of the STB are outlined in A.R.S. Title 28, Chapter 2, Article 1; with respect to aeronautics, the board's duties are further outlined in A.R.S. Title 28, Chapter 25, Aviation.

The STB has adopted seven policies applicable to the state aviation system. These policies are updated regularly to reflect aviation needs, statutory requirements, and other conditions. ADOT is currently evaluating potential revisions to the FY 2019 STB policies; therefore, this analysis presents potential recommendations for consideration specific to the issues as they relate to the SASP Update's potential effect on the policies.

Planning to Programming (P2P Link)

ADOT Aeronautics Group plans to replicate the project programming process used for the selection of highway projects known as the Planning to Programming (P2P) Link. The P2P process links Arizona's Long-Range Plan and Capital Improvement Program to develop a "well-documented, understandable, logical, and defensible means of selecting and prioritizing projects." Benefits of P2P include the following:

1. Link planning to programming more effectively
2. Drive investment decision making by system performance
3. Simplified program structure
4. Implementation of a risk-based approach
5. Assist with implementation of "Moving Ahead for Progress in the 21st Century Act (MAP 21)"

P2P is an initiative set forth by ADOT for the federal highways. P2P, as it relates to aviation, adopts the highway funding process and tailors the processes to the way aviation funds are disseminated. As ADOT implements the P2P Link process of funding for aviation/airport projects, ADOT should consider prioritizing funding based on the performance measures, targets, and facility and service objectives identified in the SASP Update.

Planning Guidelines

Airport classifications were re-examined as part of the 2018 SASP Update. Considerations emerged during the development of the classifications such as simplicity, objectivity, and capacity to conduct ongoing reviews. In addition, a clear-cut process was employed to assess each airport's performance using facility and service objectives that were determined per each airport classification. Development of the airport classifications and associated facility and service objectives should be considered as updated planning guidelines for purposes of STB or ADOT Aeronautics policy and procedures.

Priority Rating System

Review of the current priority ranking system was conducted throughout the duration of this plan. The review took a comprehensive view of the existing system and aimed to improve upon the rating system identified in the previous SASP. Several items were identified for improvement based on the findings of the 2018 SASP Update.

The current priority ranking system does not create priority for those airports that are deficient in meeting SASP Update facility and service objectives, as well as other deficiencies such as not performing well in terms of grant management. An example would include projects such as 'improving airport drainage' ranking high, but 'airport drainage plan' ranking low.

To supplement the existing point system structure to account for specific considerations, ADOT should consider adding "bonus points" or an added weighting to projects associated with SASP Update performance measures. ADOT should also consider more closely aligning the ratings of related or supporting projects (e.g., "airport drainage plan" should be of similar priority to "improving airport drainage" as they are complementary projects). In addition to considering changes to the point structure system, ADOT Aeronautics should consider amending the airport measure rating criteria, currently consisting of the following:

1. Registered based aircraft
2. Scheduled air carrier enplaned passengers
3. Sponsor-reported aircraft operations compared to the airport's annual service volume (ASV)

Two new criteria should be considered for addition:

1. **Grant assurance and regulatory compliance.** Airports should be measured and provided a score based on their current and historical compliance with both ADOT grant assurances and Arizona aviation regulations, including regulation-driven performance measures such as the requirement to adopt airport zoning and publish airport disclosure maps.

2. **Grant drawdown history.** Airports should be assigned a score based on their ability to move forward with and complete projects for which they received state funding. This will account for the need for airports to carry out projects in a timely manner and will address airports obtaining and encumbering funds but not drawing them down from the State Aviation Fund.

Any changes to the point system structure of the project selection process/project prioritization should be coordinated with industry stakeholders to obtain buy-in from key partners and to fully understand and consider the implications of any changes. Once the above-detailed recommendations are considered and any changes made, ADOT should formalize the new point system structure, project selection process, and project prioritization and update the Airport Development Guidelines accordingly. Continuous monitoring of State Aviation Funds should be conducted to track the efficacy of these new approaches and to quantify the impacts they are having on airport development throughout the state.

Resource Allocation

As outlined in **Chapter 2**, the STB distributes the State Aviation Fund in an “equitable, efficient, and effective manner” by prioritizing distribution of those funds to airports with the highest level of activity while also providing grant access to all eligible airports in the state.

The 2008 SASP determined that 80 percent of available State Aviation Funds were distributed to commercial service airports/reliever airports. Other primary airports received 18 percent of available funds and secondary airports received the remaining two percent. Based on an analysis of the total performance measure costs over the planning horizon compared to the performance measure costs needs per airport classification, ADOT Aeronautics should consider re-evaluating the resource allocation by airport classification based on the updated needs estimates included in the SASP Update.

Airport Loan Program

Revenue-generating projects such as hangars and fuel farms are typically not eligible for grants from the FAA or ADOT. To aid airports in initiating projects that will help them become more financially self-sufficient by generating additional revenue, in previous years ADOT provided financial assistance through the State Aviation Fund through the Airport Loan Program. This program was available to airport sponsors owning and operating an airport to extend and enhance aviation business opportunities at their respective facilities in the form of interest bearing loans. The loans were made available specifically for airport development projects designed to generate direct revenue to the airport (e.g., hangars and fuel facilities). This assistance helps airports to increase their financial viability by creating additional revenue opportunities that might not otherwise be made available. The program was suspended when the State Aviation Fund experienced cash flow issues.

To qualify for a loan through the Airport Loan Program, the airport sponsor was required to meet the following:

3. Identified in the ADOT State Aviation System Plan
4. Owned by the public agency making an application for the loan
5. Open to the public on a nondiscriminatory basis

Due to limitations of the State Aviation Fund from recent legislative sweeps, the ADOT Airport Loan Program was suspended. As identified in **Chapter 8**, hangar costs account for a clear majority of landside facility objectives. Because these facility needs are typically not grant eligible, ADOT Aeronautics should consider reestablishing the Airport Loan Program in the near-term to satisfy system facility needs. This program could provide substantial opportunities for airports to generate revenue to assist with meeting their capital funding needs, including general maintenance and building their activity levels, thereby supporting economic activity in each airport’s market area. The ability of the projects to generate revenue and result in a return on investment has been identified by ADOT as a criterion that would be emphasized should the Airport Loan Program be funded and project funding sought by airports.

Five-Year ACIP Guidelines

The Five-Year ACIP is a list of desired projects by all airports that require funding assistance from the State Aviation Fund. The Five-Year ACIP is reviewed annually and provides ADOT Aeronautics an itemized view of airport funding requests over five years. The ACIP is used to effectively allocate State Aviation Funds based on the airport needs.

Based on recent State Aviation Fund constraints, maintaining the ability to match FAA grants, and in an effort to encumber funds, ADOT Aeronautics should consider requiring airport sponsors to notify ADOT upon request for FAA funds. This could be accomplished by airports copying ADOT Aeronautics on FAA pre-applications when they are submitted to the FAA Airports District Office each year. This would give ADOT Aeronautics an opportunity to understand matching needs for FAA-funded projects and plan to meet those needs. Additionally, ADOT should consider prioritizing funding for 30 percent design grants to improve their ability to anticipate future construction funding requests. This process would foster proactive grant planning and assist the airport in gaining funds in a timely manner.

CONSIDERATION FOR ADDITIONAL PROGRAM FUNDING

The FAA distributes funding to airports through the Airport Improvement Program (AIP) from the Aviation Trust Fund. The Airport and Airway Trust Fund was originally established in 1970 and has since been amended on numerous occasions. The fund is supplied by money collected only from the users of the nation's airport system and is used to fund airport improvements. Only airports included in the NPIAS are eligible to apply for FAA funding.

The latest FAA funding program that authorizes the appropriations for airport funding was the "FAA Extension, Safety, and Security Act of 2016" enacted July 15, 2016, which extended AIP appropriations through September 30, 2017. Since that time, additional extensions have been enacted to continue airport funding until another full program can be established.

Commercial service airports receive entitlement funds based on the number of passengers enplaned during the prior calendar year. For primary commercial service airports (those commercial service airports enplaning at least 10,000 passengers per year), the amount is based on enplanement volume. Primary airport entitlement funds are a minimum of $650,000 or $1 million and a maximum of $22 million or $26 million per airport (depending on the funding level for the overall FAA AIP). Commercial service airports may also receive cargo entitlement funding based on the landed weight of cargo aircraft.

Non-primary airports primarily serve GA, but they also include commercial service airports with fewer than 10,000 annual enplanements. Non-primary airports included in the NPIAS are eligible for state apportionment funds and non-primary entitlement (NPE) funds. Non-primary entitlement funds are the lesser of 1/5 of the airport's anticipated five-year capital improvement plan (CIP) or $150,000. To obtain these funds, airports must have a five-year CIP with eligible projects that meet AIP justification guidelines.

The remaining funding available for GA is then allocated to states through State Apportionment funds that are allocated to states based on a formula using the size and population of the state. States can then allocate these funds to high priority projects in the state, typically at GA airports.

Discretionary funds are those AIP funds remaining after entitlement funds, including primary, NPE, and apportionment funds have been taken out. Discretionary funds are allocated to eligible airport projects at the discretion of the FAA based on a national priority system. There is no regulation guiding the allocation of discretionary funds to any specific program, project, state, or airport. For example, Pinal Airpark is now a NPIAS airport designated as GA and falls in the non-primary category. Thus, Pinal Airpark is now eligible for and can receive discretionary funds through the FAA AIP. This does mean that Arizona's State Apportionment is reduced since Pinal Airpark is eligible to receive NPE funds, therefore, the State Apportionment is not available for other airports or projects in the state system.

While funding distributions by the FAA, state, and local municipalities improve the needs of the system, there are not enough available funds to support the development needs identified in this plan. Between FY2016 and FY2036 it is estimated that approximately $433 million will be necessary to improve Arizona's airport system each year on average based on the results of this plan. Based on historical and projected federal, state, and local funding, approximately $149 million will be available to airports each year, which leaves an annual funding gap of approximately $284 million.[11]

Table 6 summarizes the funding needs at system airports in Arizona. It is important to note that the annual funding level of $148.9 million does not take into account any potential NPIAS changes discussed earlier in this chapter. For example, if Arizona airports had NPIAS status changes, that would most likely reduce the available federal funding. Additionally, if an airport were to go up in NPIAS classification—for example, move from GA to commercial service—that airport's annual entitlement funding would increase. Upgrades in NPIAS classifications would also make airports more competitive for discretionary funds, while NPIAS downgrades would make them less competitive for discretionary funds.

Table 6. Annual Funding Gap

Funding Gap	Amount
Annual Need: SASP and Non-SASP Projects	$433,222,861
Annual Funding: Federal, State, Local Match	$148,901,549
Annual Funding Gap	$284,321,312

Source: Kimley-Horn

A recent change to the State Aviation Fund due to a change to state law decreased the revenues generated from the aircraft registration tax (100 percent to 35 percent) without the concurrent increase in revenue from the jet fuel tax (40 percent to 100 percent). This change is not revenue neutral and the State Aviation Fund levels will be less than has been available previous years.

It is also important to identify that historically, the FAA annually programs between $80 million and $84 million for Arizona airports. It is of ADOT Aeronautics' highest priority to match federal grants; however, ADOT is only programming $3.8 million in fiscal year 2018 (increasing to $5.0 million in 2019) for matching funds which is currently insufficient to meet the annual match to recent FAA grants. This deficiency means that ADOT has to somehow prioritize which grants it will match. In 2018 ADOT utilized a "first come, first serve" basis in terms of requests made to match the FAA grants, however, going forward, ADOT will only consider projects included in the Five-Year Transportation Facilities Construction Program, which includes ADOT Aeronautics' Five-Year ACIP.

[11] Assumes future sweeps of the State Aviation Fund will not occur.

While the ACIP is updated annually, the projects identified in the first year will be considered “fixed” as the program has been developed to be fiscally constrained, including an estimate of the amount needed to match anticipated FAA grants for the coming year(s).

COMPARISON OF RECOMMENDATIONS

As part of the 2018 SASP Update, an evaluation of the non-performance measure based plans and recommendations from the 2008 SASP was performed. Many recommendations were made as part of both studies. The following summarizes the recommendations from the 2008 SASP and 2018 SASP Update to identify what has been accomplished, what remains on the system-wide “to-do” list, and additional recommendations based on new findings and industry updates.

Accomplishments From 2008 SASP

The following identifies recommendations from the 2008 SASP that have been completed prior to the 2018 SASP Update:

Tribal Airport Funding Eligibility

In 2008, airports owned by Tribal communities were not eligible to receive funding from ADOT Aeronautics regardless of FAA eligibility. Many Tribal airports don’t experience the level of annual aircraft operations as some of the non-tribal airports, however, the airports are vital to the rural communities in need of physical/medical transport and access to remote areas. As such, the 2008 SASP recommended that these airports become eligible for state funding through legislative action. As a result of Senate Bill (S.B.) 1317 effective June 14, 2013, 14 Tribal airports became eligible for state funding and have thus been included in the 2018 SASP Update.

Obsolete Recommendations

The following identifies recommended plans from the 2008 SASP, but have not been included in the 2018 SASP Update:

Regional Aviation System Plan for Pinal County

The 2008 SASP identified that Pinal County was the fastest growing county in Arizona and one of the fastest in the U.S. between 2006 and 2007. Due to the projected population growth, a Regional Aviation System Plan (RASP) for Pinal County airports was recommended. While the plan was never completed, the Central Arizona Association of Governments (CAAG) conducted a regional transportation plan with an aviation component and the Pinal County airports (Pinal Airpark and San Manuel) both conducted airport master plans in 2014. A RASP no longer appears warranted for the county.

Continued and Remaining Recommendations

Table 7 identifies recommended plans that are both in the 2008 SASP and the 2018 SASP Update. The recommendations may be duplicative due to “continuous planning” (such as plans that recur over time) or plans that were recommendations in the 2008 SASP but were not initiated and have been carried forward as recommendation in the 2018 SASP Update.

Table 7. SASP Recommendation Comparison

2008 SASP Recommendation	2018 SASP Update Recommendation	Notes
ASM Database Coordination	ASM Database Coordination	Airport data has been continuously updated in ASM by ADOT Aeronautics. This recommendation remains in the 2018 Update to maintain record and track SASP airport data. (Continuous planning)
Master Plans	Master Plans and ALPs with Narrative	Many airports have conducted master plans and ALP updates since the 2008 SASP. Airports should continue to update their master plans and ALPs in accordance with FAA guidance. (Continuous planning)
Land Use Compatibility Guidance	Comprehensive Statewide Land Use / RPZ Study (Special Study #1)	The 2008 SASP found that incompatible land use in the airport environs could limit future growth. A follow-on study has not yet been conducted. The 2018 SASP Update also noted the incompatible land use issue, as well as AZ airports having a lack of control over primary runway RPZs.
Airport Operational Capacity and Airspace Capacity Study	Demand/Capacity Study (Special Study #2)	Seventeen airports were identified in the 2008 SASP as having, or potentially having, capacity issues. This study recommendation remains in the 2018 SASP Update because 10 of those airports are still projected to have capacity concerns in 2036. A detailed assessment of pilot training demand/capacity could be included in this study.
Economic Impact Study	Arizona Airports Economic Impact and Economic Development Study (Special Study #4)	The Arizona Airports Economic Impact Study was conducted in 2012. Another economic impact study is recommended to update the 2012 study. (Continuous planning)
Runway Approach Obstruction Study	Obstruction Mitigation Program Study (Special Study #5)	This study was not yet implemented by ADOT Aeronautics. Due to rapidly declining system performance, an obstruction study continues to be recommended for the 2018 SASP Update.
Pavement Management Plan (Continuous)	Airport Pavement Management System Plan (Continuous) (Special Study #6)	APMS has been maintained since the 2008 SASP. Identification of pavement conditions is a continuous priority at ADOT Aeronautics and therefore remains in the 2018 SASP Update. (Continuous planning)
Compatible Land Use Planning	Compatible Land Use Planning and Disclosure	Airport compatible land use issues were identified in the 2008 SASP, but state statutory requirements are still not being achieved. As such, a plan for meeting statutory requirements remains in the 2018 SASP Update.

Sources: Wilbur Smith Associates 2008, Kimley-Horn 2018

Additional Recommendations

The following identifies plans and recommendations to the 2018 SASP Update that were not included in the 2008 SASP:

1. **Future State Aviation System Plans**. For continued planning purposes, planning for recurring statewide system plans was added to evaluate system needs at least every 10 years or sooner as FAA funding is able to be secured.
2. **UAS Safety and Integration (Special Study #3)**. Since 2008, the UAS industry has grown exponentially. Planning for its effect on the AZ system is essential.
3. **Cochise County Airport Needs Study (Special Study #7)**. Cochise County is saturated with GA airports. Special Study #7 would provide ADOT with the best opportunity to maximize limited funding, while focusing investment for the FAA, ADOT, and the airport sponsors.
4. **RIM Study (Special Study #8)**. In recent years, airfield geometry has been a primary factor for runway incursions and as such, has been a national high priority for the FAA.
5. **Statewide GA WHAs (Special Study #9)**. Airports should consider taking the results of the WSVs and WHAs and developing WHMPs if appropriate.
6. **Airport Loan Program**. The Airport Loan Program was suspended several years after the 2008 SASP. The program promotes airport self-sufficiency and a recommendation has been made to reinstate the program.

SUMMARY

The policy recommendations identified in this SASP Update establish an outline for consideration as ADOT continues to plan for the state's aviation system. This collection of recommendations is a result of a collaborative effort between ADOT, the FAA's Phoenix Airports District Office (ADO), and stakeholders to identify areas for system improvements based on analysis conducted during the SASP Update. The performance measures, facility and service objectives, and targets set forth in this plan are designed to be actionable to provide a clear path to overall system enhancement. This SASP Update provides the framework for the successful development of Arizona's airport system over the next 20 years. Additionally, it provides recommendations relevant to successfully meeting performance measure targets to ensure that the users of Arizona's airports have a safe, efficient, and economically viable aviation system. A suite of follow-on studies was identified to aid ADOT and Arizona's airports in implementing the recommendations and meeting the performance targets of the SASP Update. Maintaining and improving pavement at Arizona's airports continues to be a priority for the system. Through the effective implementation of the APMS and APPP, ADOT can protect the operational efficiency and safety of the system. Data collection will be an important part of implementing the SASP Update. Continuously tracking the performance measures and indicators will aid ADOT in monitoring the success of this plan and the recommendations contained within. The status of Arizona's airports in the NPIAS is also an important item to monitor. Potential changes to federal NPIAS guidance and future inclusion of Arizona's airports may impact federal funding levels for certain airports. Close coordination with the airports and the FAA is crucial to ensure Arizona's airports are properly considered in future NPIAS reports.

The SASP Update's three goals—safety and security, fiscal responsibility, and economic support—aid in ensuring that the state's airports are an integral part of Arizona's overall transportation system and economic development initiatives. This plan can be used by ADOT, the FAA, and individual airports to collectively plan and develop the future system of airports throughout the state and meet performance targets at individual airports and for the system as a whole.

Implementation of policy recommendations will require a partnership between not only ADOT and the airport sponsors, but public agencies including but not limited to the Arizona Department of Real Estate, Arizona State Land Department, and local municipalities. The recommendations in this Chapter are intended to help facilitate discussion and inform the FAA, ADOT Aeronautics, airport sponsors, aviation stakeholders, and any public agencies involved with overall system improvements.

APPENDIX A: GLOSSARY OF TERMS

ABBREVIATIONS

A.R.S. – Arizona Revised Statutes

A4A – Airlines for America

AAAE – American Association of Airport Executives

AAC – Aircraft Approach Category

AC – Advisory Circular

ACA – Arizona Commerce Authority

ACIP – Airport Capital Improvement Program

ACRP – Airport Cooperative Research Program

ADFFM – Arizona Department of Forest and Fire Management

ADG – Airplane Design Group

ADO – Airports District Office

ADOT – Arizona Department of Transportation

ADRE – Arizona Department of Real Estate

ADS-B – Automatic Dependent Surveillance – Broadcast

AFB – Air Force Base

AGL – Above Ground Level

AIP – Airport Improvement Program

ALP – Airport Layout Plan

ALRIS – Arizona Land Resource Information System

ALS – Approach Lighting System

ALSF-1 – Approach Lighting System with Sequenced Flashing Lights

AMSL – Above Mean Sea Level

AOEO – Arizona Office of Economic Opportunity

AOPA – Aircraft Owners and Pilots Association

APMS – Airport Pavement Management System

APPP – Arizona Pavement Preservation Program

APV – Approach Procedure with Vertical Guidance

ARC – Airport Reference Code

ARFF – Airport Rescue and Fire Fighting

ASK – Available Seat Kilometer

ASM – Airport System Manager

ASM – Available Seat Mile

ASOS – Automated Surface Observing System

ASV – Annual Service Volume

ATADS – Air Traffic Activity Data System

ATC – Air Traffic Control

ATCT – Air Traffic Control Tower

ATIS – Automated Terminal Information Service

ATP – Airline Transport Pilot

AvGas – Aviation Gasoline (100LL)

AWOS – Automated Weather Observing System

AzAA – Arizona Airports Association

BIA – Bureau of Indian Affairs

BLM – Bureau of Land Management

CAAG – Central Arizona Association of Governments

CAGR – Compound Annual Growth Rate

CBP – Customs and Border Patrol

CFR – Code of Federal Regulations

CIP – Capital Improvement Program

CMG – Cockpit to Main Gear Distance

DA – Decision Altitude

DHS – Department of Homeland Security

DME – Distance Measuring Equipment

DOD – Department of Defense

DOT – Department of Transportation

DW – Dual Wheel

EA – Environmental Assessment

EAS – Essential Air Service

EIS – Environmental Impact Statement

EMS – Emergency Medical Services

EPA – The United States Environmental Protection Agency

FAA – Federal Aviation Administration

FAF – Final Approach Fix

FAR – Federal Aviation Regulation

FBO – Fixed Base Operator

FL – Flight Level

FSL – Federal/State/Local Matching

FTZ – Foreign Trade Zone

FY – Fiscal Year

GA – General Aviation

GAMA – General Aviation Manufacturers Association

GAO – Government Accountability Office

GCN – Grand Canyon National Park Airport

GCN SFRA – Grand Canyon Special Flight Rules Area

GDP – Gross Domestic Product

GIS – Geographic Information Systems

GPS – Global Positioning System

GRP – Gross Regional Product

HIRL – High Intensity Runway Lights

HITL – High Intensity Taxiway Lights

IAP – Instrument Approach Procedure

IFR – Instrument Flight Rules

ILS – Instrument Landing System

LCC – Low–Cost Carrier

LIRL – Low Intensity Runway Lights

LITL – Low Intensity Taxiway Lights

LNAV – Lateral Navigation

LOC – Localizer

LPV – Localizer Performance with Vertical guidance

MALS – Medium Intensity Approach Lighting System

MALSF – Medium Intensity Approach Lighting System with Sequence Flashing Lights

MALSR – Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights

MASP – Metropolitan Airport System Plan

MDA – Minimum Descent Altitude

MGW – Main Gear Width

MIRL – Medium Intensity Runway Lights

MITL – Medium Intensity Taxiway Lights

MOA – Military Operations Area

MoGas – Motor Gasoline

MON – Minimum Operational Network

MP – Master Plan

MRO – Maintenance, Repair, and Overhaul

MRZ – Military Reuse Zone

MSA – Metropolitan Statistical Area

MSL – Mean Sea Level

MTR – Military Training Route

NAFTA – North American Free Trade Agreement

NAS – National Airspace System

NASAO – National Association of State Aviation Officials

NAVAID – Navigational Aid

NBAA – National Business Aircraft Association

NDB – Non–Directional Beacon

NEPA – National Environmental Policy Act

NextGen – Next Generation Air Transportation System

NM – Nautical Mile

NPE – Non–Primary Entitlement

NPI – Non–Precision Instrument Approach

NPIAS – National Plan of Integrated Airport Systems

NPS – National Park Service

NSTD – Non–Standard

OFA – Object Free Area

OFZ – Obstacle Free Zone

OPBA – Operations Per Based Aircraft

OPSNET – FAA Operational Network

P2P – Planning to Programming

PAC – Planning Advisory Committee

PAPI – Precision Approach Path Indicator

PCC – Portland Concrete Cement

PCI – Pavement Condition Index

PFC – Passenger Facility Charge

PIR – Precision Instrument Runway

PL – Public Law

PPRN – Pavement Priority Rating Number

R – Restricted

RASP – Regional Airport System Plan

RDC – Runway Design Code

REIL – Runway End Identifier Lights

RIM – Runway Incursion Mitigation

RNAV – Area Navigation

RNP – Required Navigation Performance

ROI – Return on Investment

RPK – Revenue Passenger Kilometer

RPM – Revenue Passenger Mile

RPZ – Runway Protection Zone

RSA – Runway Safety Area

RVT – Remote or Virtual Tower

S.B. – Senate Bill

SANS 2000 – Arizona State Aviation Needs Study 2000

SAO – Special Area of Operations

SASP – State Aviation System Plan

SBAS – Satellite Based Approach Systems

SEAT – Single–engine Air Tankers

SL – State/Local

SPS – Standard Positioning Service

SR – State Route

STAR – Standard Terminal Arrival Procedure

STB – State Transportation Board

SW – Single Wheel

SWPPP – Storm Water Pollution Prevention Plan

TACAN – Tactical Area Navigation

TAF – Terminal Area Forecast

TDG – Taxiway Design Group

TFMSC – Traffic Flow Management System Counts

TRACON – Terminal Radar Approach Control

TSA – Transportation Security Administration

UAS – Unmanned Aerial Systems

UCP – Unified Cargo Processing

ULCC – Ultra Low–Cost Carrier

UNICOM – Universal Integrated Communication

USBP – United States Border Patrol

USDOT – United States Department of Transportation

USFS – United States Forest Service

VASI – Visual Approach Slope Indicator

VFR – Visual Flight Rules

VGSI – Visual Glide Slope Indicator

VHF – Very High Frequency

VMC – Visual Meteorological Conditions

VNAV – Vertical Navigation

VOR – Very High Frequency Omni–Directional Range Navigation System

WAAS – Wide Area Augmentation System

WHA – Wildlife Hazard Assessment

WHMP – Wildlife Hazard Management Plan

DEFINITIONS

Advisory Circular (AC) – An AC is a series of FAA publications providing guidance and standards for the design, operation, and performance of aircraft and airport facilities.

Air Traffic Control (ATC) – ATC is 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 (NAVAIDs) to pilots.

Aircraft Approach Category (AAC) – ARC groups aircraft based on approach speed at the maximum certificated landing weight. The following categories describe the speed thresholds:

- 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

Airlines for America (A4A) – A4A is an association and lobby group based in Washington D.C., that advocates for member airlines to shape policy and improve air travel.

Airplane Design Group (ADG) – ADG groups aircraft by wingspan and tail height and is described as follows:

- Design Group I – Tail Height: less than 20’, Wingspan; less than 49’
- Design Group II – Tail Height: between 20’ and 30’, Wingspan; between 49’ and 79’
- Design Group III – Tail Height: between 30’ and 45’, Wingspan; between 79’ and 118’
- Design Group IV – Tail Height: between 45’ and 60’, Wingspan; between 118’ and 171’
- Design Group V – Tail Height: between 60’ and 66’, Wingspan; between 171’ and 214’
- Design Group VI – Tail Height: between 66’ and 80’, Wingspan; between 214’ and 262’

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 (AIP).

Airport Improvement Program (AIP) – AIP is 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) – ALPs are scaled drawings 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. An airport’s ALP requires approval by the FAA if the airport is recognized in the NPIAS.

Airport Pavement Management System (APMS) – A program developed by ADOT in 2003 which provides pavement evaluation, design services, construction administration and construction management at more than 60 airports statewide.

Airport Pavement Preservation Program (APPP) – Arizona's grant eligible airports receive visual inspections on pavement surfaces every three years. Pavements are assigned numbers on the Pavement Conditions Index (PCI).

Airport Reference Code (ARC) – ARC is FAA design criteria comprised of the aircraft approach category (AAC) and airplane design group (ADG). Together, the ARC of an airport and/or design aircraft requires a minimum of 500 annual operations per year at an airport.

American Association of Airport Executives (AAAE) – AAAE is a professional organization that represents airport executives and management personnel. Members are provided with services, support, training, and development opportunities.

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. An ALS usually serves a runway that has an instrument approach procedure (IAP) 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.

Arizona Department of Real Estate (ADRE) – ADRE is a department under the Arizona state government that regulates real estate, sale of subdivisions, unsubdivided lands, timeshares, condominiums, membership campgrounds, and cemeteries.

Arizona Department of Transportation (ADOT) – ADOT is the 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 (GCN).

Arizona Revised Statues (A.R.S) – A.R.S. is a 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 to encourage and advance the safe and orderly development of aviation in the state.

Automated Surface Observing System (ASOS) – 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 Weather Observing System (AWOS) – An AWOS 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 Mileage (ASM) – ASM is a measure of airline capacity, equal to the number of seats available multiplied by the number of miles flown.

Capital Improvement Program (CIP) – A CIP is a schedule of planned projects and costs for an airport typically prepared and adopted by the airport sponsor and other public agencies.

Distance Measuring Equipment (DME) – DME is a flight instrument that measures the line-of-sight distance of an aircraft from a navigational radio station in nautical miles.

Environmental Impact Statement (EIS) – An EIS is a document that provides a discussion of the significant environmental impacts which would occur because 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.

Federal Aviation Administration (FAA) – The FAA is a branch of the U.S. Department of Transportation responsible ensuring 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.

Fixed Base Operator (FBO) – An FBO can be 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. FBOs typically provide services such as hangar space, fuel, flight training, repair, and maintenance to general aviation airport users.

General Aviation (GA) – All civil aviation operations, other than scheduled air services and non-scheduled air transport operations for remunerations or hire, are considered general aviation. GA is 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.

Global Positioning System (GPS) – In the SASP Update document, GPS is defined as a satellite-based navigation system operated by Department of Defense that provides 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.

Instrument Flight Rules (IFR) – These are 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 feet). 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, an ILS consists 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 (RVR) 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 RVR of not less than 1200
- Cat III – Category III ILS approach procedure which provides for approaches to minima less than CAT II

Mean Sea Level (MSL) – Mean sea level is the average height of the surface of the sea for all stages of the tide over a 19-year period; MSL is used as a reference for elevations.

Metropolitan Airport System Plan (MASP) – MASP is a complimentary part of the Airport Systems Planning process that focuses specifically on strategic planning needs to address future concerns in a specific metropolitan area.

National Airspace System (NAS) – NAS is the common network of U.S. airspace, and 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) – NPIAS is an FAA program and 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 five-year estimate of AIP eligible development every two years. The NPIAS comprises all commercial service airports, all reliever airports, and selected general aviation airports.

Navigational Aid (NAVAID) – NAVAID is a term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.).

Non-Directional Beacon (NDB) – NDB is a radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine their 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.

Object Free Area (OFA) – An object free area is 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 in the OFA for air navigation or aircraft ground maneuvering purposes.

Pavement Condition Index (PCI) – PCI rates pavement condition and is a numerical index between 0 and 100 used to indicate the condition of a selected portion of pavement, with 100 representing excellent pavement.

Precision Approach Path Indicator (PAPI) – PAPIs provide visual approach slope guidance to aircraft during an approach. It is similar to a Visual Approach Slope Indicator (VASI) but provides a sharper transition between the colored indicator lights.

Project Advisory Committee (PAC) – The PAC is a committee comprised of stakeholders from across the state with a broad range of knowledge and experience in airports, aviation and other statewide issues impacting airport systems whose, function is to help guide the SASP Update.

Runway End Identifier Light (REIL) – REILs are two synchronized flashing lights (one on each side of the runway threshold) that identify the approach end of the runway.

Runway Incursion Mitigation (RIM) – RIM describes an FAA program designed identify, prioritize, and develop strategies, related to airfield geometry, for Airport sponsors to mitigate risk associated with runway incursions.

Runway Protection Zone (RPZ) – An RPZ is a protected area off the runway end to enhance the safety of people and property on the ground. The RPZ is a trapezoidal shape. Its dimensions are determined by the aircraft approach speed, runway approach type, and visibility minima.

Runway Safety Area (RSA) – An RSA is 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.

State Aviation System Plan (SASP) – A SASP is a guide to long-term aviation planning in the state, providing important insight into how the states airports can remain highly advanced, safe, and responsive to the public's needs.

State Transportation Board (STB) – 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 projects and has the exclusive authority to issue revenue bonds for financing needed transportation improvements throughout the state.

Terminal Area Forecast (TAF) – The TAF is 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, and non-towered airports.

Transportation Security Administration (TSA) – TSA is an agency within the U.S. Department of Homeland Security and is responsible for security of the nation's transportation systems.

Unmanned Aerial Systems (UAS) – UAS – also called drones – are unmanned aerial systems that are controlled by an operator on the ground rather than a human pilot.

Visual Approach Slope Indicator (VASI) – A VASI is 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) – VFR and procedures are 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) – VGSI is a 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 VGSIs are PAPIs and VASIs.

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APPENDIX B: ARIZONA AIRPORT REFERENCE TABLES

Table 1. Arizona Airports, Numerical/Alphabetical by FAA Airport Identifier

FAA ID	Associated City	Airport Name	FAA ID	Associated City	Airport Name
0V7	Kayenta	Kayenta	**IGM**	Kingman	Kingman
1G4	Peach Springs	Grand Canyon West	**INW**	Winslow	Winslow-Lindbergh Regional
44A	San Luis	Rolle Airfield	**IWA**	Phoenix	Phoenix-Mesa Gateway
A39	Maricopa	Ak-Chin Regional	**JTC**	Springerville	Springerville Municipal
AVQ	Marana	Marana Regional	**MZJ**	Marana	Pinal Airpark
AZC	Colorado City	Colorado City Municipal	**NYL**	Yuma	Yuma International
BXK	Buckeye	Buckeye Municipal	**OLS**	Nogales	Nogales
CFT	Clifton	Greenlee County	**P01**	Ajo	Eric Marcus Municipal
CGZ	Casa Grande	Casa Grande Municipal	**P03**	Douglas	Cochise College
CHD	Chandler	Chandler Municipal	**P04**	Bisbee	Bisbee Municipal
CMR	Williams	H.A. Clark Memorial Field	**P08**	Coolidge	Coolidge Municipal
DGL	Douglas	Douglas Municipal	**P10**	Polacca	Polacca
DUG	Douglas	Bisbee-Douglas International	**P13**	Globe	San Carlos Apache
DVT	Phoenix	Phoenix Deer Valley	**P14**	Holbrook	Holbrook Municipal
E24	Whiteriver	Whiteriver	**P20**	Parker	Avi Suquilla
E25	Wickenburg	Wickenburg Municipal	**P23**	Seligman	Seligman
E51	Bagdad	Bagdad	**P29**	Tombstone	Tombstone Municipal
E60	Eloy	Eloy Municipal	**P33**	Willcox	Cochise County
E63	Gila Bend	Gila Bend Municipal	**P52**	Cottonwood	Cottonwood Municipal
E67	Kearny	Kearny	**PAN**	Payson	Payson
E77	San Manuel	San Manuel	**PGA**	Page	Page Municipal
E78	Sells	Sells	**PHX**	Phoenix	Phoenix Sky Harbor International
E81	Superior	Superior	**PRC**	Prescott	Ernest A. Love Field
E91	Chinle	Chinle Municipal	**RQE**	Window Rock	Window Rock
E95	Benson	Benson Municipal	**RYN**	Tucson	Ryan Field
FFZ	Mesa	Falcon Field	**SAD**	Safford	Safford Regional
FHU	Sierra Vista	Sierra Vista Municipal Airport	**SDL**	Scottsdale	Scottsdale
FLG	Flagstaff	Flagstaff Airport	**SEZ**	Sedona	Sedona
GCN	Grand Canyon	Grand Canyon National Park	**SJN**	St. Johns	St. Johns Industrial Air Park
GEU	Glendale	Glendale Municipal	**SOW**	Show Low	Show Low Regional
GYR	Goodyear	Phoenix Goodyear	**T03**	Tuba City	Tuba City
HII	Lake Havasu City	Lake Havasu City	**TUS**	Tucson	Tucson International
IFP	Bullhead City	Laughlin/Bullhead City International	**TYL**	Taylor	Taylor
			Z95	Cibecue	Cibecue

Table 2. Arizona Airports, Alphabetical by Associated City

FAA ID	Associated City	Airport Name	FAA ID	Associated City	Airport Name
P01	Ajo	Eric Marcus Municipal	**OLS**	Nogales	Nogales
E51	Bagdad	Bagdad	**PGA**	Page	Page Municipal
E95	Benson	Benson Municipal	**P20**	Parker	Avi Suquilla
P04	Bisbee	Bisbee Municipal	**PAN**	Payson	Payson
BXK	Buckeye	Buckeye Municipal	**1G4**	Peach Springs	Grand Canyon West
IFP	Bullhead City	Laughlin/Bullhead City International	**DVT**	Phoenix	Phoenix Deer Valley
CGZ	Casa Grande	Casa Grande Municipal	**IWA**	Phoenix	Phoenix-Mesa Gateway
CHD	Chandler	Chandler Municipal	**PHX**	Phoenix	Phoenix Sky Harbor International
E91	Chinle	Chinle Municipal	**P10**	Polacca	Polacca
Z95	Cibecue	Cibecue	**PRC**	Prescott	Ernest A. Love Field
CFT	Clifton	Greenlee County	**SAD**	Safford	Safford Regional
AZC	Colorado City	Colorado City Municipal	**44A**	San Luis	Rolle Airfield
P08	Coolidge	Coolidge Municipal	**E77**	San Manuel	San Manuel
P52	Cottonwood	Cottonwood Municipal	**SDL**	Scottsdale	Scottsdale
DGL	Douglas	Douglas Municipal	**SEZ**	Sedona	Sedona
DUG	Douglas	Bisbee-Douglas International	**P23**	Seligman	Seligman
P03	Douglas	Cochise College	**E78**	Sells	Sells
E60	Eloy	Eloy Municipal	**SOW**	Show Low	Show Low Regional
FLG	Flagstaff	Flagstaff Airport	**FHU**	Sierra Vista	Sierra Vista Municipal Airport
E63	Gila Bend	Gila Bend Municipal	**JTC**	Springerville	Springerville Municipal
GEU	Glendale	Glendale Municipal	**SJN**	St. Johns	St. Johns Industrial Air Park
P13	Globe	San Carlos Apache	**E81**	Superior	Superior
GYR	Goodyear	Phoenix Goodyear	**TYL**	Taylor	Taylor
GCN	Grand Canyon	Grand Canyon National Park	**P29**	Tombstone	Tombstone Municipal
P14	Holbrook	Holbrook Municipal	**T03**	Tuba City	Tuba City
0V7	Kayenta	Kayenta	**RYN**	Tucson	Ryan Field
E67	Kearny	Kearny	**TUS**	Tucson	Tucson International
IGM	Kingman	Kingman	**E24**	Whiteriver	Whiteriver
HII	Lake Havasu City	Lake Havasu City	**E25**	Wickenburg	Wickenburg Municipal
AVQ	Marana	Marana Regional	**P33**	Willcox	Cochise County
MZJ	Marana	Pinal Airpark	**CMR**	Williams	H.A. Clark Memorial Field
A39	Maricopa	Ak-Chin Regional	**RQE**	Window Rock	Window Rock
FFZ	Mesa	Falcon Field	**INW**	Winslow	Winslow-Lindbergh Regional
			NYL	Yuma	Yuma International

Table 3. Arizona Airports, Alphabetical by Airport Name

FAA ID	Associated City	Airport Name	FAA ID	Associated City	Airport Name
A39	Maricopa	Ak-Chin Regional	**IFP**	Bullhead City	Laughlin/Bullhead City International
P20	Parker	Avi Suquilla	**AVQ**	Marana	Marana Regional
E51	Bagdad	Bagdad	**OLS**	Nogales	Nogales
E95	Benson	Benson Municipal	**PGA**	Page	Page Municipal
P04	Bisbee	Bisbee Municipal	**PAN**	Payson	Payson
DUG	Douglas	Bisbee-Douglas International	**DVT**	Phoenix	Phoenix Deer Valley
BXK	Buckeye	Buckeye Municipal	**GYR**	Goodyear	Phoenix Goodyear
CGZ	Casa Grande	Casa Grande Municipal	**PHX**	Phoenix	Phoenix Sky Harbor International
CHD	Chandler	Chandler Municipal	**IWA**	Phoenix	Phoenix-Mesa Gateway
E91	Chinle	Chinle Municipal	**MZJ**	Marana	Pinal Airpark
Z95	Cibecue	Cibecue	**P10**	Polacca	Polacca
P03	Douglas	Cochise College	**44A**	San Luis	Rolle Airfield
P33	Willcox	Cochise County	**RYN**	Tucson	Ryan Field
AZC	Colorado City	Colorado City Municipal	**SAD**	Safford	Safford Regional
P08	Coolidge	Coolidge Municipal	**P13**	Globe	San Carlos Apache
P52	Cottonwood	Cottonwood Municipal	**E77**	San Manuel	San Manuel
DGL	Douglas	Douglas Municipal	**SDL**	Scottsdale	Scottsdale
E60	Eloy	Eloy Municipal	**SEZ**	Sedona	Sedona
P01	Ajo	Eric Marcus Municipal	**P23**	Seligman	Seligman
PRC	Prescott	Ernest A. Love Field	**E78**	Sells	Sells
FFZ	Mesa	Falcon Field	**SOW**	Show Low	Show Low Regional
FLG	Flagstaff	Flagstaff Airport	**FHU**	Sierra Vista	Sierra Vista Municipal Airport
E63	Gila Bend	Gila Bend Municipal	**JTC**	Springerville	Springerville Municipal
GEU	Glendale	Glendale Municipal	**SJN**	St. Johns	St. Johns Industrial Air Park
GCN	Grand Canyon	Grand Canyon National Park	**E81**	Superior	Superior
1G4	Peach Springs	Grand Canyon West	**TYL**	Taylor	Taylor
CFT	Clifton	Greenlee County	**P29**	Tombstone	Tombstone Municipal
CMR	Williams	H.A. Clark Memorial Field	**T03**	Tuba City	Tuba City
P14	Holbrook	Holbrook Municipal	**TUS**	Tucson	Tucson International
0V7	Kayenta	Kayenta	**E24**	Whiteriver	Whiteriver
E67	Kearny	Kearny	**E25**	Wickenburg	Wickenburg Municipal
IGM	Kingman	Kingman	**RQE**	Window Rock	Window Rock
HII	Lake Havasu City	Lake Havasu City	**INW**	Winslow	Winslow-Lindbergh Regional
			NYL	Yuma	Yuma International

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APPENDIX C: NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS ANALYSIS

INTRODUCTION

The Federal Aviation Administration (FAA) manages the National Plan of Integrated Airport Systems (NPIAS). Airports included in the NPIAS are eligible for federal funding under the FAA's Airport Improvement Program (AIP) as they are considered vital to the national system. There are numerous criteria for entry into the NPIAS detailed in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems.* Of the nearly 20,000 landing facilities in the United States, only 3,340 were included in the 2017-2021 NPIAS, including 59 in Arizona. It is important to note that the NPIAS is updated every two years, with the next publication scheduled for Fiscal Year 2019, which is due to Congress on September 30, 2018.

The NPIAS divides airports into two categories: primary and non-primary. Primary airports are those that have at least 10,000 enplanements (passenger boardings) in a calendar year. All primary airports are also designated as commercial service. Within the primary category, airports are further grouped into nonhub, small hub, medium hub, and large hub subcategories based on the number of annual passenger boardings (enplanements). Non-primary airports are those airports that do not have at least 10,000 annual enplanements. Non-primary airports are further divided into non-primary commercial service, reliever, and general aviation (GA) subcategories.

AIRPORTS IN ARIZONA

In the FAA's most recent NPIAS, 59 Arizona airports were included, consisting of the following:

1. 9 Primary
   - 1 Large Hub Commercial Service
   - 2 Small Hub Commercial Service
   - 6 Nonhub Commercial Service

2. 50 Non-primary
   - 1 Commercial Service
   - 8 Reliever
   - 41 General Aviation

Tables 1 and **2** in **Chapter 5** provide more detail on Arizona's NPIAS airports. There are eight State Aviation System Plan (SASP) airports not included in the 2017-2021 NPIAS. Information on these eight airports is provided in **Table 1**.

Table 1. Current Arizona Airports Not Included in the NPIAS

Associated City	Airport Name	FAA Identifier	Use	Ownership	Based Aircraft 2016	Based Aircraft 2021 Forecast	Annual Operations
Douglas	Cochise College	P03	Public	Public	15	16	47,050
Douglas	Douglas Municipal	DGL	Public	Public	12	33	3,300
Kearny	Kearny	E67	Public	Public	6	7	1,200
San Luis	Rolle Airfield	44A	Public	Public	0	0	3,100
Seligman	Seligman	P23	Public	Public	0	2	1,100
Sells	Sells	E78	Public	Public	0	0	260
Superior	Superior Municipal	E81	Public	Public	0	0	200
Tombstone	Tombstone Municipal	P29	Public	Public	4	4	340

Sources: FAA Airport Master Records, Airport Inventory and Data Survey 2017, FAA ATADS, Woolpert 2017

NPIAS ELIGIBILITY CRITERIA

To be included in the NPIAS, a GA airport must:

1. Have at least 10 based aircraft.
2. Serve a community located at least 30 minutes average ground travel time (a 20-mile radius is generally used as the equivalent of 30 minutes ground travel time) from the nearest existing or proposed NPIAS airport.

For airports not meeting the two above-listed criteria, an airport may be considered for inclusion in the NPIAS if:

1. It is included in an accepted state or metropolitan aviation system plan.
2. The community which it serves is at least 30 minutes from the nearest existing or proposed NPIAS airport.
3. It is forecast to have at least 10 based aircraft within five years.
4. There airport has a sponsor who is eligible and willing to assume the responsibilities of airport. ownership and development.

For a proposed new airport, it may be included in the NPIAS if:

1. It is located at least 30 minutes average ground travel time from the nearest existing NPIAS facility.
2. There is evidence that the new facility will have at least 10 based aircraft in its first year.

2008 SASP NPIAS ANALYSIS

For reference, the 2008 SASP's NPIAS analysis was reviewed to determine changes that took place since that plan. It is important to note that at the time, the FAA's ASSET classifications did not exist. In 2008, three airports were examined for potential NPIAS inclusion: Rolle Airfield, Superior Airport, and a proposed new Maricopa Airport.

At the time of this 2018 study, neither Rolle Airfield nor Superior Airport have demonstrated demand levels that would warrant consideration for their inclusion in the NPIAS. Both facilities should continue to be monitored in the future to identify future increases in demand levels that might warrant inclusion in the NPIAS.

Since 2008, a new facility in Maricopa has become part of the public-use system: Ak-Chin Regional Airport (A39), a general aviation facility that reported 30 based aircraft and 18,320 aircraft operations in 2016. Ak-Chin Regional opened in 1999 as a privately-owned airport and was purchased by the Ak-Chin Indian Community in 2006, making it a publicly owned, public-use facility. Ak-Chin Regional was first included in the 2015-2019 NPIAS and was not considered or analyzed in the last SASP.

A Reliever airport is as an airport that serves to relieve a nearby commercial service airport of general aviation traffic and to provide a higher level of general aviation access to a community. According to FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems (NPIAS),* for an airport to be considered for upgrade to Reliever classification in the NPIAS, the airport must:

1. Currently have at least 100 based aircraft or 25,000 annual itinerant operations.
2. Forecasted activity level of at least 100 based aircraft or 25,000 annual itinerant operations for the duration of the time for which it seeks status as a reliever.
3. The relieved airport must:

   - Be a commercial service airport.
   - Serve a metropolitan area with a population of at least 250,000 people or have at least 250,000 annual enplanements.
   - Operate at 60 percent or greater of its capacity, be forecasted to operate at 60 percent or greater of its capacity before being relieved, or have restrictions that limit activity that would otherwise reach 60 percent of capacity.

Ak-Chin Regional should continue to be monitored for future potential upgrade to a Reliever facility. Being designated as a Reliever would open up additional FAA funding programs that could be leveraged to further the development of Ak-Chin Regional.

ARIZONA AIRPORTS TO BE CONSIDERED FOR INCLUSION IN THE NPIAS

Based on NPIAS based aircraft eligibility criteria, two of the eight publicly owned non-NPIAS airports appear to be candidates for inclusion in the NPIAS: Cochise College and Douglas Municipal, both in Douglas. However, neither Cochise College nor Douglas Municipal meet the requirements for distance from another NPIAS airport. Cochise College is approximately 11 miles from Bisbee Municipal while Douglas Municipal is approximately nine miles from Bisbee-Douglas International. There has been significant discussion over the years regarding the number of airports in Cochise County compared to the level of aviation demand. There has also been discussion regarding Bisbee Municipal and the City of Bisbee's potential interest in no longer accepting federal funds as the airport sponsor has struggled to meet funding needs as well as make the necessary improvements at Bisbee Municipal. Cochise College has an aviation program and recently completed an airport master plan, and the airport sponsor does make some investment in the facility. Douglas Municipal has also recently completed an airport master plan and is interested in making improvements, however, funding from the airport sponsor is currently limited and the runway is in significant need of a major rehabilitation with a pavement condition index of 27 as of 2017.

Based on the number of airports in Cochise County and the high level of funding needs, a more detailed analysis and coordination effort is needed to bring together the sponsors of all of the airports in the county, with a facilitated discussion regarding future needs, opportunities, and consideration of potential consolidation to better support aviation demand in the region.

ARIZONA AIRPORTS AT RISK OF NPIAS RECLASSIFICATION

Based on NPIAS inclusion criteria and an assessment of airport inventory data and forecasts from previous chapters in the SASP, there are potentially 16 Arizona airports that are at risk related to their classification in the 2019-2021 NPIAS. **Table** 2 provides details on these airports. If any or all of these airports were to lose NPIAS status, federal funding could be at jeopardy as being in the NPIAS is a requirement to be eligible to receive FAA funding. That would place a greater financial burden on ADOT's State Aviation Program which provides grant funding for all publicly owned airports in the state. For airports that receive FAA funding, these airports are eligible for up to $150,000 in grants per year from the FAA as part of a non-primary entitlement (NPE) program and ADOT provides only a match for these funds, the same as the airport sponsor. If these airports are no longer eligible for FAA funding, they would look to ADOT to assist with project grant funding which would increase the funding requests to ADOT greatly. If ADOT were unable to provide grant funding, the communities that these facilities serve would be at risk of decreased aviation services since a major funding source would no longer be available, thus impacting each airport's ability to initiate preservation and development projects. The source of the current based aircraft reflects the airport-specific responses to the 2017 Airport Inventory and Data Survey conducted through this SASP Update. The 2017-2021 development estimate is provided by the FAA in each NPIAS report, in this case the 2017-2021 NPIAS.

Table 2. Arizona Airports at Risk Related to 2019 NPIAS Status

Associated City	Airport Name	FAA Identifier	Use	Ownership	Role	NPIAS Category		Based Aircraft		2017-2021 Development Estimate
						Current	5 Year	Current	2021 Forecast	
Ajo	Eric Marcus Municipal	P01	Public	Public	Basic	GA	GA	0	4	$1,715,813
Bagdad	Bagdad	E51	Public	Public	Basic	GA	GA	0	4	$2,064,573
Bisbee	Bisbee Municipal	P04	Public	Public	Unclass.	GA	GA	0	8	$0
Chinle	Chinle Municipal	E91	Public	Public	Basic	GA	GA	0	3	$869,433
Cibecue	Cibecue	Z95	Public	Public	Basic	GA	GA	0	0	$2,848,429
Clifton/Morenci	Greenlee County	CFT	Public	Public	Unclass.	GA	GA	0	1	$0
Douglas Bisbee	Bisbee Douglas International	DUG	Public	Public	Basic	GA	GA	0	5	$2,424,649
Gila Bend	Gila Bend Municipal	E63	Public	Public	Basic	GA	GA	0	4	$692,521
Kayenta	Kayenta	0V7	Public	Public	Basic	GA	GA	60	0	$2,933,451
Marana	Pinal Airpark	MZJ	Public	Public	Unclass.	GA	GA	0	5	$0
Polacca	Polacca	P10	Public	Public	Basic	GA	GA	0	0	$4,928,134
San Manuel	San Manuel	E77	Public	Private	Unclass.	GA	GA	0	19	$0
Tuba City	Tuba City	T03	Public	Public	Basic	GA	GA	0	0	$2,772,024
Whiteriver	Whiteriver	E24	Public	Public	Basic	GA	GA	0	0	$2,722,923
Williams	H A Clark Memorial Field	CMR	Public	Public	Basic	GA	GA	0	3	$1,756,585
Window Rock	Window Rock	RQE	Public	Public	Basic	GA	GA	0	0	$7,296,046

Sources: FAA Airport Master Records, NPIAS, Airport Inventory and Data Survey 2017, FAA ATADS, Woolpert 2017

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As the above-referenced airports do not currently meet NPIAS criteria, it is possible that some or all of them may be recategorized as “Unclassified” in the next iteration of the NPIAS, due to be released in the fall of 2018. Any airport that is designated as “Unclassified” is ineligible for funding through the FAA’s non-primary entitlement funding program. In fact, FAA Order 5100.38D, *Airport Improvement Program (AIP) Handbook,* specifically notes that the only projects for which “Unclassified” airports are eligible include primary runway rehabilitation projects (not more often than once every ten years), one-time obstruction removal for each primary runway end, and runway maintenance projects covered under 49 USC § 47102(3)(H) (additional projects may be considered by the FAA when extraordinary justification is provided and when the FAA concurs with that justification). Additionally, there has been discussion of removing “Unclassified” GA airports from the NPIAS. A 2015 FAA report, *Evaluating the Formulation of the National Plan of Integrated Systems (NPIAS),* specifically mentions that these facilities remain unclassified “because they do not meet the minimum NPIAS criteria.”

APPENDIX D: ARIZONA DEMOGRAPHICS

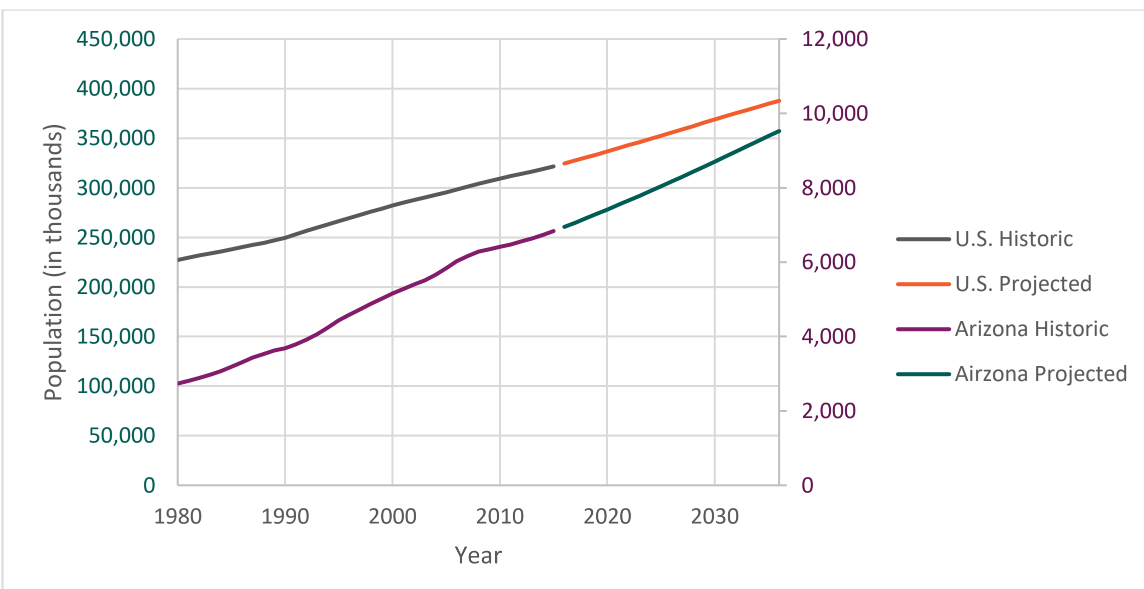
HISTORICAL AND PROJECTED DEMOGRAPHICS IN ARIZONA

Looking at the socioeconomic trends of a region can add context and understanding of the state's and its regions' aviation characteristics. Population growth and economic vitality are often positively correlated with aviation activity, both commercial service and general aviation (GA). As such, examining the prevailing social and economic trends of an area may provide insight on the aviation activity levels that can reasonably be expected.

This section examines current and future demographic trends across Arizona, including social and economic indicators. The majority of data used for this socioeconomic discussion has been gathered from the most recent edition of Woods & Poole Economics, Inc. (Woods & Poole) data. All other data sources are referenced. It is important to note that: 1) all monetary amounts have been standardized to 2009 dollars to account for inflation, and thereby more accurately compare the value of money across years, and 2) Woods & Poole elected to combine La Paz and Yuma counties into one entity; as such, there are 14 counties listed in the county discussion, instead of the 15 that comprise Arizona.

Population Trends

Figure 1 shows the historic and projected population of Arizona and the U.S. Between 1980 and 2016, Arizona's population increased in an almost linear fashion and is expected to continue through the planning horizon. Arizona's population is expected to reach 9,525,154 people by 2036, a total increase of 37 percent between 2016 and 2036. This growth is nearly double the national population growth rate expected of 20 percent.



Sources: 2017 State Profile, Arizona, Woods & Poole 2017

Figure 1. Arizona and U.S. Population Over Time

This notable population growth can largely be attributed to an influx of residents seeking a retirement location and international immigrants looking for employment opportunities and a relatively low cost of living (Gonzalez 2011) (Fischer 2014).

Table 1 presents the population trends for each of Arizona's counties. With over four million people in 2016, Maricopa County—the seat of the state's capital—has the largest population of any of the counties. Maricopa County is projected to have steady population growth between 1.7 percent and 1.8 percent annually through 2036. Pinal County is projected to experience the greatest amount of growth during all three forecasting periods (2021, 2026, and 2036), with compound annual growth rates hovering above two percent. Pinal County is poised for considerable population growth resulting from the recent economic diversification in the service, manufacturing, and trade industries, geographic location between Arizona's two most populous counties (Maricopa and Pima), and home of a new $700 million electric car manufacturing plant (Pinal County n.d.) (Hendrickson 2016).

Through all three forecast periods, 12 out of the 14 counties are projected to have an equal or higher growth rate than the U.S. average. Graham and Greenlee counties, however, lag behind in all three forecasting periods. Graham County largely comprises federal land and Greenlee County is currently the smallest county by population in Arizona. While the county is largely rural, operational changes at Freeport-McMoRan's Morenci Mine has the potential to rapidly shift population trends with changes in global copper prices (Interior 2016).

Table 1. Population (in Thousands)

County	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	52	73	77	80	88	1.0%	1.0%	1.0%	0.9%
Cochise	86	130	138	146	161	1.2%	1.1%	1.1%	1.1%
Coconino	75	142	153	164	188	1.8%	1.5%	1.5%	1.4%
Gila	37	54	57	59	64	1.0%	0.9%	0.9%	0.9%
Graham	23	39	40	42	45	1.5%	0.8%	0.8%	0.8%
Greenlee	11	9	10	10	11	-0.5%	0.8%	0.8%	0.7%
Maricopa	1,522	4,231	4,620	5,041	5,952	2.9%	1.8%	1.8%	1.7%
Mohave	56	209	222	237	267	3.7%	1.3%	1.3%	1.2%
Navajo	67	110	116	122	133	1.4%	1.0%	1.0%	0.9%
Pima	536	1,029	1,095	1,165	1,307	1.8%	1.3%	1.2%	1.2%
Pinal	91	419	467	519	637	4.3%	2.2%	2.2%	2.1%
Santa Cruz	21	48	52	56	65	2.4%	1.6%	1.6%	1.5%
Yavapai	69	226	245	265	307	3.4%	1.6%	1.6%	1.6%
Yuma & La Paz	89	230	246	263	299	2.7%	1.4%	1.4%	1.3%
Arizona	**2,736**	**6,949**	**7,537**	**8,169**	**9,525**	**2.6%**	**1.6%**	**1.6%**	**1.6%**
United States	**227,226**	**324,507**	**339,812**	**355,802**	**387,690**	**1.0%**	**0.9%**	**0.9%**	**0.9%**

Sources: 2017 State Profile, Arizona, Woods & Poole 2017

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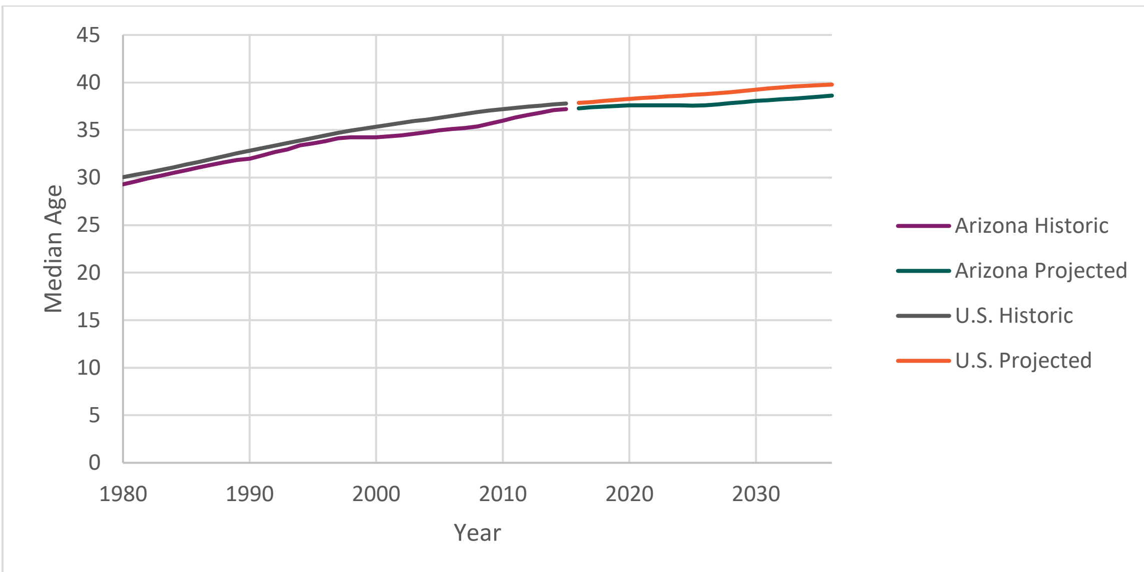
Age Trends

Figure 2 shows national and state historic and projected median ages. Arizona's median age is projected to continue rising through the planning horizon, generally mirroring the national rise in median age. By 2036, Arizona's median age is projected to be 1.34 years older than the state's median age of 37.28 in 2016. To obtain this growth, the median age must increase with a compound annual growth rate of 0.18 percent. This contrasts with the 0.67 percent growth rate for the 1980 through 2016 time period. Though the rate of increase in median age is projected to slow down, the median age is still increasing, signaling an aging population nationally and within Arizona. An inflow of retirees to Arizona also contributes to the increase (Martin 2017).



Source: Woods & Poole 2017

Figure 2. U.S. and Arizona Historic and Projected Median Age

At the county level, Yavapai and Mohave counties have the highest current and projected median ages in Arizona, with ages of 53 and 51, respectively for 2016 and 2036 (**Table 2**). Coconino County, with the lowest current median age (31), has the most aggressive increase in age, with an average growth rate of 1.1 percent from 2016 to 2036, yielding a projected 2036 median age of 39. This growth rate is equivalent to a 0.34 annual increase in the median age over the 20-year forecast horizon. Gila County has a projected reduction in the median age for the last two forecast periods, yielding a 2036 median age of 46 down from 50 in 2016.

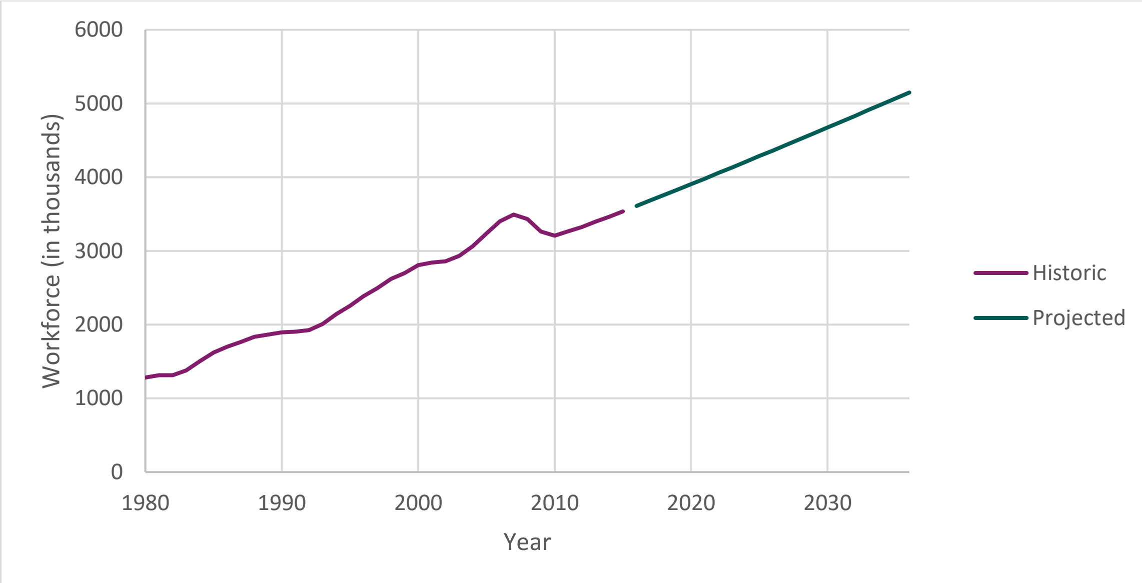
Table 2. Median Age by County

County	Historic Year 1980	Base Year 2016	Projected Years 2021	2026	2036	Compound Annual Growth Rate 1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	21	34	35	36	38	1.4%	0.5%	0.6%	0.5%
Cochise	29	41	41	42	43	1.0%	0.1%	0.2%	0.3%
Coconino	23	31	32	34	39	0.8%	0.2%	0.9%	1.1%
Gila	31	50	50	48	46	1.3%	0.0%	-0.3%	-0.4%
Graham	26	33	34	35	37	0.6%	0.6%	0.8%	0.6%
Greenlee	26	34	35	36	37	0.8%	0.6%	0.5%	0.4%
Maricopa	30	36	36	36	37	0.5%	0.1%	0.1%	0.1%
Mohave	37	51	52	52	51	0.9%	0.4%	0.2%	0.1%
Navajo	23	37	38	39	41	1.3%	0.6%	0.5%	0.6%
Pima	30	38	38	38	40	0.7%	0.0%	0.0%	0.3%
Pinal	28	39	40	40	40	0.9%	0.7%	0.4%	0.2%
Santa Cruz	27	37	37	37	38	0.8%	0.1%	0.0%	0.2%
Yavapai	39	53	54	55	53	0.8%	0.5%	0.4%	0.0%
Yuma & La Paz	28	36	36	37	39	0.7%	0.3%	0.3%	0.5%

Source: Woods & Poole 2017

Employment Trends

Figure 3 shows the historical and projected workforce in Arizona. From 1980 to 2008, the workforce population steadily increased. However, the Great Recession of 2007-2009 caused the employment number to fall 4.8 percent from 3.4 million people in 2008 to 3.2 million people in 2011. By 2014, the workforce returned to its pre-Recession, 2008 value. By 2036, the workforce is expected to exceed five million people, which is over 50 percent of the total population projected during that same year. This is an indication of a growing economy that requires increasingly more workers.



Source: Woods & Poole 2017

Figure 3. Arizona's Workforce Over Time

Table 3 shows Arizona's workforce by sector. The finance, educational services, and healthcare sectors are anticipated to have a considerable amount of growth, with average growth rates ranging from 2.2 to 3.9 percent over the three forecast horizons. These sectors will expand to support Arizona's growing population, with healthcare specifically catering to the aging population. After peaking between 2016 and 2021, manufacturing is projected to have a 0.3 percent annual growth rate during the 2016 through 2036 time period in line with its historical growth rate of 0.3 percent.

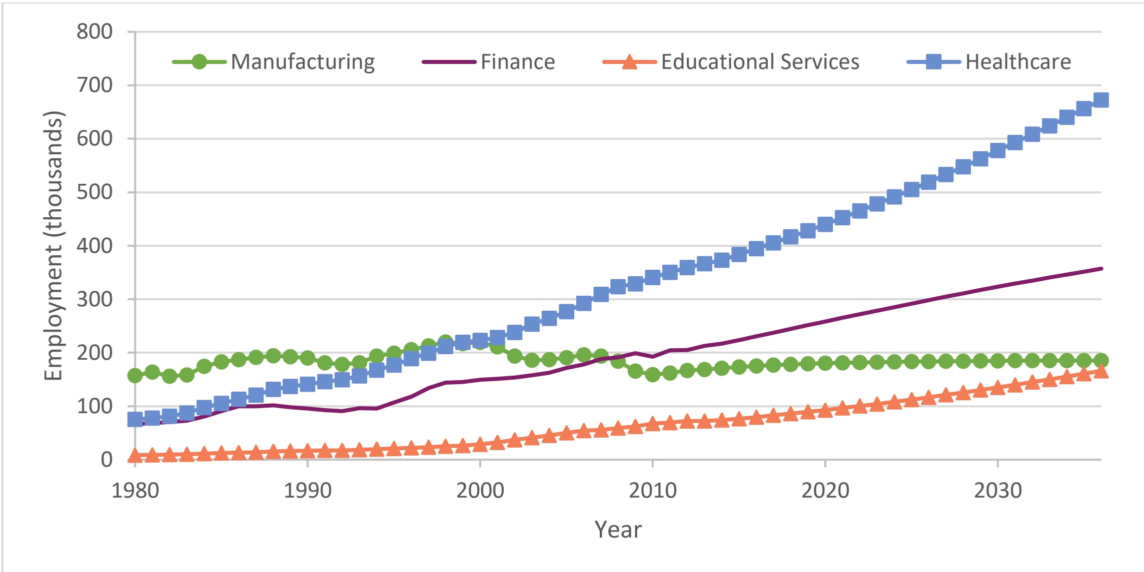
Table 3. Arizona's Employment by Sector (in Thousands)

	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
Industries	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Accommodation & Food Services	81	275	299	325	367	3.4%	1.7%	1.7%	1.5%
Administrative & Waste	72	294	319	346	399	4.0%	1.6%	1.6%	1.5%
Arts, Entertainment & Recreation	19	78	85	94	113	4.0%	1.9%	2.0%	1.9%
Business Management	6	37	41	45	54	4.9%	2.2%	2.1%	2.0%
Construction	95	189	212	233	262	1.9%	2.4%	2.1%	1.6%
Educational Services	9	80	97	117	166	6.4%	3.9%	3.9%	3.7%
Farm	21	32	33	34	36	1.1%	0.8%	0.8%	0.7%

Industries	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Federal Civilian Government	38	56	61	65	75	1.1%	1.5%	1.5%	1.5%
Federal Military	34	33	33	33	33	-0.1%	0.1%	0.1%	0.1%
Finance & Insurance	67	231	265	298	357	3.5%	2.8%	2.6%	2.2%
Forestry, Fishing & Related	7	16	17	19	21	2.5%	1.5%	1.5%	1.5%
Healthcare & Social Assistance	75	394	452	519	672	4.7%	2.8%	2.8%	2.7%
Information	22	56	57	59	63	2.6%	0.7%	0.7%	0.6%
Manufacturing	157	175	181	184	186	0.3%	0.7%	0.5%	0.3%
Mining	16	23	24	25	28	0.9%	1.0%	1.0%	1.0%
Other Services (Except Public Administration)	46	190	209	230	278	4.0%	1.9%	1.9%	1.9%
Professional & Technical Services	49	224	244	266	316	4.3%	1.7%	1.7%	1.7%
Real Estate, Rental & Lease	61	231	259	290	358	3.8%	2.3%	2.3%	2.2%
Retail Trade	155	400	447	493	598	2.7%	2.2%	2.1%	2.0%
State & Local Government	166	371	405	436	489	2.3%	1.7%	1.6%	1.4%
Transportation & Warehousing	37	102	108	116	133	2.9%	1.2%	1.3%	1.3%
Utilities	5	13	14	14	16	2.6%	1.2%	1.2%	1.1%
Wholesale Trade	44	111	117	121	129	2.6%	1.0%	0.9%	0.7%

Source: Woods & Poole 2017

Figure 4 shows the graphical trends of the above-mentioned sectors. Of the four sectors (finance, education, healthcare, and manufacturing), only the manufacturing and finance sectors experienced reductions in the workforce during the Great Recession. However, by 2011, the finance sector had more people in its workforce than 2009. The Great Recession's effect on the manufacturing industry spanned 2007 to 2010. In this time period, the manufacturing workforce lost 15.5 percent of its employees. Within the planning horizon, manufacturing is not projected to attain pre-Recession numbers again. Despite this, manufacturing is still an important part of Arizona's economy. Specifically, the high-tech manufacturing industry has a number of investments from companies like Intel (ADOT 2016).



Source: Woods & Poole 2017

Figure 4. Arizona Employment by Select Sectors

Though mining does not have one of the fastest growth rates, it is significant in Arizona's economy. As of 2014, the last year for Arizona Mining Association's data, mining accounted for over 40,000 of Arizona's 3.4 million jobs. Additionally, Arizona yielded 66 percent of the U.S.' copper mining output, making it the prime producer in the country (Arizona Mining Association 2014). Another notable industry is the aerospace and defense sector, which is not specifically categorized by Woods & Poole. According to Arizona Commerce Authority, the aerospace and defense sector provides 470,000 jobs as well as $38 billion to the economy (Arizona Commerce Authority n.d.).

Table 4 shows the top five industries in each of the counties, as well as the system airports associated with these counties. As shown, Arizona is a diversified state, with 17 industries represented within its borders. For nine of the 14 county groupings, the state and local government has the largest percentage of employees.

Retail trade is the sector that has the second highest number of employees for the counties. The healthcare sector and accommodation and food sector have the third and fourth highest number of employees, respectively. The retail and accommodation sectors tie in with the tourism aspect of Arizona's economy which is discussed in more detail starting on page D-D-15.

Apache, Graham, and Navajo are the only counties that have farming as one of the top five sectors. The sparser population of these counties allows for widespread agricultural activities that would not be feasible in more metropolitan counties, like Maricopa County.

Pinal County is the only county with "other services" listed as one of the top five sectors. According to Woods & Poole, these other services include "equipment and machinery repairing." The large percentage of "other services" may come from the mining and industrial operations present in Pinal County (Arizona Depatment of Commerce n.d.).

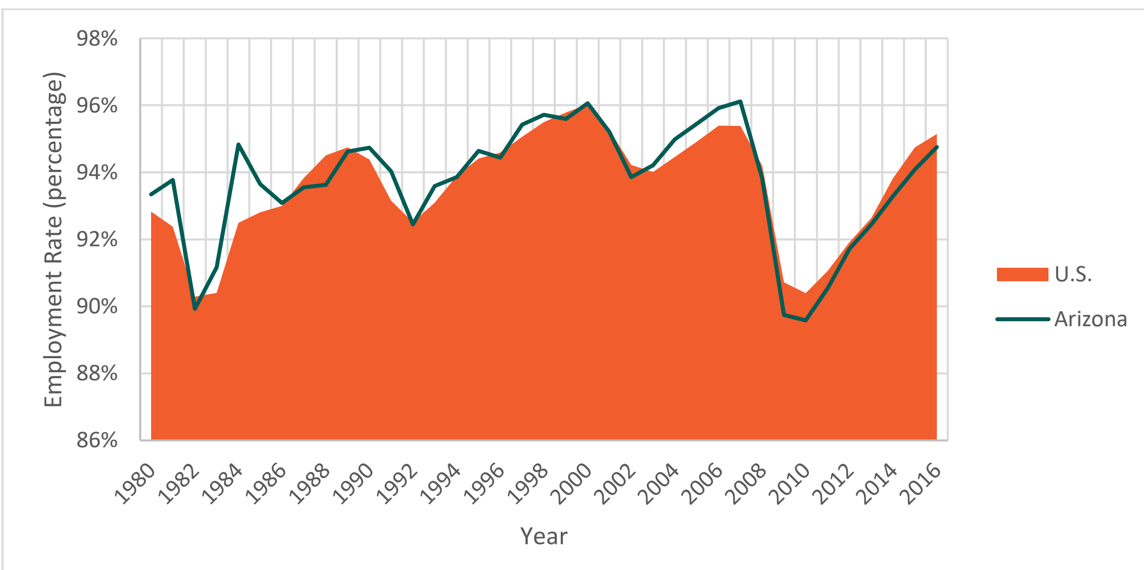
Table 4. Top Five Employment Sectors by County with Associated Airports

County	Top Industries and Airports by County				
	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
Apache	State & Local Government	Farm	Healthcare & Social Assistance	Federal Civilian Government	Retail Trade
	26%	18%	10%	8%	6%
	Airports: Chinle Municipal; Springerville Municipal; St. Johns Industrial Air Park; Window Rock				
Cochise	State & Local Government	Retail Trade	Federal Civilian Government	Federal Military	Healthcare & Social Assistance
	12%	12%	10%	8%	8%
	Airports: Benson Municipal; Bisbee Municipal; Bisbee-Douglas International; Cochise College; Douglas Municipal; Sierra Vista Municipal-Libby Army Airfield; Tombstone Municipal; Cochise County				
Coconino	State & Local Government	Accommodation & Food Services	Healthcare & Social Assistance	Retail Trade	Manufacturing
	19%	14%	12%	11%	6%
	Airports: Flagstaff Pulliam; Grand Canyon National Park; Marble Canyon; Page Municipal; Grand Canyon Caverns; Hualapai; Tuba City; H.A. Clark Memorial Field				
Gila	State & Local Government	Retail Trade	Healthcare & Social Assistance	Accommodation & Food Services	Manufacturing
	22%	11%	10%	8%	7%
	Airports: San Carlos Apache; Payson				
Graham	State & Local Government	Retail Trade	Healthcare & Social Assistance	Professional & Technical Services	Farm
	19%	14%	11%	9%	6%
	Airports: Safford Regional				
Greenlee	Construction	Mining	Accommodation & Food Services	State & Local Government	Healthcare & Social Assistance
	23%	21%	17%	8%	5%
	Airports: Greenlee County				
Maricopa	Retail Trade	Healthcare & Social Assistance	Administrative & Waste	State & Local Government	Finance & Insurance
	11%	11%	9%	8%	7%
	Airports: Eagle Roost Airpark; Buckeye Municipal; Sky Ranch at Carefree; Chandler Municipal; Gila Bend Municipal; Glendale Municipal; Phoenix Goodyear; Falcon Field; Pleasant Valley; Phoenix Deer Valley; Phoenix Sky Harbor International; Phoenix-Mesa Gateway; Scottsdale; Wickenburg Municipal				
Mohave	Retail Trade	Healthcare & Social Assistance	State & Local Government	Accommodation & Food Services	Real Estate, Rental & Lease
	16%	13%	12%	9%	7%
	Airports: Eagle Airpark; Laughlin/Bullhead City Int'l; Sun Valley; Colorado City Municipal; Kingman; Lake Havasu City; Pearce Ferry Airport; Grand Canyon West; Temple Bar; Grand Canyon Bar 10				
Navajo	State & Local Government	Retail Trade	Farm	Healthcare & Social Assistance	Accommodation & Food Services
	19%	11%	10%	10%	8%
	Airports: Cibecue; Holbrook Municipal; Kayenta; Polacca; Show Low Regional; Taylor; Whiteriver; Winslow-Lindbergh Regional				
Pima	State & Local Government	Healthcare & Social Assistance	Retail Trade	Accommodation & Food Services	Administrative & Waste
	14%	13%	11%	8%	8%
	Airports: Eric Marcus Municipal; Marana Regional; Sells; La Cholla Airpark; Ryan Field; Tucson International				

County	Top Industries and Airports by County				
	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5
Pinal	State & Local Government	Retail Trade	Administrative & Waste	Healthcare & Social Assistance	Other Services (Except Public Administration)
	21%	10%	9%	7%	7%
	Airports: Casa Grande Municipal; Coolidge Municipal; Eloy Municipal; Kearny; Pinal Airpark; Ak-Chin Regional; Estrella Sailport; San Manuel; Superior				
Santa Cruz	Retail Trade	State & Local Government	Wholesale Trade	Transportation & Warehousing	Federal Civilian Government
	15%	11%	10%	10%	9%
	Airports: Nogales				
Yavapai	Retail Trade	Healthcare & Social Assistance	State & Local Government	Accommodation & Food Services	Real Estate, Rental & Lease
	13%	12%	11%	9%	7%
	Airports: Bagdad; Cottonwood Municipal; Ernest A. Love Field; Rimrock; Sedona; Seligman				
Yuma & La Paz	State & Local Government	Retail Trade	Forestry, Fishing & Related	Healthcare & Social Assistance	Administrative & Waste
	14%	11%	11%	9%	7%
	Airports: Rolle Airfield; Yuma International; Avi Suquilla				

Source: Woods & Poole 2017

Figure 5 depicts the historical employment rates of Arizona and the U.S. Between 1980 and 2016, Arizona's employment rates generally mirrored the negative or positive trend of the national rate, though at times dipping below or rising above it. During the Great Recession, Arizona's employment rate dipped to 90 percent, one percent below the national average. After the Recession, Arizona's employment rate trended upwards, but continued to lag behind the national employment average.



Source: BLS, Series ID LASST040000000000003 for Arizona, Series ID LNS14000000 for U.S.

Figure 5. U.S. and Arizona Employment Rate Over Time

With projected growth rates of 1.3, 1.2, and 1.1 percent over the three planning periods, Graham County is projected to have the slowest increase in employment in Arizona (**Table 5**). This relates to the sparse population of the county, as well as its lack of economic diversification.

Pinal County is projected to have the greatest amount of growth, followed by Maricopa County. The projected employment growth of these counties can be attributed to the previously-discussed population trends. Maricopa County is home to Phoenix, which, as the largest metropolitan area in Arizona, is ever-expanding, and requires a workforce to support this growing population (United States Census Bureau 2017).

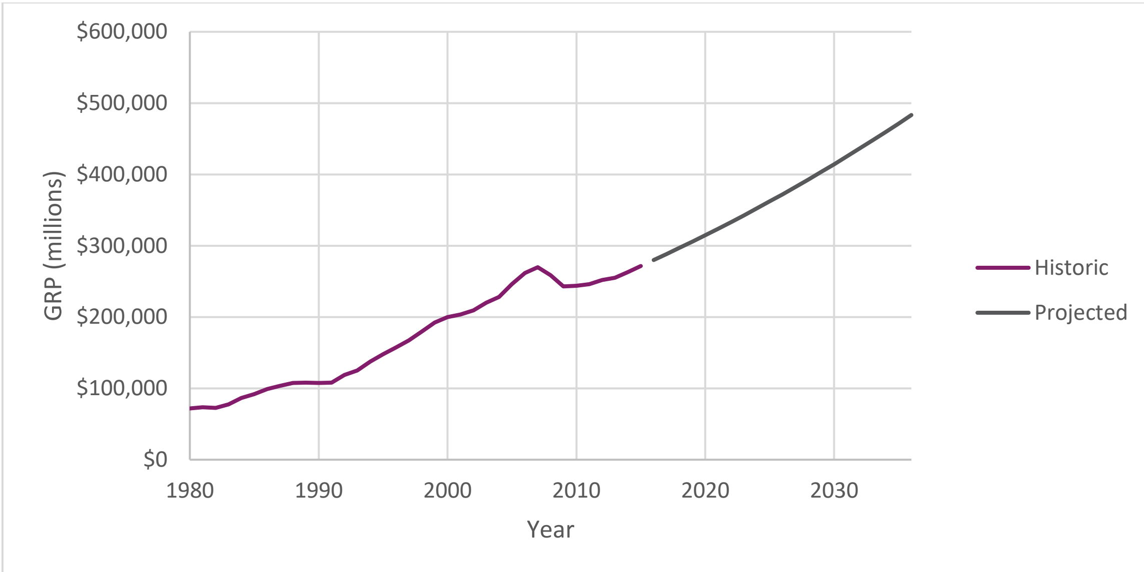
Table 5. Arizona's Employment by County (in Thousands)

	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
County	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	15	31	34	36	41	2.1%	1.5%	1.4%	1.4%
Cochise	34	55	59	64	72	1.3%	1.5%	1.4%	1.3%
Coconino	35	90	99	109	127	2.6%	2.0%	1.9%	1.7%
Gila	14	23	25	27	30	1.3%	1.5%	1.4%	1.3%
Graham	7	12	13	14	15	1.6%	1.3%	1.2%	1.1%
Greenlee	4	7	8	8	10	1.2%	1.9%	1.8%	1.7%
Maricopa	789	2,470	2,737	3,015	3,592	3.2%	2.1%	2.0%	1.9%
Mohave	21	66	72	78	89	3.2%	1.7%	1.6%	1.5%
Navajo	22	42	45	49	55	1.8%	1.6%	1.5%	1.4%
Pima	234	519	564	609	696	2.2%	1.7%	1.6%	1.5%
Pinal	32	90	101	112	137	2.9%	2.3%	2.2%	2.1%
Santa Cruz	9	20	22	24	28	2.2%	1.7%	1.6%	1.5%
Yavapai	25	90	99	108	126	3.6%	1.9%	1.8%	1.7%
Yuma & La Paz	41	95	104	113	132	2.4%	1.8%	1.7%	1.7%
Arizona	**1,283**	**3,611**	**3,981**	**4,363**	**5,149**	**2.9%**	**2.0%**	**1.9%**	**1.8%**
United States	**113,983**	**191,871**	**206,284**	**220,486**	**247,548**	**1.5%**	**1.5%**	**1.4%**	**1.3%**

Source: Woods & Poole (2017)

Gross Regional Product (GRP) Trends

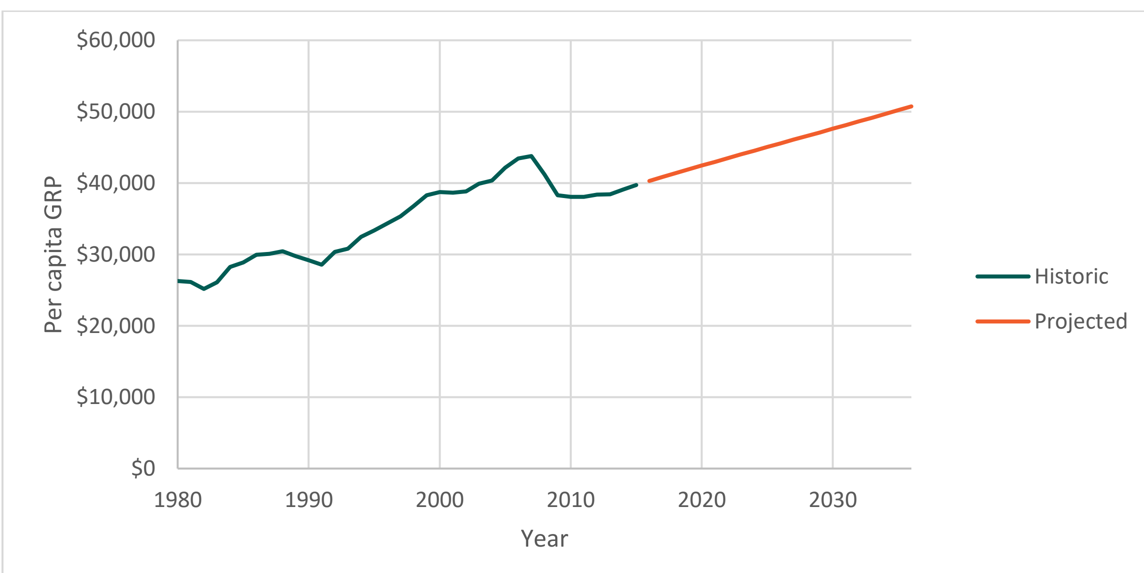
Figure 6 shows the gross regional product (GRP) of Arizona. The GRP is the gross domestic product (GDP) on a state level (Woods and Poole Economics, Inc. 2017). The GDP is a monetary measure of production and output in a region (Callen 2017). Though there was significant decline during the Great Recession, Arizona's GRP is projected to increase an estimated $200 billion by 2036.



Source: Woods & Poole 2017

Figure 6. Arizona Gross Regional Product Over Time

Figure 7 shows the per capita GRP scaled to account for the increase in population in order to accurately project economic growth. Even scaled by population, the per-capita GRP shows a definitive upward trend. It is anticipated that the per-capita GRP will increase by over $10,000 between 2016 and 2036.



Source: Woods & Poole 2017

Figure 7. Arizona Per Capita Gross Regional Product Over Time

Graham County is projected to have the highest rate of per capita regional product increase over the forecast period (**Table 6**). This is because it is expected to have modest GRP growth and little population growth. Gila County is projected to have negative growth that will start at 0.5 percent and trend to 0.4 percent from 2016 to 2036.

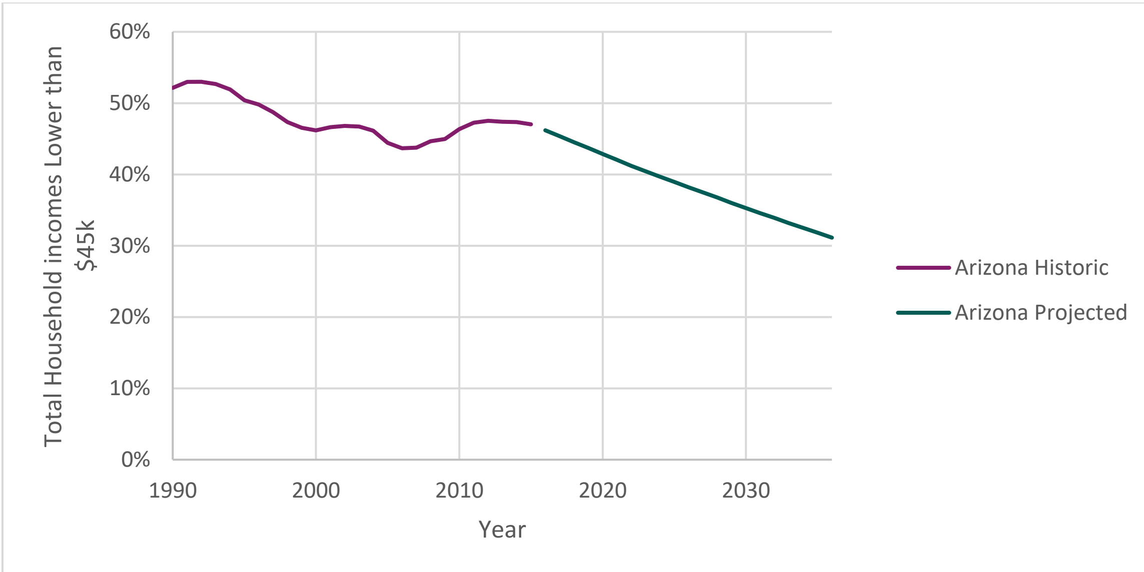
Table 6. Arizona's Per Capita Gross Regional Product by County (in Thousands)

	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
County	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	63	64	64	65	66	0.0%	0.2%	0.2%	0.2%
Cochise	57	75	78	81	89	-0.7%	0.8%	0.8%	0.8%
Coconino	51	67	70	74	82	-0.8%	1.0%	1.0%	1.0%
Gila	68	74	72	70	68	-0.2%	-0.5%	-0.4%	-0.4%
Graham	50	66	70	73	82	-0.8%	1.0%	1.1%	1.1%
Greenlee	62	89	92	95	104	-1.0%	0.6%	0.6%	0.8%
Maricopa	57	82	86	91	100	-1.0%	1.0%	1.0%	1.0%
Mohave	48	62	65	68	76	-0.7%	1.0%	1.0%	1.0%
Navajo	59	65	67	70	76	-0.3%	0.8%	0.8%	0.8%
Pima	54	71	74	77	83	-0.8%	0.8%	0.8%	0.8%
Pinal	61	65	67	69	74	-0.2%	0.7%	0.7%	0.7%
Santa Cruz	48	72	76	79	88	-1.1%	1.0%	1.0%	1.0%
Yavapai	50	58	60	63	68	-0.4%	0.8%	0.8%	0.8%
Yuma & La Paz	56	68	71	73	80	-0.5%	0.7%	0.8%	0.8%

Source: Woods & Poole 2017

Income Trends

Figure 8 offers a metric akin to the median household income. In 1998, 50 percent of households earned more than $45,000 and 50 percent earned less than $45,000. Effectively, the median household income was $45,000 in this year. In 2016, this percentage decreased, with 46 percent of households earning less than $45,000. By 2036, it is projected that only 31 percent of households will earn less than $45,000.



Note: 1990 is the latest year for historical data.

Source: Woods & Poole 2017

Figure 8. Percentage of Households with Incomes below $45,000

Greenlee County had the least number of households with a median income level below $45,000 of all counties in 2016 (**Table 7**). Additionally, it has the most aggressive projected increase in median income, widening the gap between it and Maricopa County, which possesses the second-highest median income.

Apache County had the lowest median income in 2016, with 65 percent of its homes generating an income below $45,000, and is projected to maintain this status through 2036, nearing Santa Cruz, the second lowest-performing county.

In 2016, only two counties (Greenlee and Maricopa) had a higher median than the U.S. It is projected that this trend will continue through the 20-year planning horizon.

Table 7. Percentage of Households with Incomes below $45,000 by County

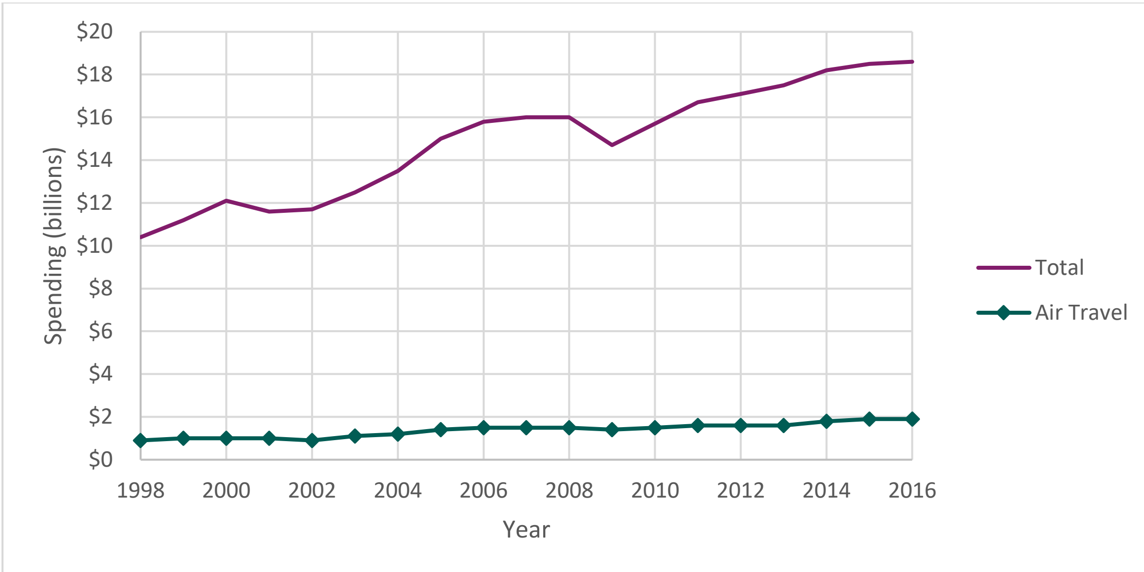
County	Historic Year	Base Year	Projected Years			Compound Annual Growth Rate			
	1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	74%	65%	60%	54%	41%	-0.4%	-1.6%	-1.9%	-2.3%
Cochise	62%	51%	46%	41%	34%	-0.6%	-2.0%	-2.0%	-2.0%
Coconino	55%	48%	44%	40%	33%	-0.4%	-1.8%	-1.9%	-1.9%
Gila	68%	57%	52%	46%	34%	-0.5%	-1.8%	-2.1%	-2.5%
Graham	72%	52%	47%	42%	34%	-0.9%	-2.0%	-2.0%	-2.1%
Greenlee	63%	42%	35%	30%	21%	-1.1%	-3.4%	-3.5%	-3.3%
Maricopa	46%	43%	39%	36%	30%	-0.2%	-1.7%	-1.7%	-1.8%
Mohave	62%	57%	51%	45%	34%	-0.2%	-2.4%	-2.4%	-2.5%
Navajo	65%	58%	53%	48%	38%	-0.3%	-1.8%	-1.9%	-2.1%
Pima	56%	50%	46%	42%	34%	-0.3%	-1.8%	-1.8%	-1.9%
Pinal	68%	44%	40%	35%	28%	-1.2%	-2.1%	-2.2%	-2.3%
Santa Cruz	62%	58%	54%	49%	40%	-0.2%	-1.5%	-1.7%	-1.9%
Yavapai	65%	52%	46%	41%	33%	-0.6%	-2.3%	-2.2%	-2.3%
Yuma & La Paz	63%	55%	49%	44%	33%	-0.3%	-2.3%	-2.3%	-2.5%
Arizona	**52%**	**46%**	**42%**	**38%**	**31%**	**-0.3%**	**-1.9%**	**-1.9%**	**-2.0%**
United States	**48%**	**44%**	**40%**	**37%**	**30%**	**-0.2%**	**-1.7%**	**-1.8%**	**-1.9%**

Source: Woods & Poole 2017

Tourism

Tourism is one indicator of the economic health of Arizona. **Figure 9** shows that the amount spent by tourists generally increased between 1998 and 2016. However, there was a dip in tourism spending between 2008 and 2009 as a result of the Great Recession. During the 2008/2009 timeframe, the total amount spent dropped $1.3 billion from $16 billion to $14.7 billion.

Tourism has since recovered, and it exceeded the pre-Recession amount by the year 2011. Though 2009 saw a decline in air travel, it once again rebounded by 2011 and continued to climb to $1.9 billion, 10.2 percent of total tourist spending, by 2016. In total, the amount tourists spent on air travel increased by over 100 percent between 1998 and 2016, despite the impacts of the Great Recession (Dean Runyan Associates 2017).



Source: Woods & Poole 2017

Figure 9. Historic Tourist Spending in Arizona

Arizona Trends Summary

The examination of Arizona's statewide and countywide socioeconomic trends provides both interesting and valuable information. Arizona is projected to have a steadily increasing, and older population through 2036. Matching the population growth, the economy will also expand, with development lead by the finance, educational services, and healthcare sectors. The per capita GRP and household median income are also projected to rise.

On a county level, additional trends are revealed. Pinal County is projected to have a significant amount of population and economic growth which may be attributed to its location near two thriving counties and industry diversification. Another notable trend is the lack of growth in counties that are predominantly federally owned. A lack of metropolitan areas, as well as a restriction on usable land, sets counties like Apache and Graham behind the growth curve of the rest of the counties.

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APPENDIX E: FACILITY AND SERVICE OBJECTIVES

In addition to system-wide performance measures, facility and service objectives are established for Arizona's system airports. These objectives are tailored to the six airport classifications as defined in the Arizona State Aviation System Plan (SASP) Update:

1. Commercial Service-International
2. Commercial Service-National
3. Reliever
4. General Aviation (GA)-Community
5. GA-Rural
6. GA-Basic

This appendix expands upon facility and service objectives summarized in **Chapter 6**, and details performance at each Arizona system airport. The first part of this appendix details performance associated with airside facility objectives. The second section details performance associated with landside facilities and services.

These facility and service objectives should not be viewed as a requirement, but rather guidelines for how each airport can best serve its functional role within the system. Airports that meets all facility and service objectives are best equipped to fulfill the market needs of their system classification.

As mentioned in **Chapter 6,** an airport that is deficient in a particular objective does not necessarily indicate a project should be pursued. Instead, an airport should consider if its existing facilities and services accommodate current and anticipated needs during the master planning process. From federal (i.e., Federal Aviation Administration [FAA]) and state (i.e., Arizona Department of Transportation [ADOT]) perspectives, specific projects must be justified in an airport-specific study (e.g., master plan) and included on the Airport Layout Plan (ALP) before funding can be awarded. While the SASP Update provides the framework of statewide needs, airport-specific analyses are critical to determine the facilities and objectives appropriate for a specific airport.

Some Arizona system airports may have already identified similar or additional facility and service needs in their individual master plans and capital improvement programs. In some cases, these master plans may already be moving towards addressing the facility and service needs identified in the SASP Update. In these cases, the projects identified in the analysis of facility and service objectives have been removed to avoid duplication in the final analysis of aviation system needs and costs in **Chapter 8**.

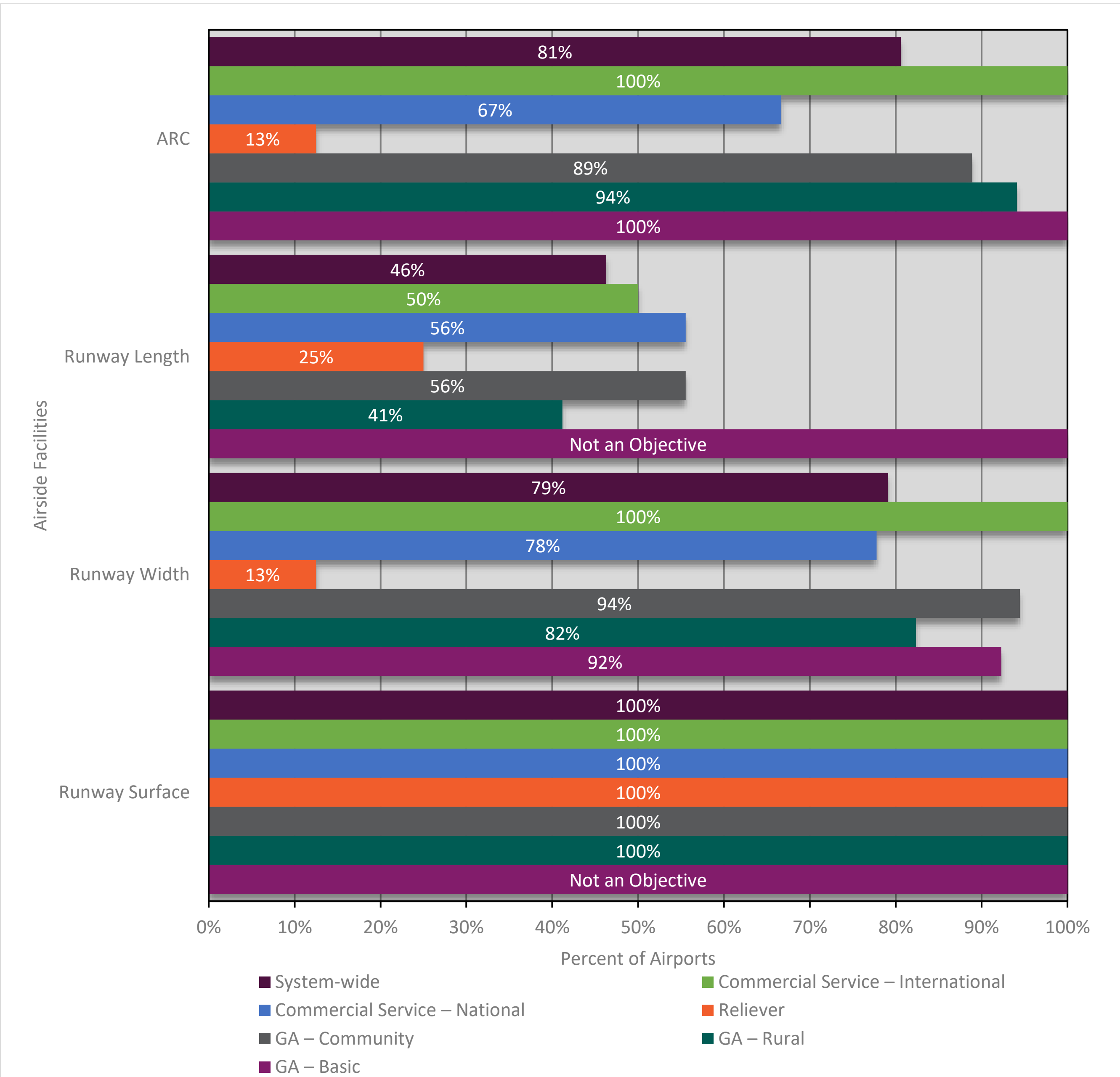
AIRSIDE FACILITIES

Airside facilities include airfield pavements and aviation equipment used in flight operations. Airside facilities are therefore the most significant factor in an airport's ability to support aviation operations and statewide aviation needs. The following airside facilities are assessed at Arizona airports, with specific objectives assigned for each airport's classification:

1. Airport reference code (ARC)
2. Primary runway length, width, and surface
3. Taxiway type and width
4. Instrument approach procedures (IAPs)

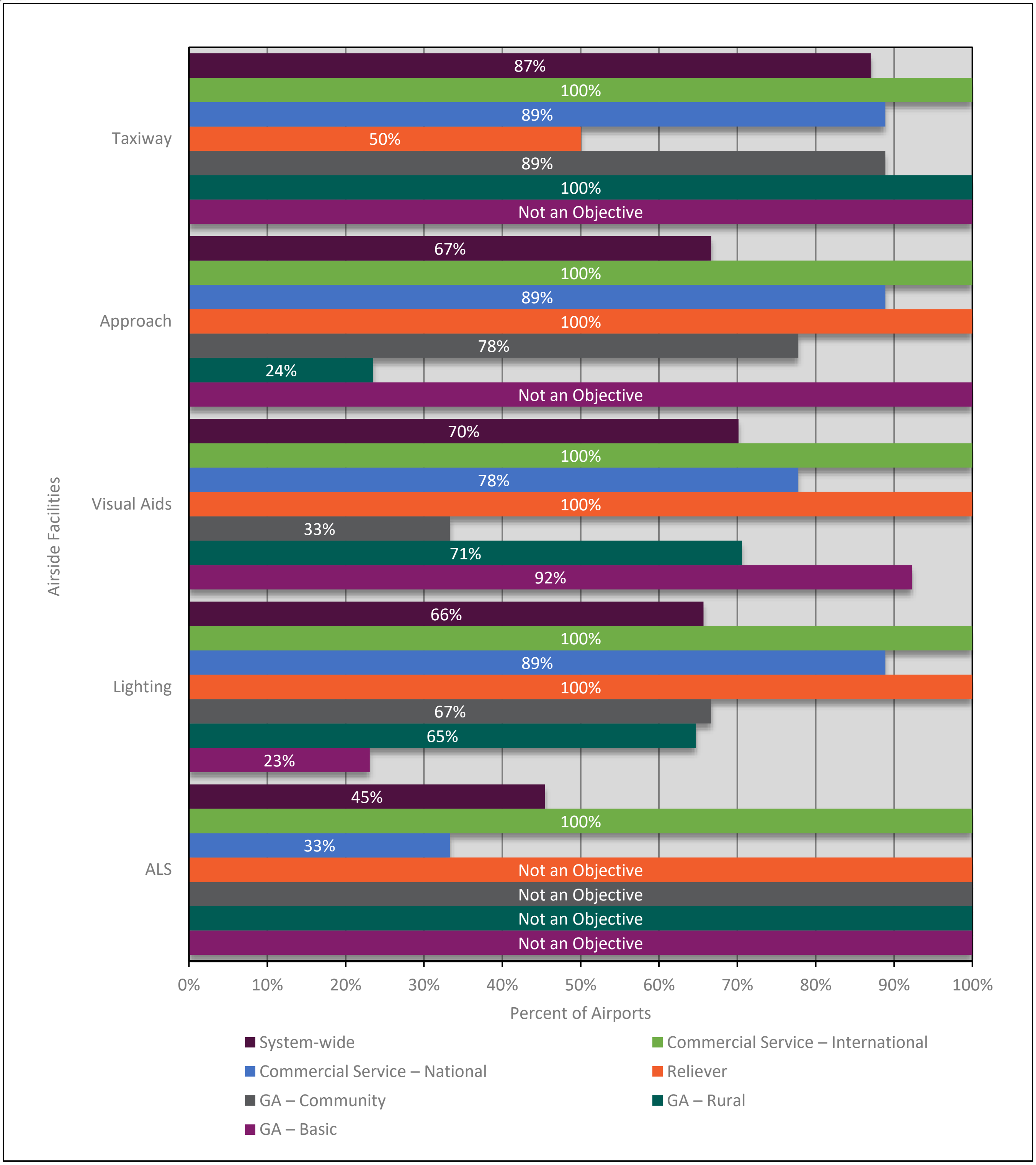
5. Visual aids, including rotating beacons, wind indicators, segmented circles, runway end indicator lights (REILs), and visual glideslope indicators (VGSIs)
6. Runway and taxiway lighting
7. Approach lighting systems (ALSs)

Figure 1 and **Figure 2** summarize system performance for airside facility objectives, each of which is described in the following pages.



Sources: Airport Inventory and Data Survey 2017, AirNav, FAA 5010 Master Record

Figure 1. Summary of Airside Facility and Service Objectives (1 of 2)



Sources: Airport Inventory and Data Survey 2017, AirNav, FAA 5010 Master Record

Figure 2. Summary of Airside Facility and Service Objectives (2 of 2)

Airport Reference Code

Airports included in the FAA's National Plan of Integrated Airport Systems (NPIAS) are encouraged by the FAA to meet all applicable design and development standards. Design standards are related to the approach speed and wingspan of each airport's design (or critical) aircraft, which is the most demanding aircraft, or group of same category aircraft, that operates at the airport on a regular basis with at least 500 annual takeoffs and landings. Each design aircraft is assigned a letter (A through E) based on its approach speed, and a roman numeral (I through VI) for its wingspan. These same characteristics are used to determine each runway's highest runway design code (RDC), the largest of which at an airport is considered the ARC. The ARC is used primarily for planning and design and the FAA notes that it is not a limiting factor in the aircraft that can safely operate at an airport.

Many of the FAA's safety and operational standards are based on the RDC (the highest of which is an airport's ARC), including but not limited to runway width, runway safety area (RSA), runway protection zones (RPZs), runway to taxiway separation, and object free area (OFA). A more detailed discussion of ARCs is provided in **Chapter 3** of this plan.

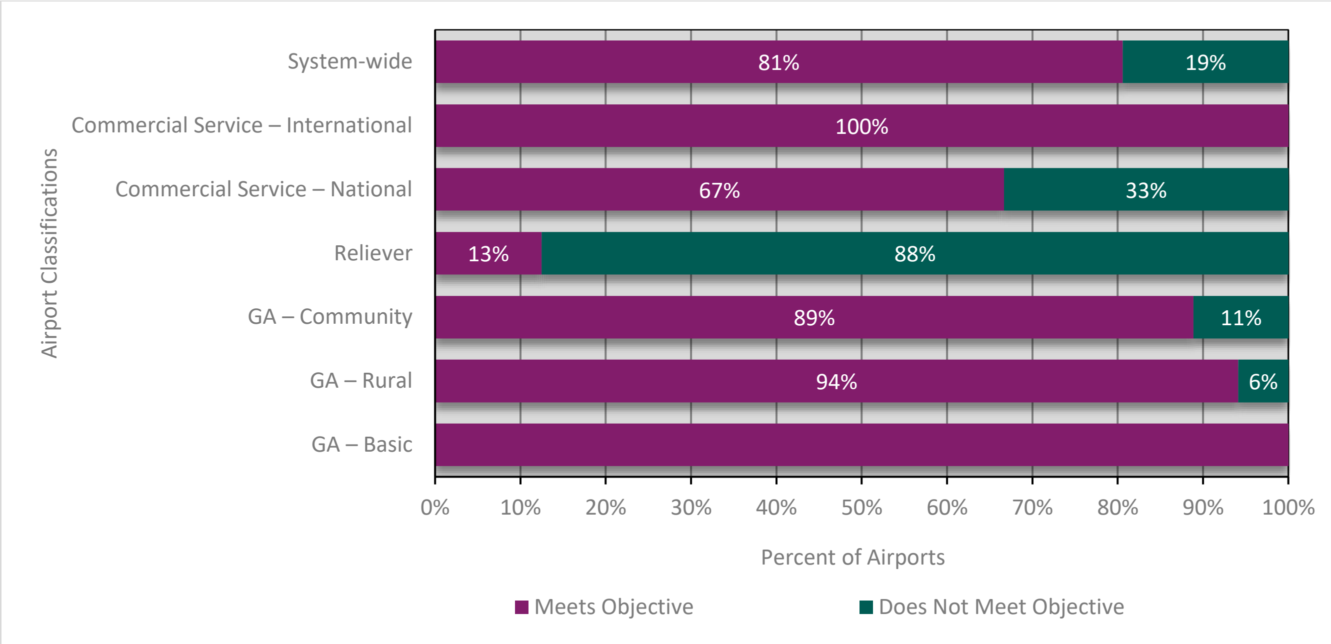
Objective ARCs for commercial service airports are based on the ultimate ARC on their primary runway shown in their most recent airport master plan. For GA airports, objective ARCs are based on each airport's system classification, with more demanding airports having a more advanced objective ARC. **Table 1** explains how aircraft characteristics relate to airfield design components.

Table 1. Aircraft Characteristics and Design Components

Aircraft Characteristics	Design Components
Approach Speed	RSA, Runway Obstacle Free Area (ROFA), RPZ, runway width, runway-to-taxiway separation, runway-to-fixed object
Landing and Takeoff Distance	Runway length
Cockpit to Main Gear Distance (CMG)	Fillet design, apron area, parking layout
Main Gear Width (MGW)	Taxiway width, fillet design
Wingspan/Tail Height	Taxiway and apron OFA, parking configuration, hangar locations, taxiway-to-taxiway separation, runway-to-taxiway separation

Source: FAA Advisory Circular (AC) 150/5300-13A, Change 1

Figure 3 summarizes ARC objective performance at Arizona system airports. In total, 81 percent of the Arizona system meets its ARC objective relative to its classification. This includes 100 percent of Commercial Service-International airports and nearly all airports in the three Non-Reliever GA classification. However, only one Reliever airport (Phoenix Goodyear Airport) meets its objective for its ARC.



Source: Airport Inventory and Data Survey 2017

Figure 3. Percentage of Airports by Classification Meeting ARC Objectives

Table 2 details ARC objective performance by individual airport.

Table 2. ARC Objective Performance by Airport

Associated City	Airport Name	Existing ARC	Objective ARC	Meets Objective
Commercial Service-International: Consistent with Master Plan				
Phoenix	Phoenix Sky Harbor International	D-V	D-V	Yes
Tucson	Tucson International	D-IV	D-IV	Yes
Commercial Service-National: Consistent with Master Plan				
Bullhead City	Laughlin/Bullhead City International	C-III	D-IV	No
Flagstaff	Flagstaff Pulliam	C-III	C-III	Yes
Grand Canyon	Grand Canyon National Park	C-III	C-III	Yes
Page	Page Municipal	B-II	B-II	Yes
Peach Springs	Grand Canyon West	B-II	C-II	No
Phoenix	Phoenix-Mesa Gateway	D-V	D-V	Yes
Prescott	Ernest A. Love Field	C-III	C-III	Yes
Show Low	Show Low Regional	C-II	C-III	No
Yuma	Yuma International	E-VI	E-VI	Yes
Reliever: 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	C-II	C-III	No
Mesa	Falcon Field	B-II	C-III	No
Phoenix	Phoenix Deer Valley	C-II	C-III	No
Scottsdale	Scottsdale	B-II	C-III	No
Tucson	Ryan Field	B-II	C-III	No

Associated City	Airport Name	Existing ARC	Objective ARC	Meets Objective
		GA-Community: B-II		
Benson	Benson Municipal	B-II	B-II	Yes
Buckeye	Buckeye Municipal	B-II	B-II	Yes
Casa Grande	Casa Grande Municipal	B-II	B-II	Yes
Coolidge	Coolidge Municipal	C-IV	B-II	Yes
Cottonwood	Cottonwood Municipal	B-I	B-II	No
Kingman	Kingman	C-III	B-II	Yes
Lake Havasu City	Lake Havasu City	C-III	B-II	Yes
Marana	Pinal Airpark	D-V	B-II	Yes
Nogales	Nogales	C-II	B-II	Yes
Parker	Avi Suquilla	C-II	B-II	Yes
Payson	Payson	B-I	B-II	No
Safford	Safford Regional	B-II	B-II	Yes
Sedona	Sedona	B-II	B-II	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	E-V	B-II	Yes
Springerville	Springerville Municipal	B-II	B-II	Yes
St. Johns	St. Johns Industrial Air Park	B-II	B-II	Yes
Wickenburg	Wickenburg Municipal	B-II	B-II	Yes
Willcox	Cochise County	B-II	B-II	Yes
		GA-Rural: B-I		
Bisbee	Bisbee Municipal	B-II	B-I	Yes
Chinle	Chinle Municipal	B-I	B-I	Yes
Colorado City	Colorado City Municipal	B-II	B-I	Yes
Douglas	Bisbee-Douglas International	C-I	B-I	Yes
Douglas	Cochise College	B-I	B-I	Yes
Douglas	Douglas Municipal	B-II	B-I	Yes
Eloy	Eloy Municipal	A-II	B-I	No
Gila Bend	Gila Bend Municipal	B-II	B-I	Yes
Holbrook	Holbrook Municipal	B-I	B-I	Yes
Maricopa	Ak-Chin Regional	B-I	B-I	Yes
San Luis	Rolle Airfield	B-I	B-I	Yes
San Manuel	San Manuel	B-I	B-I	Yes
Taylor	Taylor	B-II	B-I	Yes
Whiteriver	Whiteriver	B-II	B-I	Yes
Williams	H.A. Clark Memorial Field	B-II	B-I	Yes
Window Rock	Window Rock	B-II	B-I	Yes
Winslow	Winslow-Lindbergh Regional	C-II	B-I	Yes
		GA-Basic: A-I		
Ajo	Eric Marcus Municipal	B-I	A-I	Yes
Bagdad	Bagdad	B-I	A-I	Yes
Cibecue	Cibecue	A-I	A-I	Yes
Clifton	Greenlee County	B-II	A-I	Yes
Globe	San Carlos Apache	C-II	A-I	Yes
Kayenta	Kayenta	B-II	A-I	Yes
Kearny	Kearny	A-I	A-I	Yes
Polacca	Polacca	A-I	A-I	Yes
Seligman	Seligman	B-I	A-I	Yes
Sells	Sells	A-I	A-I	Yes
Superior	Superior	B-II	A-I	Yes
Tombstone	Tombstone Municipal	A-I	A-I	Yes
Tuba City	Tuba City	B-II	A-I	Yes

Source: Airport Inventory and Data Survey 2017

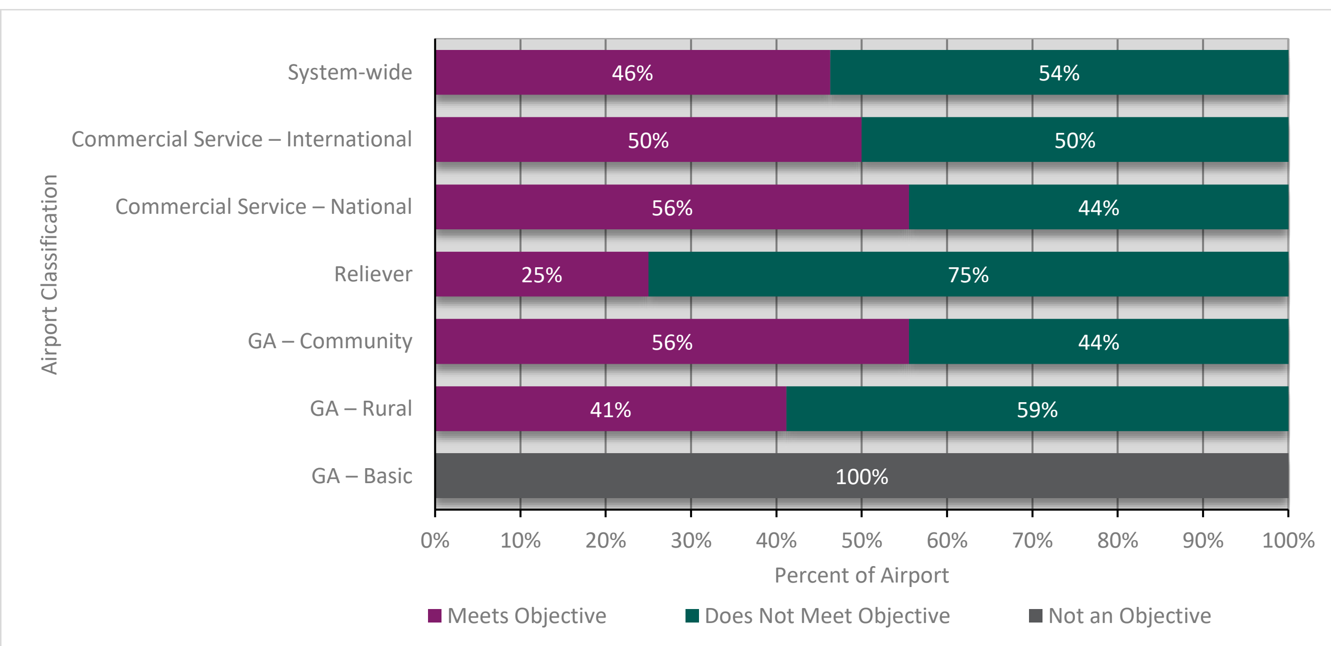
Primary Runway Length

The length of a runway is one of the most important factors determining what types of aircraft can land at an airport. While there are other factors, in general, longer runways can support larger aircraft. Primary runway length objectives for airports in the Commercial Service-International and Commercial Service-National classifications were determined using ultimate runway lengths specified in each airport's master plan. There is no objective for GA-Basic airports, which are recommended to maintain existing lengths.

For the other classifications, the SASP Update employed a runway length analysis that considers factors such as mean maximum daily temperature during the hottest month and airport elevation. Outputs were based on the type of aircraft and useful load the airport will accommodate. Objective primary runway lengths for airports in the Reliever, GA-Community, and GA-Rural classifications were determined based on the following parameters:

1. Reliever: Accommodate 75% of large aircraft at 90% useful load
2. GA-Community: Accommodate 75% of large aircraft at 60% useful load
3. GA-Rural: Accommodate 75% of small planes

The SASP Update sets runway length objectives as a basis for evaluation. Airports exceeding their objectives are not recommended to reduce their runway length unless determined by other factors or plans. **Figure 4** summarizes runway length objective performance by airport classification. In total, 46 percent of the system meets objectives for runway length. This includes 25 percent of Reliever, 56 percent of GA-Community, and 41 percent of GA-Rural airports. As previously mentioned, commercial service airports were evaluated based on the ultimate runway length cited in their master plans. Based on these criteria, one of two Commercial Service-International and 56 percent of Commercial Service-National airports meet runway length objectives.



Sources: Airport Inventory and Data Survey 2017,
FAA AC 150/5325-4B – Runway Length Requirements for Airport Design

Figure 4. Percentage of Airports by Classification Meeting Primary Runway Length Objectives

Table 3 details primary runway length objective performance by individual airport.

Table 3. Primary Runway Length Objective Performance by Airport

Associated City	Airport Name	Primary Runway	Primary Runway Length	Objective Runway Length	Meets Objective
Commercial Service-International: Consistent with Master Plan					
Phoenix	Phoenix Sky Harbor International	08/26	11,489	12,000	No
Tucson	Tucson International	11L/29R	10,966	10,966	Yes
Commercial Service-National: Consistent with Master Plan					
Bullhead City	Laughlin/Bullhead City International	16/34	8,500	8,500	Yes
Flagstaff	Flagstaff Pulliam	03/21	8,800	8,800	Yes
Grand Canyon	Grand Canyon National Park	03/21	8,999	10,000	No
Page	Page Municipal	15/33	5,950	6,550	No
Peach Springs	Grand Canyon West	17/35	5,000	6,500	No
Phoenix	Phoenix-Mesa Gateway	12C/30C	10,201	10,201	Yes
Prescott	Ernest A. Love Field	03R/21L	7,619	10,570	No
Show Low	Show Low Regional	06/24	7,200	7,200	Yes
Yuma	Yuma International	03L/21R	13,000	13,000	Yes
Reliever: Accommodate 75% of Large Aircraft at 90% Useful Load					
Chandler	Chandler Municipal	04L/22R	4,401	7,850	No
Glendale	Glendale Municipal	01/19	7,150	7,850	No
Goodyear	Phoenix Goodyear	03/21	8,501	8,500	Yes
Marana	Marana Regional	03/21	3,892	7,900	No
Mesa	Falcon Field	4R/22L	5,101	7,850	No
Phoenix	Phoenix Deer Valley	7L/25R	4,500	7,850	No
Scottsdale	Scottsdale	03/21	8,249	8,130	Yes
Tucson	Ryan Field	6R/24L	5,500	8,000	No
GA-Community: Accommodate 75% of Large Aircraft at 60% Useful Load					
Benson	Benson Municipal	10/28	4,002	6,400	No
Buckeye	Buckeye Municipal	17/35	5,500	5,550	No
Casa Grande	Casa Grande Municipal	05/23	5,200	5,200	Yes
Coolidge	Coolidge Municipal	05/23	5,564	5,420	Yes
Cottonwood	Cottonwood Municipal	14/32	4,252	6,300	No
Kingman	Kingman	03/21	6,825	6,300	Yes
Lake Havasu City	Lake Havasu City	14/32	8,001	5,480	Yes
Marana	Pinal Airpark	12/30	6,849	5,300	Yes
Nogales	Nogales	03/21	7,199	7,430	No
Parker	Avi Suquilla	01/19	6,250	5,090	Yes
Payson	Payson	06/24	5,504	6,780	No
Safford	Safford Regional	12/30	6,006	5,970	Yes
Sedona	Sedona	03/21	5,132	7,100	No
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	08/26	12,001	7,840	Yes
Springerville	Springerville Municipal	03/21	8,422	7,700	Yes
St. Johns	St. Johns Industrial Air Park	14/32	5,322	7,050	No
Wickenburg	Wickenburg Municipal	05/23	6,101	5,600	Yes
Willcox	Cochise County	03/21	6,095	6,430	No
GA-Rural: Accommodate 75% of Small Planes					
Bisbee	Bisbee Municipal	17/35	5,929	4,480	Yes
Chinle	Chinle Municipal	18/36	6,902	7,400	No
Colorado City	Colorado City Municipal	11/29	6,300	6,800	No
Douglas	Bisbee-Douglas International	08/26	4,966	6,000	No
Douglas	Cochise College	05/23	5,551	4,110	Yes

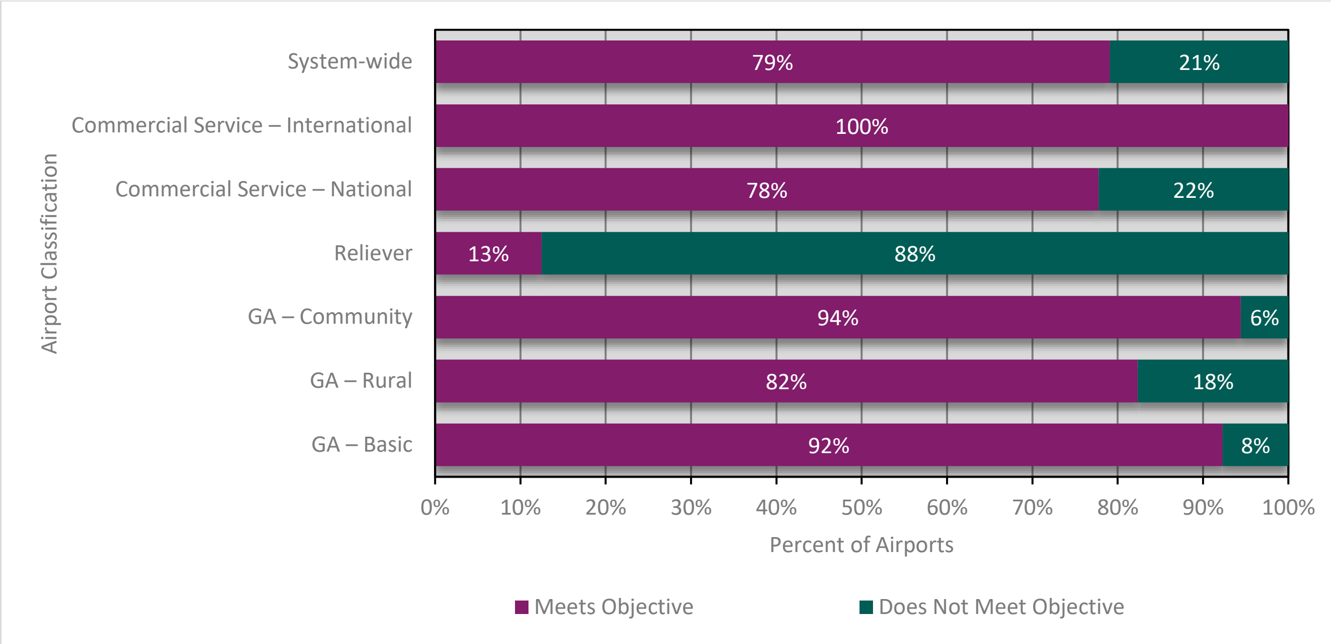
Associated City	Airport Name	Primary Runway	Primary Runway Length	Objective Runway Length	Meets Objective
Douglas	Douglas Municipal	03/21	5,760	6,390	No
Eloy	Eloy Municipal	02/20	3,901	4,500	No
Gila Bend	Gila Bend Municipal	04/22	5,200	4,200	Yes
Holbrook	Holbrook Municipal	03/21	6,698	7,100	No
Maricopa	Ak-Chin Regional	04/22	4,751	4,400	Yes
San Luis	Rolle Airfield	17/35	2,800	2,730	Yes
San Manuel	San Manuel	11/29	4,207	5,400	No
Taylor	Taylor	03/21	7,001	7,700	No
Whiteriver	Whiteriver	01/19	6,350	4,520	Yes
Williams	H.A. Clark Memorial Field	18/36	6,000	7,340	No
Window Rock	Window Rock	02/20	7,000	5,770	Yes
Winslow	Winslow-Lindbergh Regional	11/29	7,100	7,390	No
GA-Basic: Maintain Existing					
Ajo	Eric Marcus Municipal	12/30	3,800	NA	NA
Bagdad	Bagdad	05/23	4,552	NA	NA
Cibecue	Cibecue	07/25	4,200	NA	NA
Clifton	Greenlee County	07/25	4,978	NA	NA
Globe	San Carlos Apache	09/27	6,500	NA	NA
Kayenta	Kayenta	05/23	7,101	NA	NA
Kearny	Kearny	08/26	3,400	NA	NA
Polacca	Polacca	04/22	4,200	NA	NA
Seligman	Seligman	04/22	4,800	NA	NA
Sells	Sells	04/22	5,830	NA	NA
Superior	Superior	04/22	3,250	NA	NA
Tombstone	Tombstone Municipal	06/24	4,430	NA	NA
Tuba City	Tuba City	05/33	6,230	NA	NA

Sources: Airport Inventory and Data Survey 2017, FAA Advisory Circular 150/5325-4B – Runway Length Requirements for Airport Design

Primary Runway Width

Runway width is also strongly associated with the type of activity that an airport can accommodate. Like primary runway length objectives, not every airport in a classification has the same objective for its primary runway width. Rather, primary runway width objectives are determined by the existing or objective ARC of each airport, whichever is more advanced. For example, if an airport has an existing B-II ARC but an objective ARC of C-III, the runway width standard for a C-III airport is used as the primary runway width objective. However, if an airport has an existing ARC of C-III but an objective ARC of B-II, C-III primary runway width standards would still apply. This higher ARC is hereafter referred to as the ultimate ARC.

Figure 5 summarizes primary runway width objective performance by airport classification. In total, 79 percent of the system meets primary runway width objectives, including 100 percent of Commercial Service-International airports and nearly all Non-Reliever GA airports. Only one Reliever airport (Phoenix Goodyear Airport) meets this objective.



Sources: Airport Inventory and Data Survey 2017

Figure 5. Percentage of Airports by Classification Meeting Primary Runway Width Objectives

Table 4 details primary runway width objective performance at each airport in the Arizona system.

Table 4. Primary Runway Width Objective Performance by Airport

Associated City	Airport Name	Primary Runway	Primary Runway Width	Ultimate ARC	Objective Runway Width	Meets Objective
Commercial Service-International: To Meet ARC Standards						
Phoenix	Phoenix Sky Harbor International	08/26	150	D-V	150	Yes
Tucson	Tucson International	11L/29R	150	D-IV	150	Yes
Commercial Service-National: To Meet ARC Standards						
Bullhead City	Laughlin/Bullhead City International	16/34	150	D-IV	150	Yes
Flagstaff	Flagstaff Pulliam	03/21	150	C-III	150	Yes
Grand Canyon	Grand Canyon National Park	03/21	150	C-III	150	Yes
Page	Page Municipal	15/33	150	B-II	75	Yes
Peach Springs	Grand Canyon West	17/35	75	C-II	100	No
Phoenix	Phoenix-Mesa Gateway	12C/30C	150	D-V	150	Yes
Prescott	Ernest A. Love Field	03R/21L	150	C-III	150	Yes
Show Low	Show Low Regional	06/24	100	C-III	150	No
Yuma	Yuma International	03L/21R	200	E-VI	200	Yes
Reliever: To Meet ARC Standards						
Chandler	Chandler Municipal	04L/22R	75	C-III	150	No
Glendale	Glendale Municipal	01/19	100	C-III	150	No
Goodyear	Phoenix Goodyear	03/21	150	C-III	150	Yes
Marana	Marana Regional	03/21	75	C-III	150	No
Mesa	Falcon Field	4R/22L	100	C-III	150	No
Phoenix	Phoenix Deer Valley	7L/25R	75	C-III	150	No

Associated City	Airport Name	Primary Runway	Primary Runway Width	Ultimate ARC	Objective Runway Width	Meets Objective
Scottsdale	Scottsdale	03/21	100	C-III	150	No
Tucson	Ryan Field	6R/24L	75	C-III	150	No
GA-Community: To Meet ARC Standards						
Benson	Benson Municipal	10/28	75	B-II	75	Yes
Buckeye	Buckeye Municipal	17/35	75	B-II	75	Yes
Casa Grande	Casa Grande Municipal	05/23	100	B-II	75	Yes
Coolidge	Coolidge Municipal	05/23	150	B-II	150	Yes
Cottonwood	Cottonwood Municipal	14/32	75	B-II	75	Yes
Kingman	Kingman	03/21	150	B-II	150	Yes
Lake Havasu City	Lake Havasu City	14/32	100	B-II	150	No
Marana	Pinal Airpark	12/30	150	B-II	150	Yes
Nogales	Nogales	03/21	100	B-II	100	Yes
Parker	Avi Suquilla	01/19	100	B-II	100	Yes
Payson	Payson	06/24	75	B-II	75	Yes
Safford	Safford Regional	12/30	100	B-II	75	Yes
Sedona	Sedona	03/21	100	B-II	75	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	08/26	150	B-II	150	Yes
Springerville	Springerville Municipal	03/21	75	B-II	75	Yes
St. Johns	St. Johns Industrial Air Park	14/32	75	B-II	75	Yes
Wickenburg	Wickenburg Municipal	05/23	75	B-II	75	Yes
Willcox	Cochise County	03/21	75	B-II	75	Yes
GA-Rural: To Meet ARC Standards						
Bisbee	Bisbee Municipal	17/35	60	B-I	75	No
Chinle	Chinle Municipal	18/36	60	B-I	60	Yes
Colorado City	Colorado City Municipal	11/29	75	B-I	75	Yes
Douglas	Bisbee-Douglas International	08/26	60	B-I	100	No
Douglas	Cochise College	05/23	60	B-I	60	Yes
Douglas	Douglas Municipal	03/21	75	B-I	75	Yes
Eloy	Eloy Municipal	02/20	75	B-I	60	Yes
Gila Bend	Gila Bend Municipal	04/22	75	B-I	75	Yes
Holbrook	Holbrook Municipal	03/21	75	B-I	60	Yes
Maricopa	Ak-Chin Regional	04/22	50	B-I	60	No
San Luis	Rolle Airfield	17/35	60	B-I	60	Yes
San Manuel	San Manuel	11/29	75	B-I	60	Yes
Taylor	Taylor	03/21	75	B-I	75	Yes
Whiteriver	Whiteriver	01/19	75	B-I	75	Yes
Williams	H.A. Clark Memorial Field	18/36	100	B-I	75	Yes
Window Rock	Window Rock	02/20	75	B-I	75	Yes
Winslow	Winslow-Lindbergh Regional	11/29	150	B-I	100	Yes
GA-Basic: To Meet ARC Standards						
Ajo	Eric Marcus Municipal	12/30	60	A-I	60	Yes
Bagdad	Bagdad	05/23	60	A-I	60	Yes
Cibecue	Cibecue	07/25	100	A-I	60	Yes
Clifton	Greenlee County	07/25	75	A-I	75	Yes
Globe	San Carlos Apache	09/27	100	A-I	100	Yes
Kayenta	Kayenta	05/23	75	A-I	75	Yes
Kearny	Kearny	08/26	60	A-I	60	Yes
Polacca	Polacca	04/22	50	A-I	60	No
Seligman	Seligman	04/22	75	A-I	60	Yes
Sells	Sells	04/22	60	A-I	60	Yes

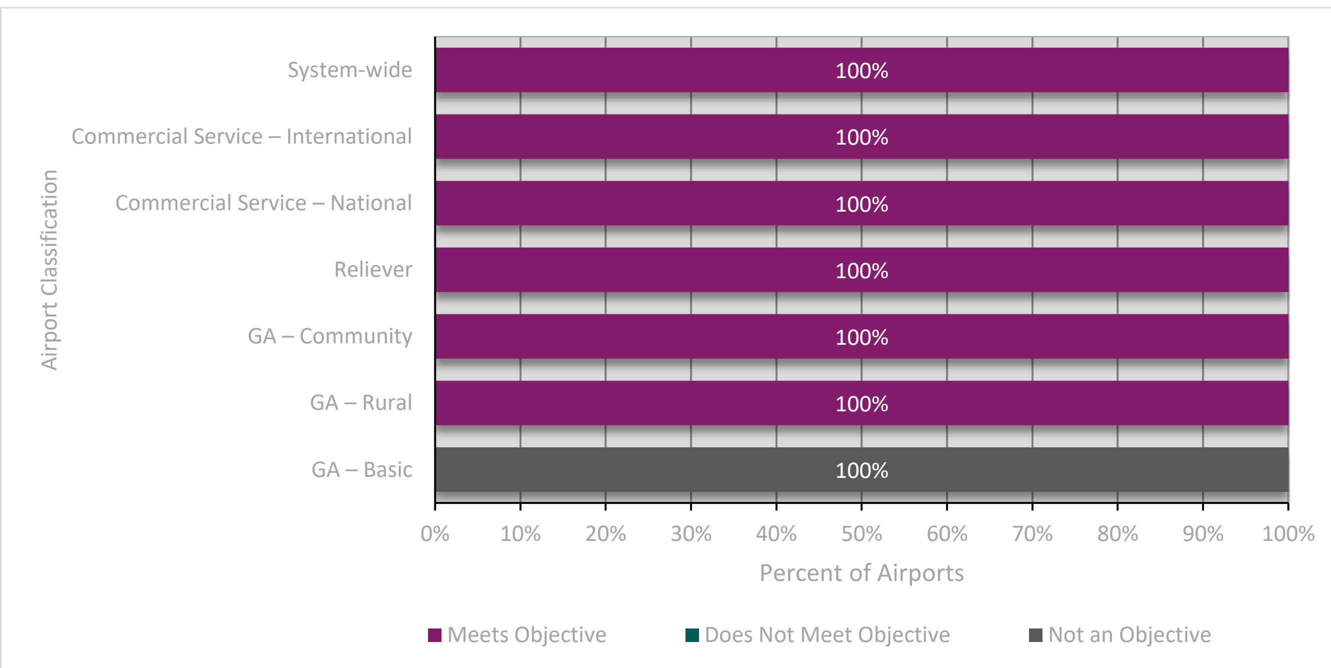
Associated City	Airport Name	Primary Runway	Primary Runway Width	Ultimate ARC	Objective Runway Width	Meets Objective
Superior	Superior	04/22	75	A-I	75	Yes
Tombstone	Tombstone Municipal	06/24	60	A-I	60	Yes
Tuba City	Tuba City	05/33	75	A-I	75	Yes

Source: Airport Inventory and Data Survey 2017

Primary Runway Surface

The surface material of a runway is another major determinant in the type of aircraft that can operate at an airport. A runway's surface is directly tied to its weight capacity and resistance to weather and time. Runway surfaces range from gravel and turf (grass or dirt) to paved materials such as asphalt and concrete. All airports in the Arizona system other than those in the GA-Basic classification are held to the objective of having a paved runway.

Figure 6 summarizes runway surface objectives in the Arizona system. Every airport in the system meets its runway surface objective. As stated, GA-Basic airports do not have a runway pavement objective. Despite this, 11 of the 13 GA-Basic airports also have a paved primary runway.



Source: Airport Inventory and Data Survey 2017

Figure 6. Percentage of Airports by Classification Meeting Primary Runway Surface Objectives

Table 5 details primary runway surface objective performance at Arizona system airports.

Table 5. Primary Runway Surface Objective Performance by Airport

Associated City	Airport Name	Primary Surface	Meets Objective
Commercial Service-International: Asphalt/Paved			
Phoenix	Phoenix Sky Harbor International	Paved	Yes
Tucson	Tucson International	Paved	Yes
Commercial Service-National: Asphalt/Paved			
Bullhead City	Laughlin/Bullhead City International	Paved	Yes
Flagstaff	Flagstaff Pulliam	Paved	Yes
Grand Canyon	Grand Canyon National Park	Paved	Yes
Page	Page Municipal	Paved	Yes
Peach Springs	Grand Canyon West	Paved	Yes
Phoenix	Phoenix-Mesa Gateway	Paved	Yes
Prescott	Ernest A. Love Field	Paved	Yes
Show Low	Show Low Regional	Paved	Yes
Yuma	Yuma International	Paved	Yes
Reliever: Asphalt/Paved			
Chandler	Chandler Municipal	Paved	Yes
Glendale	Glendale Municipal	Paved	Yes
Goodyear	Phoenix Goodyear	Paved	Yes
Marana	Marana Regional	Paved	Yes
Mesa	Falcon Field	Paved	Yes
Phoenix	Phoenix Deer Valley	Paved	Yes
Scottsdale	Scottsdale	Paved	Yes
Tucson	Ryan Field	Paved	Yes
GA-Community: Asphalt/Paved			
Benson	Benson Municipal	Paved	Yes
Buckeye	Buckeye Municipal	Paved	Yes
Casa Grande	Casa Grande Municipal	Paved	Yes
Coolidge	Coolidge Municipal	Paved	Yes
Cottonwood	Cottonwood Municipal	Paved	Yes
Kingman	Kingman	Paved	Yes
Lake Havasu City	Lake Havasu City	Paved	Yes
Marana	Pinal Airpark	Paved	Yes
Nogales	Nogales	Paved	Yes
Parker	Avi Suquilla	Paved	Yes
Payson	Payson	Paved	Yes
Safford	Safford Regional	Paved	Yes
Sedona	Sedona	Paved	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Paved	Yes
Springerville	Springerville Municipal	Paved	Yes
St. Johns	St. Johns Industrial Air Park	Paved	Yes
Wickenburg	Wickenburg Municipal	Paved	Yes
Willcox	Cochise County	Paved	Yes
GA-Rural: Asphalt/Paved (Desired)			
Bisbee	Bisbee Municipal	Paved	Yes
Chinle	Chinle Municipal	Paved	Yes
Colorado City	Colorado City Municipal	Paved	Yes
Douglas	Bisbee-Douglas International	Paved	Yes
Douglas	Cochise College	Paved	Yes

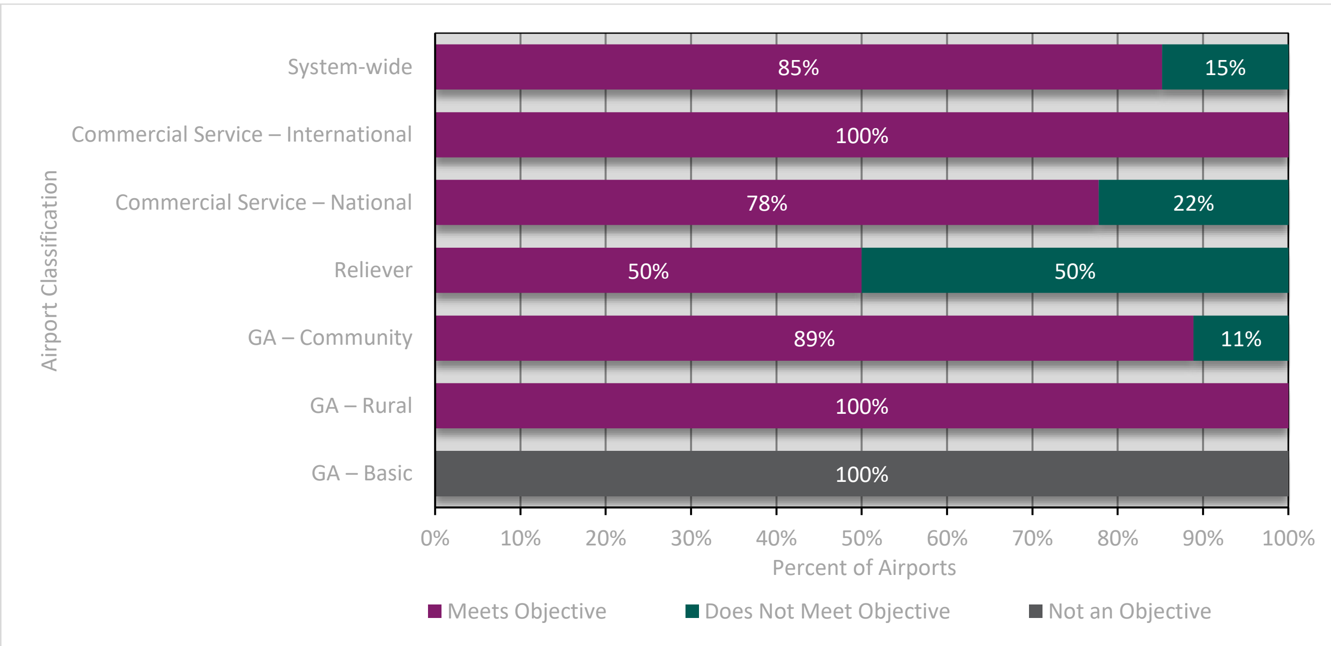
Associated City	Airport Name	Primary Surface	Meets Objective
Douglas	Douglas Municipal	Paved	Yes
Eloy	Eloy Municipal	Paved	Yes
Gila Bend	Gila Bend Municipal	Paved	Yes
Holbrook	Holbrook Municipal	Paved	Yes
Maricopa	Ak-Chin Regional	Paved	Yes
San Luis	Rolle Airfield	Paved	Yes
San Manuel	San Manuel	Paved	Yes
Taylor	Taylor	Paved	Yes
Whiteriver	Whiteriver	Paved	Yes
Williams	H.A. Clark Memorial Field	Paved	Yes
Window Rock	Window Rock	Paved	Yes
Winslow	Winslow-Lindbergh Regional	Paved	Yes
GA-Basic: Gravel/Dirt (Minimum)			
Ajo	Eric Marcus Municipal	Paved	NA
Bagdad	Bagdad	Paved	NA
Cibecue	Cibecue	Dirt	NA
Clifton	Greenlee County	Paved	NA
Globe	San Carlos Apache	Paved	NA
Kayenta	Kayenta	Paved	NA
Kearny	Kearny	Paved	NA
Polacca	Polacca	Paved	NA
Seligman	Seligman	Paved	NA
Sells	Sells	Paved	NA
Superior	Superior	Dirt	NA
Tombstone	Tombstone Municipal	Paved	NA
Tuba City	Tuba City	Paved	NA

Source: FAA 5010 Master Record (accessed 2017)

Primary Taxiway Type and Width

At the most basic level, taxiways are constructed to facilitate aircraft movements between the runways and aircraft parking areas. However, as airports take on more substantial activity volumes, taxiways also become necessary to improve operational efficiency and safety. Strategically placed taxiway exits permit aircraft to clear the runway quickly after landing, improving the capacity and safety of the runway. Taxiways come in several forms, including parallel taxiways that run the full length of the connected runway, partial parallel taxiways, turnarounds located at the ends of the runway, and stub taxiways. Taxiways are designed for “cockpit over centerline” taxiing with pavement being sufficiently wide to allow for a certain amount of wander. Previous guidance on taxiway design was based only on Airplane Design Group (ADG). ADGs are based on wingspan and tail height, but not the dimensions of the aircraft undercarriage. Updated guidance establishes Taxiway Design Groups (TDGs), which is based on Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG). Taxiway-type objectives are determined by airport classification, with airports in more demanding classifications having an objective of a more complex taxiway system. Taxiway width objectives are determined by each airport’s ultimate ARC.

Figure 7 summarizes the percentage of airports by classification that meet primary taxiway objectives. In total, 85 percent of applicable Arizona system airports meet taxiway objectives, including 100 percent of Commercial Service-International, 78 percent of Commercial Service-National, 89 percent of GA-Community, and 100 percent of GA-Rural. While all Reliever airports meet their objectives for taxiway type, only half of the airports in the classification meet objectives for taxiway width. Several airports exceed their classification objectives for taxiway type and meet the “desired” objectives, including 78 percent of GA-Community airports that have a full parallel taxiway instead of the minimum partial parallel. Also exceeding the objectives for taxiway type are most of the airports in the GA-Rural classification: nine airports in this classification have a full parallel taxiway, four have a partial parallel, and one airport has a stub—all exceeding the minimum of turnarounds. There is no objective for GA-Basic airports.



Source: Google Earth 2017

Figure 7. Percentage of Airports by Classification Meeting Primary Taxiway Objectives

Table 6 details primary taxiway type and width objective performance at Arizona system airports.

Table 6. Primary Taxiway Objective Performance by Airport

Associated City	Airport Name	Existing Taxiway Type	Existing Taxiway Width	Ultimate ARC	Objective Taxiway Width	Meets Objective
Commercial Service-International: Consistent with Master Plan						
Phoenix	Phoenix Sky Harbor International	Full Parallel	75	D-V	75	Yes
Tucson	Tucson International	Full Parallel	75	D-IV	75	Yes
Commercial Service-National: Consistent with Master Plan						
Bullhead City	Laughlin/Bullhead City International	Full Parallel	75	D-IV	75	Yes
Flagstaff	Flagstaff Pulliam	Full Parallel	50	C-III	50	Yes
Grand Canyon	Grand Canyon National Park	Full Parallel	75	C-III	50	Yes
Page	Page Municipal	Full Parallel	40	B-II	35	Yes
Peach Springs	Grand Canyon West	Full Parallel	35	C-II	35	Yes
Phoenix	Phoenix-Mesa Gateway	Full Parallel	75	D-V	75	Yes
Prescott	Ernest A. Love Field	Full Parallel	50	C-III	50	Yes
Show Low	Show Low Regional	Partial Parallel	50	C-III	50	No
Yuma	Yuma International	Full Parallel	75	E-VI	100	No
Reliever: Full Parallel; Width per ARC						
Chandler	Chandler Municipal	Full Parallel	40	C-III	50	No
Glendale	Glendale Municipal	Full Parallel	35	C-III	50	No
Goodyear	Phoenix Goodyear	Full Parallel	75	D-IV	75	Yes
Marana	Marana Regional	Full Parallel	50	C-III	50	Yes
Mesa	Falcon Field	Full Parallel	50	C-III	50	Yes
Phoenix	Phoenix Deer Valley	Full Parallel	40	C-III	50	No
Scottsdale	Scottsdale	Full Parallel	40	C-III	50	No
Tucson	Ryan Field	Full Parallel	50	C-III	50	Yes
GA-Community: Full or Partial Parallel; Width per ARC						
Benson	Benson Municipal	Full Parallel	35	B-II	35	Yes
Buckeye	Buckeye Municipal	Full Parallel	40	B-II	35	Yes
Casa Grande	Casa Grande Municipal	Full Parallel	40	B-II	35	Yes
Coolidge	Coolidge Municipal	Partial Parallel	35	C-IV	75	No
Cottonwood	Cottonwood Municipal	Partial Parallel	40	B-II	35	Yes
Kingman	Kingman	Full Parallel	75	C-III	50	Yes
Lake Havasu City	Lake Havasu City	Full Parallel	50	C-III	50	Yes
Marana	Pinal Airpark	Full Parallel	75	D-V	75	Yes
Nogales	Nogales	Full Parallel	50	C-II	35	Yes
Parker	Avi Suquilla	Full Parallel	50	C-II	35	Yes
Payson	Payson	Full Parallel	35	B-II	35	Yes
Safford	Safford Regional	Full Parallel	35	B-II	35	Yes
Sedona	Sedona	Partial Parallel	35	B-II	35	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Full Parallel	75	E-V	75	Yes
Springerville	Springerville Municipal	Full Parallel	30	B-II	35	No
St. Johns	St. Johns Industrial Air Park	Full Parallel	40	B-II	35	Yes
Wickenburg	Wickenburg Municipal	Full Parallel	35	B-II	35	Yes
Willcox	Cochise County	Partial Parallel	35	B-II	35	Yes
GA-Rural: Full or Partial Parallel, Connectors, or Turnarounds; Width per ARC						
Bisbee	Bisbee Municipal	Full Parallel	35	B-II	35	Yes

Associated City	Airport Name	Existing Taxiway Type	Existing Taxiway Width	Ultimate ARC	Objective Taxiway Width	Meets Objective
Chinle	Chinle Municipal	Turnaround	0	B-I	25	Yes
Colorado City	Colorado City Municipal	Partial Parallel	35	B-II	35	Yes
Douglas	Bisbee-Douglas International	Stub	35	C-I	25	Yes
Douglas	Cochise College	Full Parallel	25	B-I	25	Yes
Douglas	Douglas Municipal	Partial Parallel	30	B-II	35	Yes
Eloy	Eloy Municipal	Full Parallel	40	B-I	25	Yes
Gila Bend	Gila Bend Municipal	Full Parallel	40	B-II	35	Yes
Holbrook	Holbrook Municipal	Partial Parallel	35	B-I	25	Yes
Maricopa	Ak-Chin Regional	Full Parallel	30	B-I	25	Yes
San Luis	Rolle Airfield	Turnaround	0	B-I	25	Yes
San Manuel	San Manuel	Partial Parallel	35	B-I	25	Yes
Taylor	Taylor	Full Parallel	35	B-II	35	Yes
Whiteriver	Whiteriver	Full Parallel	30	B-II	35	Yes
Williams	H.A. Clark Memorial Field	Full Parallel	50	B-II	35	Yes
Window Rock	Window Rock	Turnaround	0	B-II	35	Yes
Winslow	Winslow-Lindbergh Regional	Full Parallel	50	C-II	35	Yes
GA-Basic: None						
Ajo	Eric Marcus Municipal	None	0	B-I	25	NA
Bagdad	Bagdad	None	0	B-I	25	NA
Cibecue	Cibecue	None	0	A-I	25	NA
Clifton	Greenlee County	Full Parallel	35	B-II	35	NA
Globe	San Carlos Apache	Full Parallel	35	C-II	35	NA
Kayenta	Kayenta	Turnaround	0	B-II	35	NA
Kearny	Kearny	Turnaround	0	A-I	25	NA
Polacca	Polacca	Turnaround	0	A-I	25	NA
Seligman	Seligman	Full Parallel	35	B-I	25	NA
Sells	Sells	Turnaround	0	A-I	25	NA
Superior	Superior	None	0	B-II	35	NA
Tombstone	Tombstone Municipal	None	0	A-I	25	NA
Tuba City	Tuba City	Turnaround	0	B-II	35	NA

Sources: Airport Inventory and Data Survey 2017, Kimley-Horn

Instrument Approach Procedures

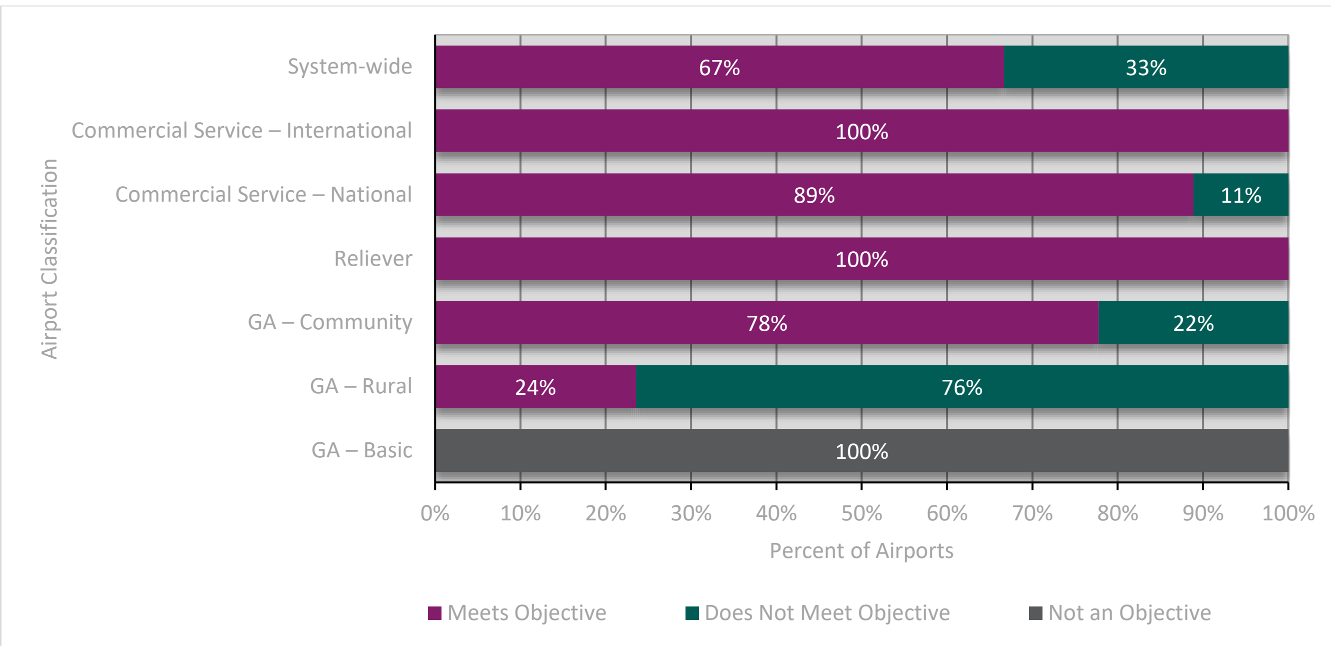
IAPs provide navigational guidance to aircraft beyond simple visual operations. An IAP can significantly improve an airport's operational efficiency and safety by allowing a pilot to navigate without visual reference to a point close enough to the runway that visual contact can be made. This is particularly important during times of low visibility or inclement weather. IAP minima are expressed in terms of cloud ceiling (feet) and visibility distance to the runway (miles). The more advanced the IAP, the lower these minima, and the closer the aircraft can come to the runway without having to make visual contact. While IAPs come in many forms, from instrument landing systems to global positioning system-based technology, they are categorized into the following three tiers for the purposes of the SASP Update:

1. **Precision approach:** The most advanced approaches that provide both horizontal and vertical guidance, with minima not higher than ¾ mile for cloud ceiling and 200 feet for visibility.
2. **Approach with vertical guidance (APV):** An approach that provides both horizontal and vertical guidance but with higher cloud ceiling and visibility minima than a precision approach.
3. **Non-precision approach:** An approach that provides only horizontal guidance.

Airports with only a visual approach have no published IAPs.

Figure 8 summarizes IAP objective performance for the Arizona system. In total, 67 percent of applicable airports meet their IAP objective, including 100 percent of Commercial Service-International and Reliever airports. With only four of 17 airports meeting the objective, GA-Rural was the lowest performing classification category. There is no IAP objective for GA-Basic airports.

Several airports exceeded their classification objectives for IAP, meeting the “desired” objectives. This includes both Commercial Service-International and five Commercial Service-National airports having precision IAPs. In addition, four of eight Reliever airports exceeded the non-precision objective, with three having an APV approach and one airport (Ryan Airfield in Tucson) having a precision approach. All four of the GA-Rural airports that met the IAP objective did so with the desired non-precision approach over the minimum circling approach.



Source: Airport Inventory and Data Survey 2017

Figure 8. Percentage of Airports by Classification Meeting Instrument Approach Objectives

Table 7 details IAP objectives by airport.

Table 7. Instrument Approach Objective Performance by Airport

Associated City	Airport Name	Existing Approach Capability	Meets Objective
Commercial Service-International: Precision (Desired); Near-Precision (Minimum)			
Phoenix	Phoenix Sky Harbor International	Precision	Yes
Tucson	Tucson International	Precision	Yes
Commercial Service-National: Precision (Desired); Near-Precision (Minimum)			
Bullhead City	Laughlin/Bullhead City International	APV	Yes
Flagstaff	Flagstaff Pulliam	Precision	Yes
Grand Canyon	Grand Canyon National Park	Precision	Yes
Page	Page Municipal	APV	Yes
Peach Springs	Grand Canyon West	Visual	No
Phoenix	Phoenix-Mesa Gateway	Precision	Yes
Prescott	Ernest A. Love Field	Precision	Yes
Show Low	Show Low Regional	APV	Yes
Yuma	Yuma International	Precision	Yes
Reliever: Asphalt/Paved: Near-Precision (Desired); Non-Precision (Minimum)			
Chandler	Chandler Municipal	Non-Precision	Yes
Glendale	Glendale Municipal	APV	Yes
Goodyear	Phoenix Goodyear	Non-Precision	Yes
Marana	Marana Regional	Non-Precision	Yes
Mesa	Falcon Field	Non-Precision	Yes
Phoenix	Phoenix Deer Valley	APV	Yes
Scottsdale	Scottsdale	APV	Yes
Tucson	Ryan Field	Precision	Yes
GA-Community: Non-Precision			
Benson	Benson Municipal	Visual	No
Buckeye	Buckeye Municipal	Visual	No
Casa Grande	Casa Grande Municipal	Precision	Yes
Coolidge	Coolidge Municipal	Non-Precision	Yes
Cottonwood	Cottonwood Municipal	Non-Precision	Yes
Kingman	Kingman	APV	Yes
Lake Havasu City	Lake Havasu City	APV	Yes
Marana	Pinal Airpark	Visual	No
Nogales	Nogales	Non-Precision	Yes
Parker	Avi Suquilla	APV	Yes
Payson	Payson	Non-Precision	Yes
Safford	Safford Regional	APV	Yes
Sedona	Sedona	Non-Precision	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Precision	Yes
Springerville	Springerville Municipal	Non-Precision	Yes
St. Johns	St. Johns Industrial Air Park	APV	Yes
Wickenburg	Wickenburg Municipal	Visual	No
Willcox	Cochise County	APV	Yes
GA-Rural: Non-Precision or Circling			
Bisbee	Bisbee Municipal	Visual	No
Chinle	Chinle Municipal	Visual	No
Colorado City	Colorado City Municipal	Visual	No
Douglas	Bisbee-Douglas International	Non-Precision	Yes
Douglas	Cochise College	Visual	No

Associated City	Airport Name	Existing Approach Capability	Meets Objective
Douglas	Douglas Municipal	Visual	No
Eloy	Eloy Municipal	Visual	No
Gila Bend	Gila Bend Municipal	Visual	No
Holbrook	Holbrook Municipal	Visual	No
Maricopa	Ak-Chin Regional	Visual	No
San Luis	Rolle Airfield	Visual	No
San Manuel	San Manuel	Visual	No
Taylor	Taylor	Non-Precision	Yes
Whiteriver	Whiteriver	Visual	No
Williams	H.A. Clark Memorial Field	Visual	No
Window Rock	Window Rock	Non-Precision	Yes
Winslow	Winslow-Lindbergh Regional	Non-Precision	Yes
GA-Basic: None			
Ajo	Eric Marcus Municipal	Visual	N/A
Bagdad	Bagdad	Visual	N/A
Cibecue	Cibecue	Visual	N/A
Clifton	Greenlee County	Visual	N/A
Globe	San Carlos Apache	Non-Precision	N/A
Kayenta	Kayenta	Visual	N/A
Kearny	Kearny	Visual	N/A
Polacca	Polacca	Visual	N/A
Seligman	Seligman	Visual	N/A
Sells	Sells	Visual	N/A
Superior	Superior	Visual	N/A
Tombstone	Tombstone Municipal	Visual	N/A
Tuba City	Tuba City	Visual	N/A

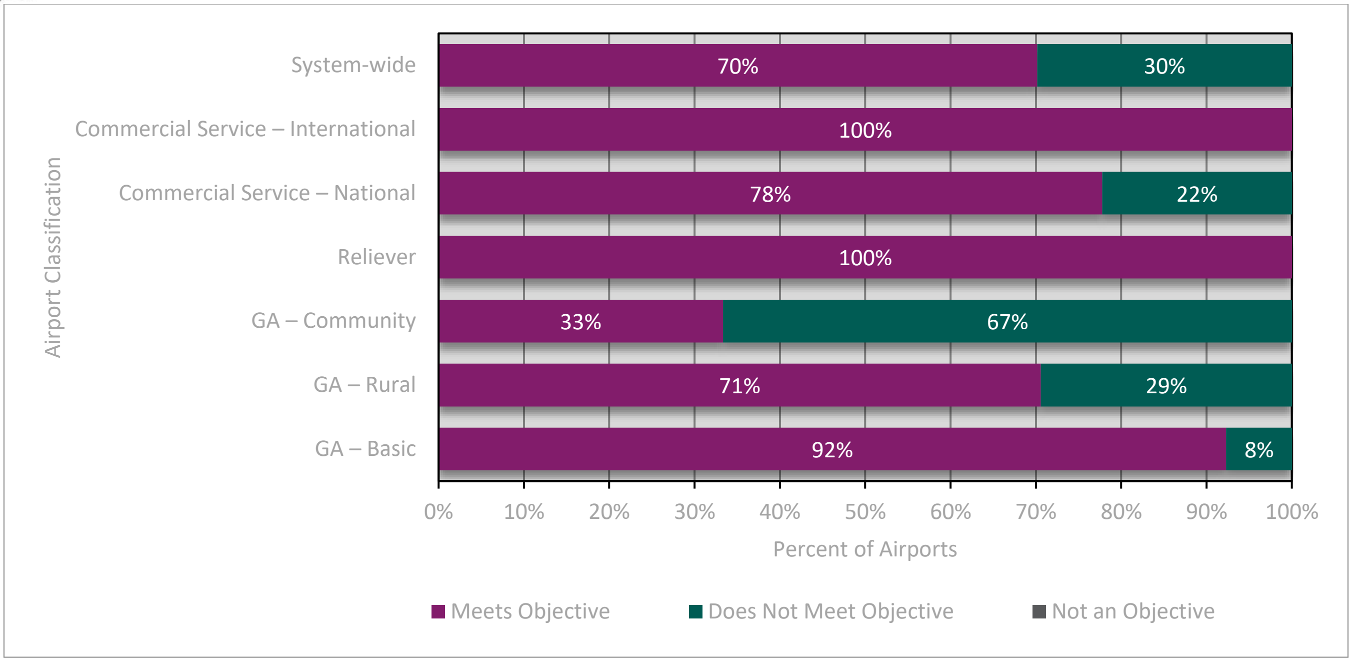
Sources: Airport Inventory and Data Survey 2017, Kimley-Horn

Visual Aids

Visual aids, also called navigational aids (NAVAIDs), are aviation equipment that assist pilots during the enroute phase of a flight and while on final approach. Visual aids often work in concert with IAPs and, like IAPs, are particularly important during times of inclement weather and decreased visibility. Visual aids allow for visual identification of runways, help pilots align with runway centerlines and to ensure proper approach paths. Visual aids included as part of the airside facility objectives analysis include the following:

1. Rotating beacon
2. Wind indicators (including lighted wind cones and wind socks)
3. Segmented circle
4. REILs
5. VGSI, including the precision approach path indicator (PAPI) and visual approach slope indicator (VASI)

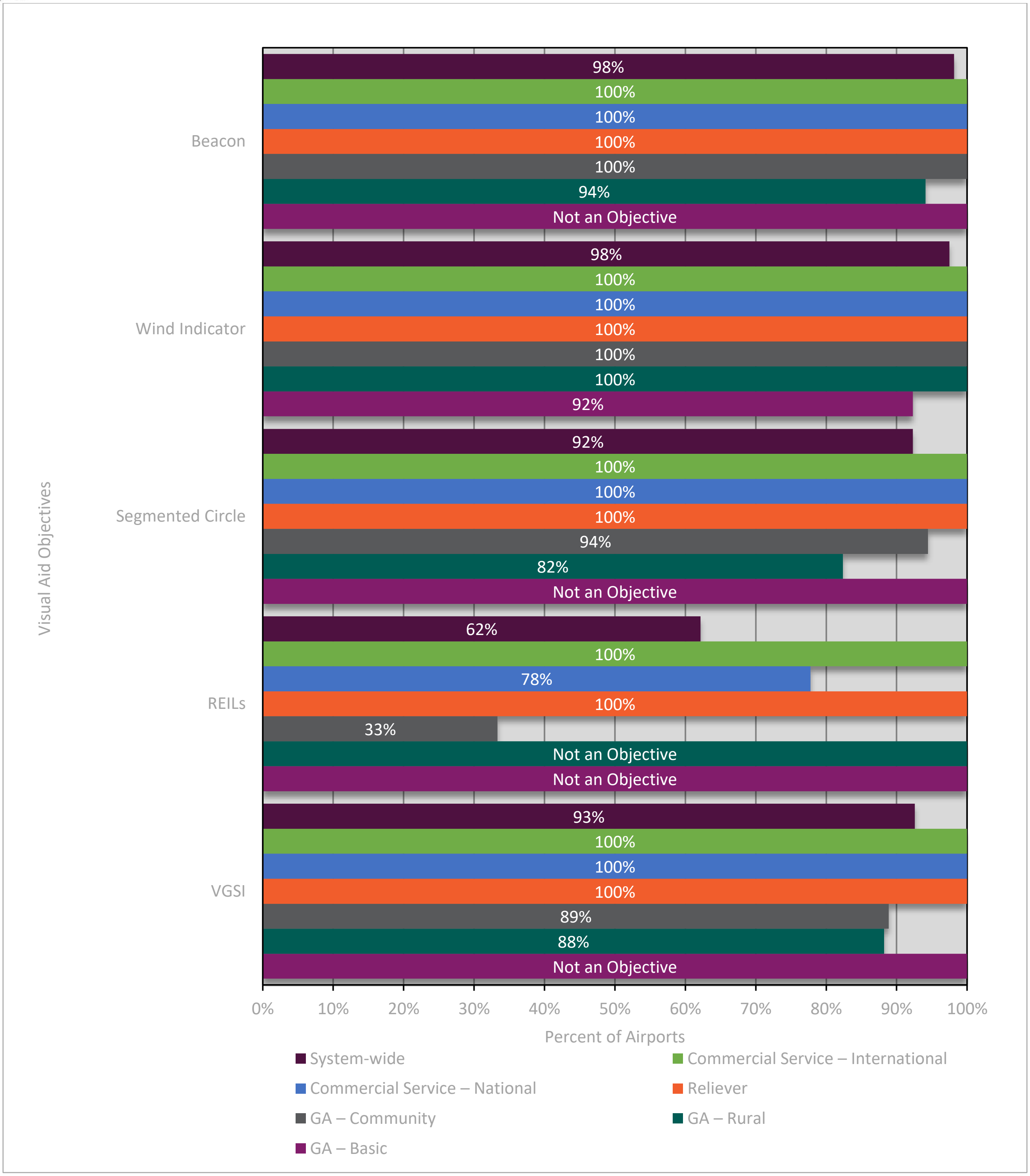
Figure 9 summarizes the percentage of airports by classification that meet all visual aid objectives, while **Figure 10** shows visual aids performance by individual facility. In total, 70 percent of Arizona system airports meet all visual aid objectives for their respective classification. This includes 100 percent of Commercial Service-International and Reliever airports, 92 percent of GA-Basic airports, 78 percent of Commercial Service-National airports, and 71 percent of GA-Rural airports. Only 33 percent of GA-Community airports meet all visual aid objectives, making it the lowest performing airport classification.



Source: Airport Inventory and Data Survey 2017

Figure 9. Percentage of Airports by Classification Meeting All Visual Aid Objectives

Individually, objectives related to rotating beacons and wind indicators performed the highest, each being met by 98 percent of the system. In addition, 93 percent of applicable airports have a VGSI, and 92 percent of applicable airports have a segmented circle. Rotating beacons, segmented circles, REILs, and VGSI are not objectives for GA-Basic airports.



Source: Airport Inventory and Data Survey 2017

Figure 10. Percentage of Airports by Classification Meeting Individual Visual Aid Objectives

Table 8 presents visual aid objectives by airport.

Table 8. Visual Aids Objective Performance by Airport

Associated City	Airport Name	Existing Visual Aids	Missing Objective Visual Aids	Meets Objective
Commercial Service-International: Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSIs				
Phoenix	Phoenix Sky Harbor	Rotating Beacon, Lighted Wind Cone, REILs, VGSI	N/A	Yes
Tucson	Tucson International	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Commercial Service-National: Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSIs				
Bullhead City	Laughlin/Bullhead City Int'l	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Flagstaff	Flagstaff Pulliam	Rotating Beacon, Lighted Wind Cone, VGSI	REILs	No
Grand Canyon	Grand Canyon National Park	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Page	Page Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Peach Springs	Grand Canyon West	Rotating Beacon, Wind Sock, Segmented Circle, REILs, VGSI	N/A	Yes
Phoenix	Phoenix-Mesa Gateway	Rotating Beacon, Wind Sock, Segmented Circle, REILs, VGSI	N/A	Yes
Prescott	Ernest A. Love Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Show Low	Show Low Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Yuma	Yuma International	Rotating Beacon, Lighted Wind Cone, VGSI	REILs	No
Reliever: Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSIs				
Chandler	Chandler Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Glendale	Glendale Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Goodyear	Phoenix Goodyear	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Marana	Marana Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Mesa	Falcon Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Phoenix	Phoenix Deer Valley	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Scottsdale	Scottsdale	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Tucson	Ryan Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
GA-Community: Rotating Beacon, Wind Cone, Segmented Circle, REILs, VGSIs				
Benson	Benson Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Buckeye	Buckeye Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Casa Grande	Casa Grande Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No

Associated City	Airport Name	Existing Visual Aids	Missing Objective Visual Aids	Meets Objective
Coolidge	Coolidge Municipal	Rotating Beacon, Wind Sock, Segmented Circle, VGSI	REILs	No
Cottonwood	Cottonwood Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Kingman	Kingman	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Lake Havasu City	Lake Havasu City	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Marana	Pinal Airpark	Rotating Beacon, Lighted Wind Cone, Segmented Circle	REILs, VGSI	No
Nogales	Nogales	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Parker	Avi Suquilla	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Payson	Payson	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Safford	Safford Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Sedona	Sedona	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Rotating Beacon, Lighted Wind Cone, VGSI	Segmented Circle, REILs	No
Springerville	Springerville Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
St. Johns	St. Johns Industrial Air Park	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	REILs	No
Wickenburg	Wickenburg Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Willcox	Cochise County	Rotating Beacon, Lighted Wind Cone, Segmented Circle	REILs, VGSI	No
GA-Rural: Rotating Beacon, Wind Cone, Segmented Circle, VGSIs				
Bisbee	Bisbee Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Chinle	Chinle Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Colorado City	Colorado City Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Douglas	Bisbee-Douglas International	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Douglas	Cochise College	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Douglas	Douglas Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Eloy	Eloy Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Gila Bend	Gila Bend Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Holbrook	Holbrook Municipal	Rotating Beacon, Lighted Wind Cone, REILs, VGSI	Segmented Circle	No
Maricopa	Ak-Chin Regional	Rotating Beacon, Wind Sock, Segmented Circle	VGSI	No
San Luis	Rolle Airfield	Wind Sock, Segmented Circle	Rotating Beacon, VGSI	No

Associated City	Airport Name	Existing Visual Aids	Missing Objective Visual Aids	Meets Objective
San Manuel	San Manuel	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Taylor	Taylor	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Whiteriver	Whiteriver	Rotating Beacon, Wind Sock, REILs, VGSI	Segmented Circle	No
Williams	H.A. Clark Memorial Field	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Window Rock	Window Rock	Rotating Beacon, Lighted Wind Cone, REILs, VGSI	Segmented Circle	No
Winslow	Winslow-Lindbergh Regional	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
GA-Basic: Wind Sock				
Ajo	Eric Marcus Municipal	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Bagdad	Bagdad	Rotating Beacon, Wind Sock	N/A	Yes
Cibecue	Cibecue	Wind Sock	N/A	Yes
Clifton	Greenlee County	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes
Globe	San Carlos Apache	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Kayenta	Kayenta	Rotating Beacon, Wind Sock, Segmented Circle, VGSI	N/A	Yes
Kearny	Kearny	Wind Sock	N/A	Yes
Polacca	Polacca	Lighted Wind Cone	N/A	Yes
Seligman	Seligman	Rotating Beacon, Lighted Wind Cone, Segmented Circle, REILs, VGSI	N/A	Yes
Sells	Sells	None	Wind Indicator	No
Superior	Superior	Wind Sock	N/A	Yes
Tombstone	Tombstone Municipal	Wind Sock	N/A	Yes
Tuba City	Tuba City	Rotating Beacon, Lighted Wind Cone, Segmented Circle, VGSI	N/A	Yes

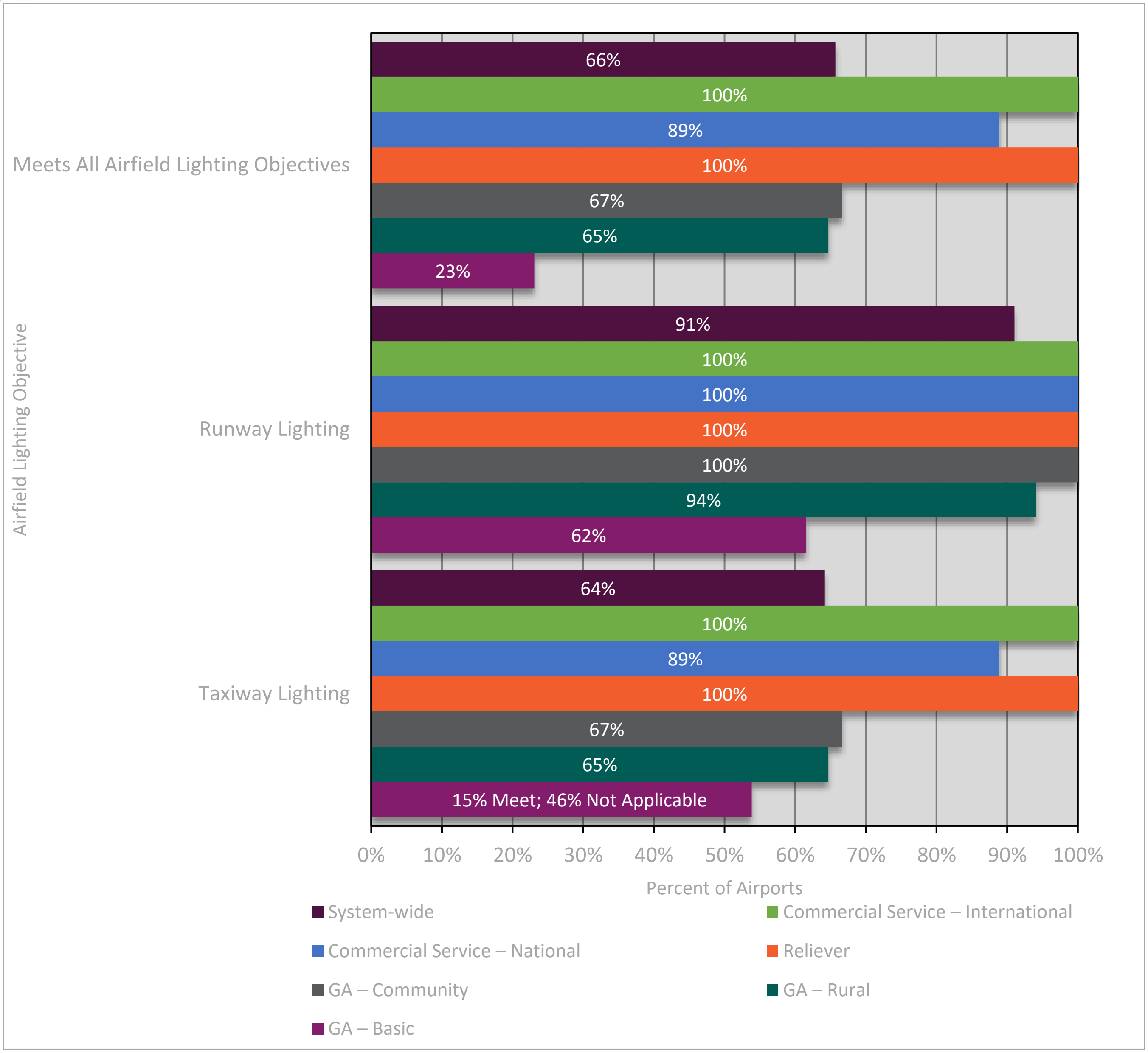
Source: Airport Inventory and Data Survey 2017

Airfield Lighting

Airfield lighting identifies runways and taxiways at night or other times of reduced visibility. Airfield lighting is classified based on the brightness/intensity each system of lighting can produce. Runway lights are grouped as high, medium, and low intensity runway lighting (HIRL, MIRL, and LIRL, respectively), while taxiway lights are grouped similarly (HITL, MITL, and LITL). To meet the benchmark for airfield lighting, each system airport must meet its objectives for both runway and taxiway lighting. Note that GA-Basic airports are only held to the objective of having taxiway reflectors if the airport has an existing taxiway.

Figure 11 summarizes airfield lighting objectives by SASP classification, including performance for both runway and taxiway lighting in addition to full airfield lighting performance. In total, 66 percent of Arizona's system airports meet airfield lighting objectives, including 100 percent of Commercial Service-International and Reliever airports. Individually, 91 percent of the system meets objectives for runway lighting, and 64 percent of the system meets objectives for taxiway lighting.

While only held to the objective of MIRL and MITL, it is considered desirable for airports in the Commercial Service-International and Commercial Service-National classifications to have HIRL and HITL. Both Commercial Service-International and two Commercial Service-National airports have HIRL, but no airports in these classifications have HITL.



Source: Airport Inventory and Data Survey 2017

Figure 11. Percentage of Airports by Classification Meeting Airfield Lighting Objectives

Table 9 details airfield lighting at each system airport.

Table 9. Airfield Lighting Objective Performance by Airport

Associated City	Airport Name	Existing Runway Lighting	Existing Taxiway Lighting	Meets Objective
Commercial Service-International: HIRL/HITL (Desired); MIRL/MITL (Minimum)				
Phoenix	Phoenix Sky Harbor International	HIRL	MITL	Yes
Tucson	Tucson International	HIRL	MITL	Yes
Commercial Service-National: HIRL/HITL (Desired); MIRL/MITL (Minimum)				
Bullhead City	Laughlin/Bullhead City International	MIRL	MITL	Yes
Flagstaff	Flagstaff Pulliam	HIRL	MITL	Yes
Grand Canyon	Grand Canyon National Park	MIRL	MITL	Yes
Page	Page Municipal	MIRL	MITL	Yes
Peach Springs	Grand Canyon West	MIRL	None	No
Phoenix	Phoenix-Mesa Gateway	MIRL	MITL	Yes
Prescott	Ernest A. Love Field	MIRL	MITL	Yes
Show Low	Show Low Regional	MIRL	MITL	Yes
Yuma	Yuma International	HIRL	MITL	Yes
Reliever: 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: MIRL/MITL				
Benson	Benson Municipal	MIRL	MITL	Yes
Buckeye	Buckeye Municipal	MIRL	MITL	Yes
Casa Grande	Casa Grande Municipal	MIRL	MITL	Yes
Coolidge	Coolidge Municipal	MIRL	MITL	Yes
Cottonwood	Cottonwood Municipal	MIRL	None	No
Kingman	Kingman	MIRL	MITL	Yes
Lake Havasu City	Lake Havasu City	MIRL	MITL	Yes
Marana	Pinal Airpark	MIRL	Reflectors	No
Nogales	Nogales	MIRL	MITL	Yes
Parker	Avi Suquilla	MIRL	MITL	Yes
Payson	Payson	MIRL	Reflectors	No
Safford	Safford Regional	MIRL	MITL	Yes
Sedona	Sedona	MIRL	MITL	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	HIRL	MITL	Yes
Springerville	Springerville Municipal	MIRL	Reflectors	No
St. Johns	St. Johns Industrial Air Park	MIRL	Reflectors	No
Wickenburg	Wickenburg Municipal	MIRL	MITL	Yes
Willcox	Cochise County	MIRL	Reflectors	No
GA-Rural: MIRL/MITL				
Bisbee	Bisbee Municipal	MIRL	MITL	Yes
Chinle	Chinle Municipal	MIRL	MITL	Yes
Colorado City	Colorado City Municipal	MIRL	MITL[1]	Yes

[1] Colorado City Airport's MITL is located on a taxiway connected to the secondary runway.

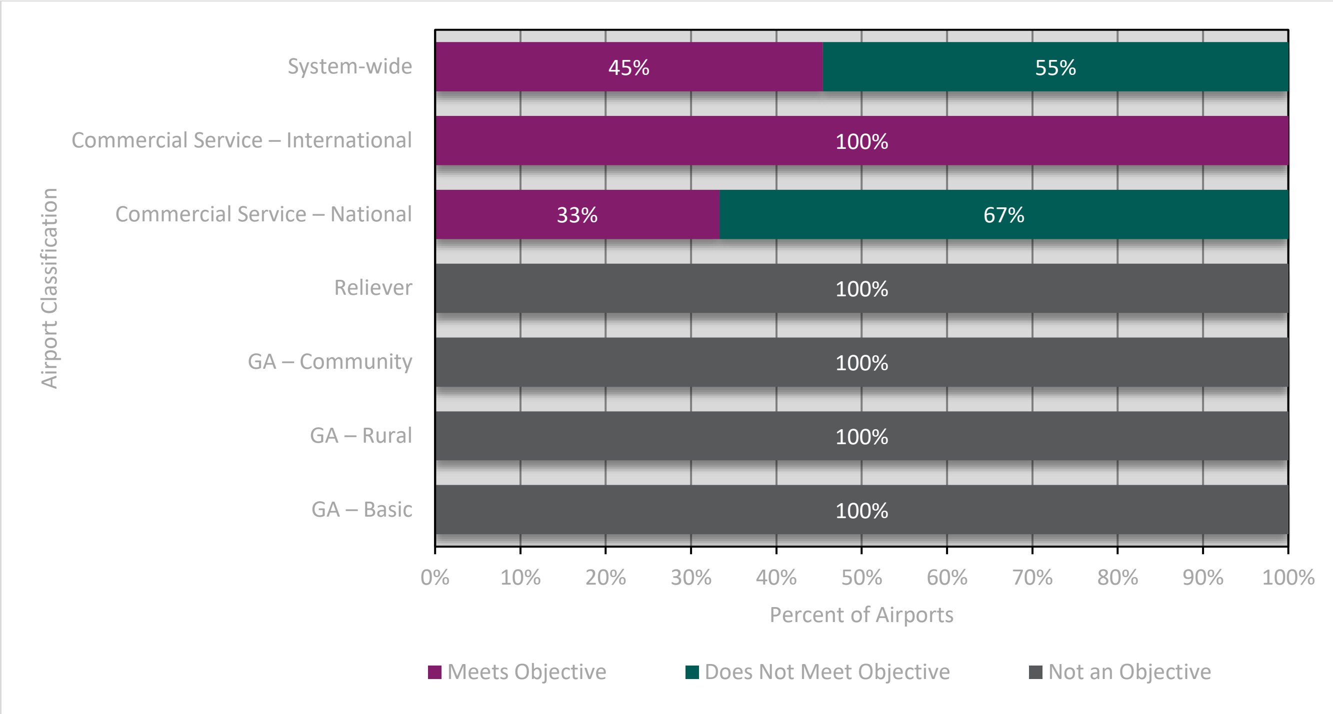
Associated City	Airport Name	Existing Runway Lighting	Existing Taxiway Lighting	Meets Objective
Douglas	Bisbee-Douglas International	MIRL	MITL	Yes
Douglas	Cochise College	MIRL	MITL	Yes
Douglas	Douglas Municipal	MIRL	MITL	Yes
Eloy	Eloy Municipal	MIRL	MITL	Yes
Gila Bend	Gila Bend Municipal	MIRL	MITL	Yes
Holbrook	Holbrook Municipal	MIRL	MITL	Yes
Maricopa	Ak-Chin Regional	MIRL	None	No
San Luis	Rolle Airfield	None	None	No
San Manuel	San Manuel	MIRL	MITL	Yes
Taylor	Taylor	MIRL	Reflectors	No
Whiteriver	Whiteriver	MIRL	None	No
Williams	H.A. Clark Memorial Field	MIRL	None	No
Window Rock	Window Rock	MIRL	None	No
Winslow	Winslow-Lindbergh Regional	MIRL	MITL	Yes
GA-Basic: Reflectors (if Airport has Taxiway)				
Ajo	Eric Marcus Municipal	MIRL	N/A	Yes
Bagdad	Bagdad	None	N/A	No
Cibecue	Cibecue	None	N/A	No
Clifton	Greenlee County	MIRL	Reflectors	Yes
Globe	San Carlos Apache	MIRL	None	No
Kayenta	Kayenta	MIRL	None	No
Kearny	Kearny	None	None	No
Polacca	Polacca	NSTD	None	No
Seligman	Seligman	MIRL	MITL	Yes
Sells	Sells	NSTD	None	No
Superior	Superior	None	N/A	No
Tombstone	Tombstone Municipal	None	N/A	No
Tuba City	Tuba City	MIRL	None	No

Source: Airport Inventory and Data Survey 2017

Approach Lighting System

An ALS extends outward from a runway end and allows pilots to visually align with a runway while on approach to land. Types of ALS installed at Arizona airports include the medium intensity approach lighting system with runway alignment indicator lights (MALSRs) and medium intensity approach lighting system with sequenced flashing lights (MALSFs).

Only Arizona's Commercial Service-International and Commercial Service-National airports are held to the objective of having an ALS. As shown in **Figure 12**, 45 percent of Arizona's commercial service airports have an ALS. This includes both Commercial Service-International airports and three of eight Commercial Service-National Airports. While an ALS is considered desirable for Reliever airports, no Arizona Reliever airports currently have an ALS.



Source: Airport Inventory and Data Survey 2017

Figure 12. Percentage of Airports by Classification Meeting ALS Objectives

Table 10 details ALS objective performance by airport.

Table 10. ALS Objective Performance by Airport

Associated City	Airport Name	Existing ALS	Meets Objective
Commercial Service-International: ALS			
Phoenix	Phoenix Sky Harbor International	MALSF	Yes
Tucson	Tucson International	MALSR	Yes
Commercial Service-National: ALS			
Bullhead City	Laughlin/Bullhead City International	None	No
Flagstaff	Flagstaff Pulliam	MALSR	Yes
Grand Canyon	Grand Canyon National Park	None	No
Page	Page Municipal	None	No
Peach Springs	Grand Canyon West	None	No
Phoenix	Phoenix-Mesa Gateway	None	No
Prescott	Ernest A. Love Field	MALSR	Yes
Show Low	Show Low Regional	None	No
Yuma	Yuma International	MALSR	Yes

Source: Airport Inventory and Data Survey 2017

LANDSIDE FACILITIES AND SERVICES

Landside facilities and services are important elements of an airport's attractiveness to customers. Hangar storage, apron parking, and ground handling services such as aircraft fuel and oxygen help to draw both visiting customers and based businesses. Terminal facilities such as phones, internet, and a pilot's lounge are important to passengers as well as pilots.

Landside facilities included in SASP Update objectives include the following:

1. Airport fencing
2. Aprons and tie-downs
3. Hangars
4. Terminal buildings
5. Automobile parking

Landside services included in SASP Update objectives include the following:

1. Automated weather reporting
2. Fixed base operator (FBO)
3. Air taxi/charter
4. Aircraft rental
5. Aircraft maintenance
6. Avionics sales and service
7. Aircraft fuel: AvGas and Jet A
8. Deicing
9. Oxygen
10. Snow Removal
11. Ground transportation
12. On-site rental car
13. Internet access
14. Phone access
15. Restroom
16. U.S. Customs

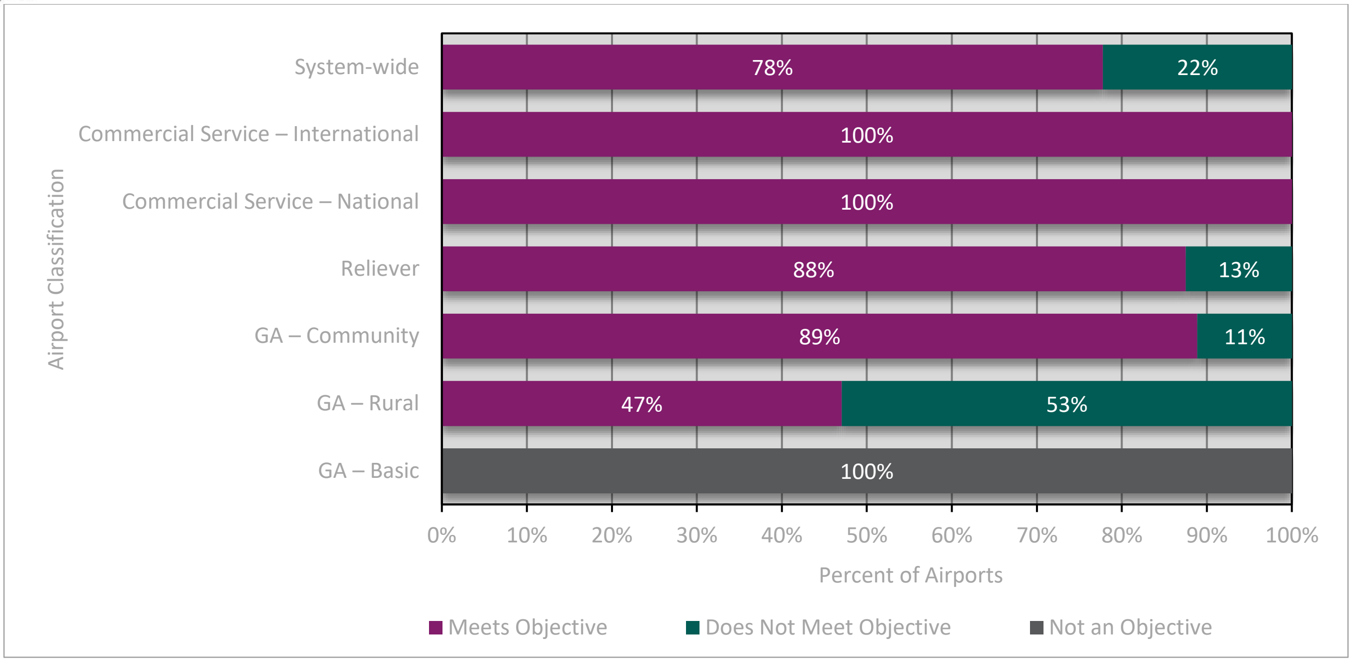
Landside Facilities

Airfield fencing is a crucial component of airport safety and security. For the purposes of the SASP Update, the fencing objective is for airports to have full perimeter fencing around the entire airport property. While it is not an objective for GA-Basic airports to have perimeter fencing, it is desired. Full perimeter fencing may come in any of four forms:

1. Four-foot barb wire fencing
2. Six-foot chain link fencing
3. Eight-foot security fencing
4. 10-foot wildlife fencing

In addition to fencing, airports in the Commercial Service-International, Commercial Service-National, and Reliever classifications are held to the objective of having secured access. This secured or limited access most commonly comes in the form of security gates that require access cards for entry.

Figure 13 summarizes fencing objective performance at Arizona system airports. System-wide, 78 percent of all airports meet objectives for fencing, including 100 percent of both Commercial Service-International and Commercial Service-National classifications, and most airports in the Reliever and GA-Community classifications. While airports in the GA-Basic classification are not held to a specific objective, it is still considered desirable for these airports to have perimeter fencing. Of the 13 GA-Basic airports, six currently have full perimeter fencing, while three have partial perimeter fencing.



Source: Airport Inventory and Data Survey 2017

Figure 13. Percentage of Airports by Classification Meeting Airport Fencing Objectives

Table 11 details perimeter fencing objective performance by airport.

Table 11. Airport Fencing Objective Performance by Airport

Associated City	Airport Name	Existing Airport Fencing	Meets Objective
Commercial Service-International: Full Perimeter Fencing with Controlled Access			
Phoenix	Phoenix Sky Harbor International	Full Perimeter with Controlled Access	Yes
Tucson	Tucson International	Full Perimeter with Controlled Access	Yes
Commercial Service-National: Full Perimeter Fencing with Controlled Access			
Bullhead City	Laughlin/Bullhead City International	Full Perimeter with Controlled Access	Yes
Flagstaff	Flagstaff Pulliam	Full Perimeter with Controlled Access	Yes
Grand Canyon	Grand Canyon National Park	Full Perimeter with Controlled Access	Yes
Page	Page Municipal	Full Perimeter with Controlled Access	Yes
Peach Springs	Grand Canyon West	Full Perimeter with Controlled Access	Yes
Phoenix	Phoenix-Mesa Gateway	Full Perimeter with Controlled Access	Yes
Prescott	Ernest A. Love Field	Full Perimeter with Controlled Access	Yes
Show Low	Show Low Regional	Full Perimeter with Controlled Access	Yes
Yuma	Yuma International	Full Perimeter with Controlled Access	Yes
Reliever: Full Perimeter Fencing with Controlled Access			
Chandler	Chandler Municipal	Full Perimeter with Controlled Access	Yes
Glendale	Glendale Municipal	Full Perimeter with Controlled Access	Yes
Goodyear	Phoenix Goodyear	Full Perimeter with Controlled Access	Yes
Marana	Marana Regional	Partial Perimeter with Controlled Access	No
Mesa	Falcon Field	Full Perimeter with Controlled Access	Yes

Associated City	Airport Name	Existing Airport Fencing	Meets Objective
Phoenix	Phoenix Deer Valley	Full Perimeter with Controlled Access	Yes
Scottsdale	Scottsdale	Full Perimeter with Controlled Access	Yes
Tucson	Ryan Field	Full Perimeter with Controlled Access	Yes
GA-Community: Full Perimeter Fencing			
Benson	Benson Municipal	Full Perimeter with Controlled Access	Yes
Buckeye	Buckeye Municipal	Full Perimeter with Controlled Access	Yes
Casa Grande	Casa Grande Municipal	Full Perimeter with Controlled Access	Yes
Coolidge	Coolidge Municipal	Full Perimeter	Yes
Cottonwood	Cottonwood Municipal	Full Perimeter with Controlled Access	Yes
Kingman	Kingman	Full Perimeter with Controlled Access	Yes
Lake Havasu City	Lake Havasu City	Full Perimeter with Controlled Access	Yes
Marana	Pinal Airpark	Partial Perimeter with Controlled Access	No
Nogales	Nogales	Full Perimeter with Controlled Access	Yes
Parker	Avi Suquilla	Full Perimeter	Yes
Payson	Payson	Full Perimeter	Yes
Safford	Safford Regional	Full Perimeter with Controlled Access	Yes
Sedona	Sedona	Full Perimeter with Controlled Access	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	Full Perimeter with Controlled Access	Yes
Springerville	Springerville Municipal	Partial Perimeter	No
St. Johns	St. Johns Industrial Air Park	Full Perimeter	Yes
Wickenburg	Wickenburg Municipal	Full Perimeter with Controlled Access	Yes
Willcox	Cochise County	Full Perimeter	Yes
GA-Rural: Full Perimeter Fencing			
Bisbee	Bisbee Municipal	Full Perimeter	Yes
Chinle	Chinle Municipal	Full Perimeter	Yes
Colorado City	Colorado City Municipal	None	No
Douglas	Bisbee-Douglas International	Full Perimeter	Yes
Douglas	Cochise College	Partial Perimeter with Controlled Access	No
Douglas	Douglas Municipal	Partial Perimeter	No
Eloy	Eloy Municipal	Partial Perimeter with Controlled Access	No
Gila Bend	Gila Bend Municipal	Full Perimeter	Yes
Holbrook	Holbrook Municipal	Full Perimeter	Yes
Maricopa	Ak-Chin Regional	Full Perimeter with Controlled Access	Yes
San Luis	Rolle Airfield	Full Perimeter with Controlled Access	Yes
San Manuel	San Manuel	Partial Perimeter	No
Taylor	Taylor	Partial Perimeter with Controlled Access	No
Whiteriver	Whiteriver	Partial Perimeter with Controlled Access	No
Williams	H.A. Clark Memorial Field	Full Perimeter with Controlled Access	Yes
Window Rock	Window Rock	Partial Perimeter	No
Winslow	Winslow-Lindbergh Regional	Partial Perimeter with Controlled Access	No
GA-Basic: Perimeter Fencing (Desired)			
Ajo	Eric Marcus Municipal	None	NA
Bagdad	Bagdad	Full Perimeter	NA
Cibecue	Cibecue	Partial Perimeter	NA
Clifton	Greenlee County	Full Perimeter with Controlled Access	NA
Globe	San Carlos Apache	Full Perimeter	NA
Kayenta	Kayenta	Full Perimeter	NA

Associated City	Airport Name	Existing Airport Fencing	Meets Objective
Kearny	Kearny	Partial Perimeter	NA
Polacca	Polacca	Full Perimeter	NA
Seligman	Seligman	Partial Perimeter with Controlled Access	NA
Sells	Sells	None	NA
Superior	Superior	Full Perimeter	NA
Tombstone	Tombstone Municipal	None	NA
Tuba City	Tuba City	None	NA

Source: Airport Inventory and Data Survey 2017

Landside facilities are important elements of an airport's infrastructure in terms of both airport operations and economic activity. Like airside facilities and landside services, landside facilities are often catalysts for airport activity, both based and transient. Facilities for parking and storing aircraft are among the most essential landside facilities. These range from surface parking on apron tie-downs to T-hangar and box hangar storage. The type of storage or parking needed at each airport can depend on several factors, including airport activities, the volume of operations, climate, and an operator's desire for security. Tie-down parking is common for transient aircraft that are visiting for a shorter period of time, while covered hangar storage is often preferred for based aircraft. Objectives for apron and hangar capacity are based on the volume of transient operations at an airport and the number of based aircraft:

Apron objectives:

1. Reliever: 25 percent of based fleet and 75 percent for transient
2. GA-Community: 40 percent of based fleet and 50 percent for transient
3. GA -Rural: 50 percent of based fleet and 25 percent for transient

Hangar objectives:

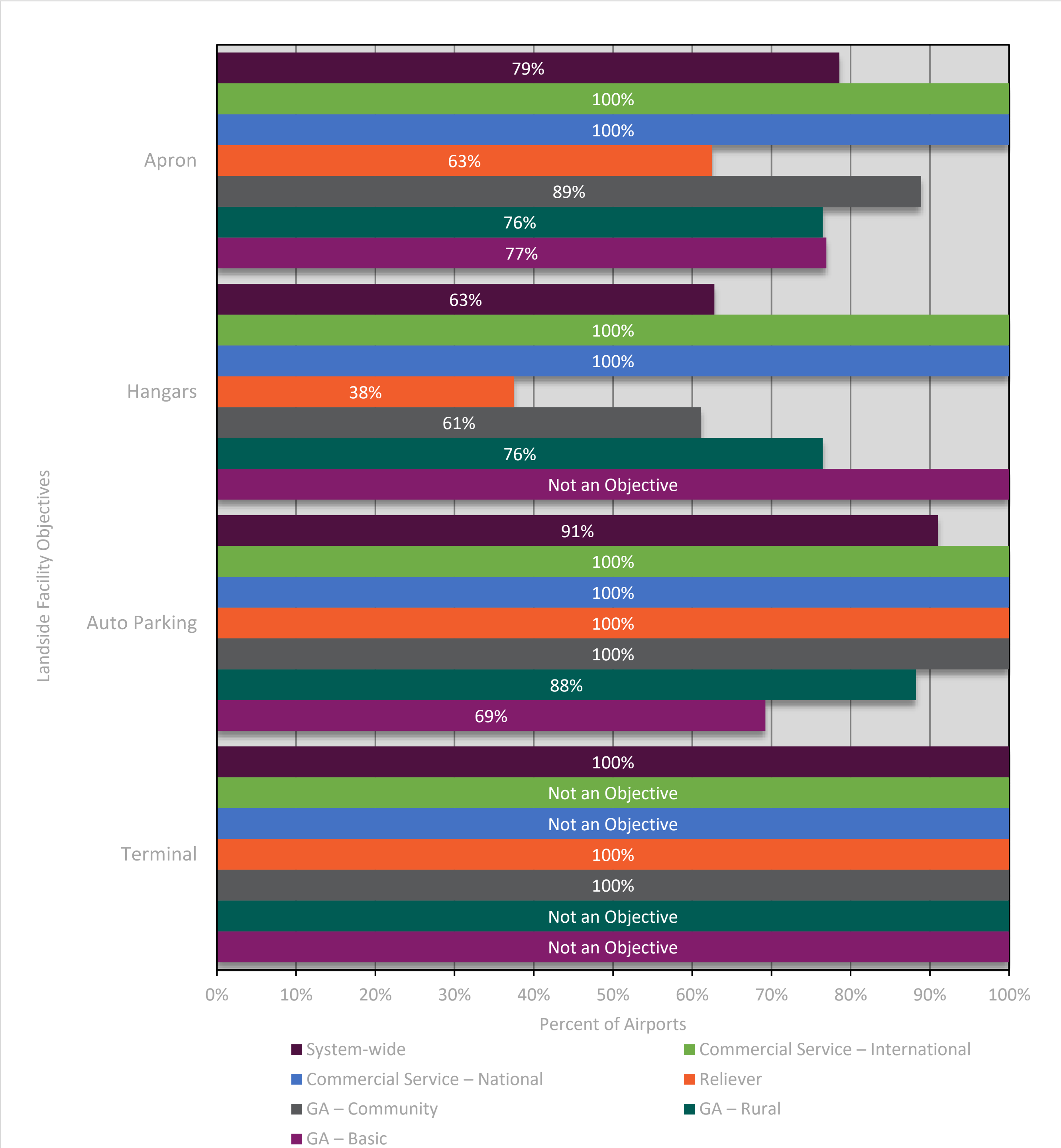
1. Reliever: 75 percent of based fleet and 25 percent overnight
2. GA-Community: 60 percent of based fleet and 25 percent overnight
3. GA-Rural: 50 percent of based fleet and 25 percent overnight

An airport terminal is another common and important landside facility. A terminal is typically seen as a gateway or welcome center for both the airport and its community. GA terminals may serve a variety of roles depending on the types and volume of aviation activity. A terminal is often the location of an airport's FBO, and may house facilities such as pilots lounge, weather information area, flight planning area, conference rooms, and flight observation area.

Surface automobile parking is another necessary landside facility. Airport users need a place to park their cars upon arrival at an airport, while automobile parking lots also provide a necessary facility to rental car facilities. For security reasons, automobile parking located away from hangars and other sensitive areas is preferable.

Figure 14 summarizes the percentage of airports by classification meeting apron, hangar, auto parking, and terminal facility objectives. In total, 79 percent of applicable airports meet apron capacity objectives, 63 percent meet hangar capacity objectives, 91 meet objectives for automobile parking areas, and 100 percent of applicable airports meet terminal objectives.

Table 12 provides details on these four landside facility objectives performance.



Source: Airport Inventory and Data Survey 2017

Figure 14. Percentage of Airports by Classification Meeting Landside Facility Objectives

Table 12. Landside Facility Objective Performance by Airport

Associated City	Airport Name	Apron Capacity Objective	Current Apron Capacity	Hangar Capacity Objective	Current Hangar Capacity	Auto Parking	Terminal	Meets All Facility Objectives
Commercial Service-International: Consistent with Master Plan with the Following Minimums – Apron, Auto Parking, Operations/Maintenance Hangar								
Phoenix	Phoenix Sky Harbor International	N/A	42	N/A	81	Yes	With Pilot's Lounge	Yes
Tucson	Tucson International	N/A	85	N/A	32,019	Yes	With Pilot's Lounge	Yes
Commercial Service-National: Consistent with Master Plan with the Following Minimums – Apron, Auto Parking, Operations/Maintenance Hangar								
Bullhead City	Laughlin/Bullhead City International	N/A	55	N/A	31	Yes	With Pilot's Lounge	Yes
Flagstaff	Flagstaff Pulliam	N/A	60	N/A	49	Yes	Terminal	Yes
Grand Canyon	Grand Canyon National Park	N/A	96	N/A	0	Yes	Terminal	Yes
Page	Page Municipal	N/A	104	N/A	62	Yes	With Pilot's Lounge	Yes
Peach Springs	Grand Canyon West	N/A	42	N/A	0	Yes	With Pilot's Lounge	Yes
Phoenix	Phoenix-Mesa Gateway	N/A	115	N/A	152	Yes	With Pilot's Lounge	Yes
Prescott	Ernest A. Love Field	N/A	222	N/A	165	Yes	Terminal	Yes
Show Low	Show Low Regional	N/A	100	N/A	50	Yes	With Pilot's Lounge	Yes
Yuma	Yuma International	N/A	144	N/A	125	Yes	With Pilot's Lounge	Yes
Reliever: Apron (25% of Based Fleet and 75% for Transient), Auto Parking, Hangars (75% of Based Fleet and 25% Overnight), Terminal with Pilot's Lounge								
Chandler	Chandler Municipal	189	286	349	244	Yes	With Pilot's Lounge	No
Glendale	Glendale Municipal	97	0	221	244	Yes	With Pilot's Lounge	No
Goodyear	Phoenix Goodyear	97	93	178	127	Yes	With Pilot's Lounge	No
Marana	Marana Regional	93	131	194	245	Yes	With Pilot's Lounge	Yes
Mesa	Falcon Field	224	436	536	485	Yes	With Pilot's Lounge	No
Phoenix	Phoenix Deer Valley	363	366	737	783	Yes	With Pilot's Lounge	Yes
Scottsdale	Scottsdale	197	227	354	207	Yes	With Pilot's Lounge	No
Tucson	Ryan Field	105	93	203	123	Yes	With Pilot's Lounge	No
GA-Community: Apron (40% of Based Fleet and 50% for Transient), Auto Parking, Hangars (60% of Based Fleet and 25% Overnight), Terminal with Appropriate Facilities								
Benson	Benson Municipal	26	65	28	17	Yes	With Pilot's Lounge	No
Buckeye	Buckeye Municipal	54	59	49	42	Yes	With Pilot's Lounge	No

Associated City	Airport Name	Apron Capacity Objective	Current Apron Capacity	Hangar Capacity Objective	Current Hangar Capacity	Auto Parking	Terminal	Meets All Facility Objectives
Casa Grande	Casa Grande Municipal	111	18	77	52	Yes	With Pilot's Lounge	No
Coolidge	Coolidge Municipal	21	30	28	47	Yes	Terminal	Yes
Cottonwood	Cottonwood Municipal	14	82	12	34	Yes	With Pilot's Lounge	Yes
Kingman	Kingman	68	160	92	95	Yes	Terminal	Yes
Lake Havasu City	Lake Havasu City	69	185	84	71	Yes	With Pilot's Lounge	No
Marana	Pinal Airpark	3	0	3	57	Yes	With Pilot's Lounge	No
Nogales	Nogales	18	31	18	18	Yes	With Pilot's Lounge	Yes
Parker	Avi Suquilla	15	78	12	27	Yes	With Pilot's Lounge	Yes
Payson	Payson	36	53	36	8	Yes	Terminal	No
Safford	Safford Regional	28	32	35	39	Yes	With Pilot's Lounge	Yes
Sedona	Sedona	29	95	39	67	Yes	With Pilot's Lounge	Yes
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	28	28	33	65	Yes	With Pilot's Lounge	Yes
Springerville	Springerville Municipal	6	41	8	3	Yes	With Pilot's Lounge	No
St. Johns	St. Johns Industrial Air Park	15	20	11	7	Yes	With Pilot's Lounge	No
Wickenburg	Wickenburg Municipal	35	38	32	53	Yes	With Pilot's Lounge	Yes
Willcox	Cochise County	15	22	16	18	Yes	With Pilot's Lounge	Yes
GA-Rural: Apron (50% of Based Fleet and 25% for Transient), Auto Parking, Hangars (50% of Based Fleet and 25% for Transient)								
Bisbee	Bisbee Municipal	15	35	14	3	Yes	With Pilot's Lounge	No
Chinle	Chinle Municipal	3	3	2	0	Yes	None	No
Colorado City	Colorado City Municipal	8	17	7	14	Yes	With Pilot's Lounge	Yes
Douglas	Bisbee-Douglas International	8	4	4	48	Yes	With Pilot's Lounge	No
Douglas	Cochise College	9	35	8	12	Yes	With Pilot's Lounge	Yes
Douglas	Douglas Municipal	7	45	6	21	Yes	With Pilot's Lounge	Yes
Eloy	Eloy Municipal	15	27	12	36	Yes	None	Yes
Gila Bend	Gila Bend Municipal	4	56	3	6	Yes	With Pilot's Lounge	Yes
Holbrook	Holbrook Municipal	9	5	8	4	Yes	With Pilot's Lounge	No
Maricopa	Ak-Chin Regional	20	12	16	3	Yes	With Pilot's Lounge	No
San Luis	Rolle Airfield	0	4	0	2	No	None	No
San Manuel	San Manuel	13	20	12	28	Yes	With Pilot's Lounge	Yes

Associated City	Airport Name	Apron Capacity Objective	Current Apron Capacity	Hangar Capacity Objective	Current Hangar Capacity	Auto Parking	Terminal	Meets All Facility Objectives
Taylor	Taylor	8	24	8	16	Yes	With Pilot's Lounge	Yes
Whiteriver	Whiteriver	1	17	0	0	No	None	No
Williams	H.A. Clark Memorial Field	4	0	3	16	Yes	With Pilot's Lounge	No
Window Rock	Window Rock	5	12	4	12	Yes	With Pilot's Lounge	Yes
Winslow	Winslow-Lindbergh Regional	11	15	7	9	Yes	With Pilot's Lounge	Yes
GA-Basic: Apron, Auto Parking								
Ajo	Eric Marcus Municipal	1	9	N/A	2	Yes	None	Yes
Bagdad	Bagdad	1	12	N/A	1	Yes	None	Yes
Cibecue	Cibecue	1	0	N/A	0	No	None	No
Clifton	Greenlee County	1	20	N/A	2	Yes	With Pilot's Lounge	Yes
Globe	San Carlos Apache	1	40	N/A	5	Yes	Terminal	Yes
Kayenta	Kayenta	1	17	N/A	0	Yes	Terminal	Yes
Kearny	Kearny	1	7	N/A	4	Yes	None	Yes
Polacca	Polacca	1	2	N/A	0	No	None	No
Seligman	Seligman	1	14	N/A	0	Yes	None	Yes
Sells	Sells	1	0	N/A	0	Yes	None	No
Superior	Superior	1	0	N/A	0	No	None	No
Tombstone	Tombstone Municipal	1	4	N/A	0	No	None	No
Tuba City	Tuba City	1	8	N/A	0	Yes	None	Yes

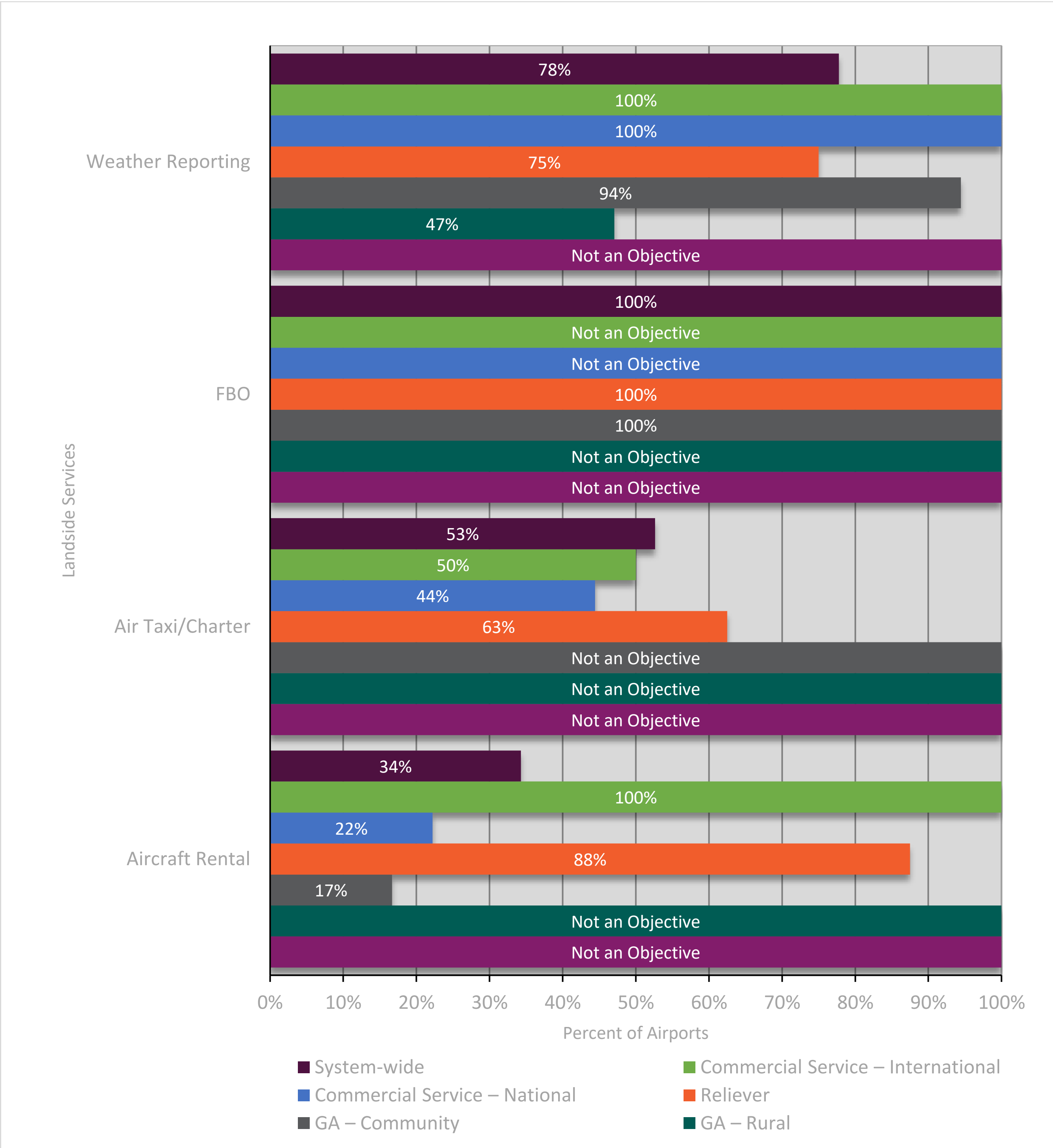
Source: Airport Inventory and Data Survey 2017

Landside Services

The types and level of pilot and passenger services available at an airport can greatly influence the types of activities and aviation operations that can be supported. Airports that have a greater number and range of aviation services are better prepared to attract activities ranging from recreational flying to high-end business aviation. An FBO is a common provider of services at airports, providing ground handling services such as fueling and oxygen, but these services may also be provided by the airport sponsor. Other common aviation services include ground transportation, deicing, aircraft maintenance and avionics service, and aircraft rental. Air taxi and charter services help to improve an airport's chances of attracting business activity, while pilot services such as automated weather reporting via an Automated Weather Observing System (AWOS) or Automated Surface Observing System (ASOS) can improve accessibility and operational safety. Various terminal services such as phones, restrooms, and internet access are also needed at many airports, while a U.S. Customs and Border Protection facility can be an important service at many commercial airports.

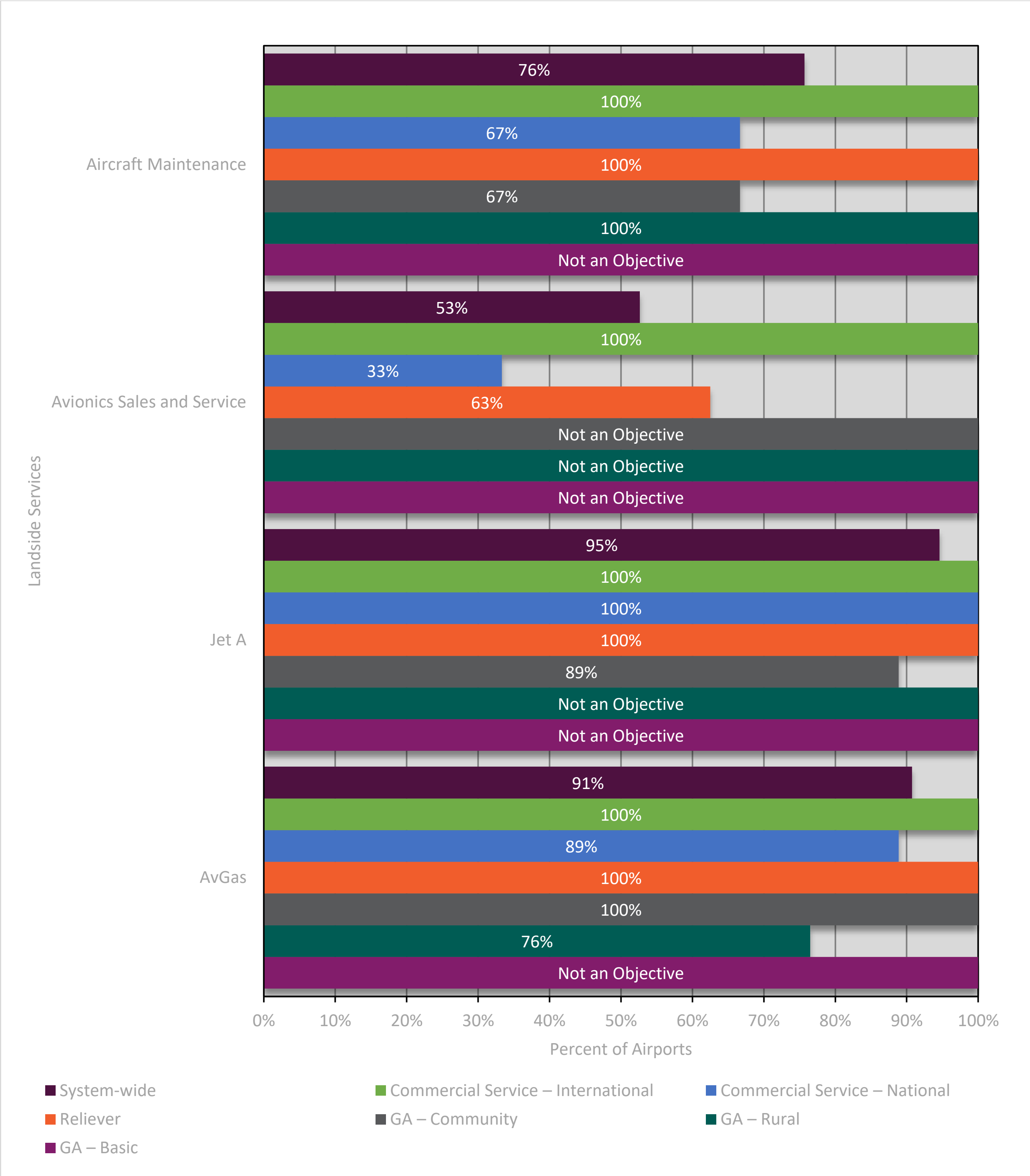
Figure 15 through **Figure 18** summarize landside service objective performance at Arizona system airports. While only one airport, Colorado City Municipal Airport, meets all service objectives, this is largely due to an expanded list of service objectives in comparison to the previous SASP. Many individual facility objectives performed very well, however. Airports in the Reliever and GA-Community classifications have an FBO objective, and all of these airports meet this objective. In addition, 95 percent of applicable airports meet objectives for jet fuel service, while 91 percent meet objectives for AvGas. Other high performing service objectives include restroom facilities (91 percent of applicable airports), internet access (84 percent), and on-site rental car

(82 percent). The lowest performing service objectives were U.S. Customs services (26 percent of applicable airports), deicing (27 percent), and phone access (33 percent). **Table 13** details service objective performance by individual airport.



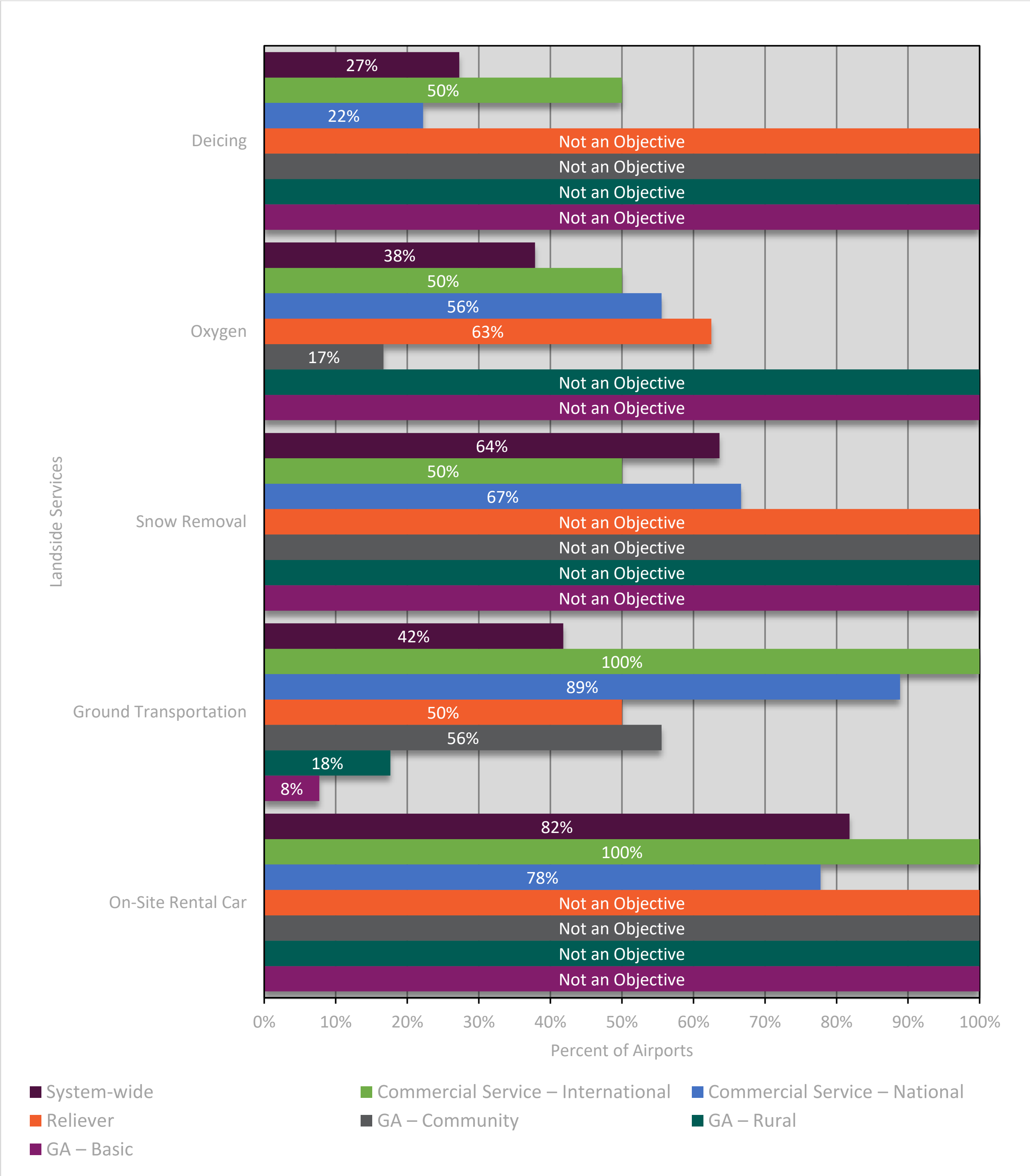
Source: Airport Inventory and Data Survey 2017

Figure 15. Percentage of Airports by Classification Meeting Landside Service Objectives (1 of 4)



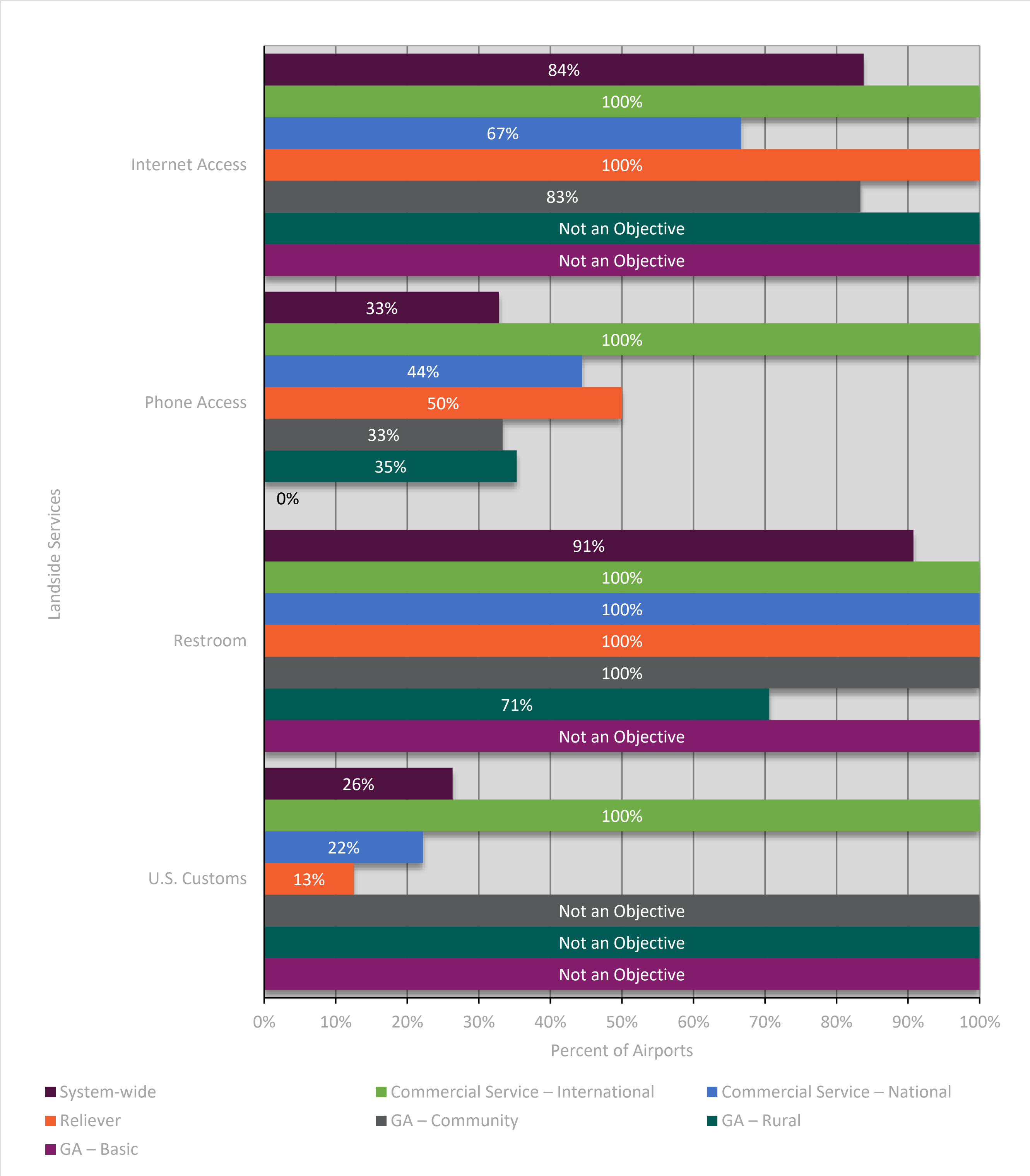
Source: Airport Inventory and Data Survey 2017

Figure 16. Percentage of Airports by Classification Meeting Landside Service Objectives (2 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 17. Percentage of Airports by Classification Meeting Landside Service Objectives (3 of 4)



Source: Airport Inventory and Data Survey 2017

Figure 18. Percentage of Airports by Classification Meeting Landside Service Objectives (4 of 4)

Table 13. Landside Services Objective Performance by Airport

Associated City	Airport Name	Existing Services	Missing Objective Services	Meets Objective
Commercial Service-International: Air Taxi/Charter, Aircraft Maintenance, AvGas, Avionics, Deicing, Ground Transportation, Internet Access, Jet A, On-Site Rental Car, Oxygen, Phone Access, Restroom, Snow Removal (as Needed), U.S. Customs, Weather Reporting				
Phoenix	Phoenix Sky Harbor	AWOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom, U.S. Customs	Deicing, Snow Removal	No
Tucson	Tucson International	ASOS, FBO, Aircraft Maintenance, Avionics, Jet A, AvGas, Deicing, Snow Removal, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom, U.S. Customs	Air Taxi/Charter, Oxygen	No
Commercial Service-National: Air Taxi/Charter, Aircraft Maintenance, Aircraft Rental, AvGas, Avionics, Deicing, Ground Transportation, Internet Access, Jet A, On-Site Rental Car, Oxygen, Phone Access, Restroom, Snow Removal (as Needed), U.S. Customs, Weather Reporting				
Bullhead City	Laughlin/Bullhead City Int'l	ASOS, FBO, Jet A, AvGas, Ground Transportation, On-Site Rental Car, Internet Access, Restroom	Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Deicing, Oxygen, Snow Removal, Phone Access, U.S. Customs	No
Flagstaff	Flagstaff Pulliam	ASOS, FBO, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Deicing, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Restroom	Air Taxi/Charter, Avionics, Snow Removal, Phone Access, U.S. Customs	No
Grand Canyon	Grand Canyon National Park	ASOS, FBO, Aircraft Maintenance, Jet A, AvGas, Snow Removal, Ground Transportation, Restroom	Air Taxi/Charter, Aircraft Rental, Avionics, Deicing, Oxygen, On-Site Rental Car, Internet Access, Phone Access, U.S. Customs	No
Page	Page Municipal	ASOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Snow Removal, Ground Transportation, On-Site Rental Car, Restroom	Aircraft Rental, Deicing, Internet Access, Phone Access, U.S. Customs	No
Peach Springs	Grand Canyon West	AWOS, Air Taxi/Charter, Jet A, Snow Removal, Phone Access, Restroom	Aircraft Rental, Aircraft Maintenance, Avionics, AvGas, Deicing, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, U.S. Customs	No
Phoenix	Phoenix-Mesa Gateway	ASOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom, U.S. Customs	Aircraft Rental, Deicing, Snow Removal	No
Prescott	Ernest A. Love Field	AWOS, FBO, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Jet A, AvGas, Deicing, Oxygen, Snow Removal, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom	U.S. Customs	No

Associated City	Airport Name	Existing Services	Missing Objective Services	Meets Objective
Show Low	Show Low Regional	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Snow Removal, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom	Air Taxi/Charter, Aircraft Rental, Avionics, Deicing, Oxygen, U.S. Customs	No
Yuma	Yuma International	ASOS, FBO, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Restroom, U.S. Customs	Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Deicing, Phone Access	No
Reliever: Air Taxi/Charter, Aircraft Maintenance, Aircraft Rental, AvGas, Avionics, FBO, Ground Transportation, Internet Access, Jet A, Oxygen, Phone Access, Restroom, U.S. Customs, Weather Reporting				
Chandler	Chandler Municipal	AWOS, FBO, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Jet A, AvGas, Internet Access, Phone Access, Restroom	Oxygen, Ground Transportation, U.S. Customs	No
Glendale	Glendale Municipal	AWOS, FBO, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Internet Access, Restroom	Air Taxi/Charter, Avionics, Oxygen, Ground Transportation, Phone Access, U.S. Customs	No
Goodyear	Phoenix Goodyear	FBO, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Phone Access, Restroom	Weather Reporting, Air Taxi/Charter, Avionics, U.S. Customs	No
Marana	Marana Regional	AWOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Restroom	Aircraft Rental, Phone Access, U.S. Customs	No
Mesa	Falcon Field	FBO, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Jet A, AvGas, Deicing, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Restroom	Weather Reporting, Phone Access, U.S. Customs	No
Phoenix	Phoenix Deer Valley	ASOS, FBO, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Oxygen, On-Site Rental Car, Internet Access, Phone Access, Restroom	Avionics, Ground Transportation, U.S. Customs	No
Scottsdale	Scottsdale	ASOS, FBO, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Internet Access, Restroom, U.S. Customs	Phone Access	No
Tucson	Ryan Field	AWOS, FBO, Aircraft Rental, Aircraft Maintenance, Avionics, Jet A, AvGas, Internet Access, Phone Access, Restroom	Air Taxi/Charter, Oxygen, Ground Transportation, U.S. Customs	No
GA-Community: Aircraft Maintenance, Aircraft Rental, AvGas, FBO, Ground Transportation, Internet Access, Jet A, Oxygen, Phone Access, Restroom, Weather Reporting				
Benson	Benson Municipal	AWOS, FBO, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Ground Transportation, Internet Access, Phone Access, Restroom	Oxygen	No
Buckeye	Buckeye Municipal	AWOS, FBO, AvGas, Ground Transportation, Internet Access, Restroom	Aircraft Rental, Aircraft Maintenance, Jet A, Oxygen, Phone Access	No

Associated City	Airport Name	Existing Services	Missing Objective Services	Meets Objective
Casa Grande	Casa Grande Municipal	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Internet Access, Restroom	Aircraft Rental, Oxygen, Ground Transportation, Phone Access	No
Coolidge	Coolidge Municipal	AWOS, FBO, Jet A, AvGas, Restroom	Aircraft Rental, Aircraft Maintenance, Oxygen, Ground Transportation, Internet Access, Phone Access	No
Cottonwood	Cottonwood Municipal	AWOS, AvGas, Ground Transportation, Internet Access, Phone Access, Restroom	Aircraft Rental, Aircraft Maintenance, Jet A, Oxygen	No
Kingman	Kingman	ASOS, FBO, Aircraft Maintenance, Jet A, AvGas, Phone Access, Restroom	Aircraft Rental, Oxygen, Ground Transportation, Internet Access	No
Lake Havasu City	Lake Havasu City	AWOS, Air Taxi/Charter, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Oxygen, Ground Transportation, On-Site Rental Car, Phone Access, Restroom	Internet Access	No
Marana	Pinal Airpark	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Oxygen, Internet Access, Restroom	Aircraft Rental, Ground Transportation, Phone Access	No
Nogales	Nogales	ASOS, FBO, Aircraft Rental, Aircraft Maintenance, Jet A, AvGas, Ground Transportation, Internet Access, Restroom, U.S. Customs	Oxygen, Phone Access	No
Parker	Avi Suquilla	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Internet Access, Restroom	Aircraft Rental, Oxygen, Ground Transportation, Phone Access	No
Payson	Payson	AWOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Snow Removal, Ground Transportation, Internet Access, Restroom	Aircraft Rental, Oxygen, Phone Access	No
Safford	Safford Regional	ASOS, FBO, Air Taxi/Charter, Aircraft Maintenance, Avionics, Jet A, AvGas, Oxygen, Ground Transportation, Internet Access, Phone Access, Restroom	Aircraft Rental	No
Sedona	Sedona	AWOS, FBO, Jet A, AvGas, Internet Access, Restroom	Aircraft Rental, Aircraft Maintenance, Oxygen, Ground Transportation, Phone Access	No
Sierra Vista	Sierra Vista Municipal-Libby Army Airfield	ASOS, FBO, Aircraft Maintenance, Jet A, AvGas, Deicing, Internet Access, Restroom	Aircraft Rental, Oxygen, Ground Transportation, Phone Access	No
Springerville	Springerville Municipal	AWOS, FBO, Jet A, AvGas, Snow Removal, Ground Transportation, Internet Access, Restroom	Aircraft Rental, Aircraft Maintenance, Oxygen, Phone Access	No
St. Johns	St. Johns Industrial Air Park	ASOS, FBO, Jet A, AvGas, Ground Transportation, Internet Access, Phone Access, Restroom	Aircraft Rental, Aircraft Maintenance, Oxygen	No
Wickenburg	Wickenburg Municipal	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Ground Transportation, Internet Access, Restroom, U.S. Customs	Aircraft Rental, Oxygen, Phone Access	No
Willcox	Cochise County	FBO, Aircraft Maintenance, Jet A, AvGas, Internet Access, Restroom	Weather Reporting, Aircraft Rental, Oxygen, Ground Transportation, Phone Access	No

Associated City	Airport Name	Existing Services	Missing Objective Services	Meets Objective
GA-Rural: AvGas, Ground Transportation, Phone Access, Restroom, Weather Reporting				
Bisbee	Bisbee Municipal	FBO, AvGas, Phone Access, Restroom	Weather Reporting, Ground Transportation	No
Chinle	Chinle Municipal	Jet A, Snow Removal	Weather Reporting, AvGas, Ground Transportation, Phone Access, Restroom	No
Colorado City	Colorado City Municipal	AWOS, FBO, Aircraft Maintenance, Jet A, AvGas, Snow Removal, Ground Transportation, Internet Access, Phone Access, Restroom	N/A	Yes
Douglas	Bisbee-Douglas International	ASOS, FBO, Aircraft Maintenance, Jet A, AvGas, Snow Removal, Restroom, U.S. Customs	Ground Transportation, Phone Access	No
Douglas	Cochise College	AvGas, Internet Access, Phone Access	Weather Reporting, Ground Transportation, Restroom	No
Douglas	Douglas Municipal	FBO, Jet A, AvGas	Weather Reporting, Ground Transportation, Phone Access, Restroom	No
Eloy	Eloy Municipal	FBO, Aircraft Maintenance, Jet A, AvGas, Restroom	Weather Reporting, Ground Transportation, Phone Access	No
Gila Bend	Gila Bend Municipal	FBO, AvGas, Internet Access, Phone Access, Restroom	Weather Reporting, Ground Transportation	No
Holbrook	Holbrook Municipal	AWOS, FBO, AvGas, Restroom	Ground Transportation, Phone Access	No
Maricopa	Ak-Chin Regional	FBO, Aircraft Rental, Aircraft Maintenance, AvGas, Internet Access, Restroom	Weather Reporting, Ground Transportation, Phone Access	No
San Luis	Rolle Airfield	N/A	Weather Reporting, AvGas, Ground Transportation, Phone Access, Restroom	No
San Manuel	San Manuel	AWOS, FBO, Aircraft Maintenance, AvGas, Internet Access, Restroom	Ground Transportation, Phone Access	No
Taylor	Taylor	AWOS, FBO, Aircraft Maintenance, AvGas, Snow Removal, Ground Transportation, Internet Access, Phone Access, Restroom	N/A	Yes
Whiteriver	Whiteriver	Snow Removal, U.S. Customs	Weather Reporting, AvGas, Ground Transportation, Phone Access, Restroom	No
Williams	H.A. Clark Memorial Field	AWOS, FBO, Aircraft Maintenance, AvGas, Snow Removal, On-Site Rental Car, Internet Access, Restroom	Ground Transportation, Phone Access	No
Window Rock	Window Rock	ASOS, FBO, Air Taxi/Charter, Jet A, Snow Removal, Internet Access, Phone Access, Restroom, U.S. Customs	AvGas, Ground Transportation	No
Winslow	Winslow-Lindbergh Regional	ASOS, FBO, Aircraft Maintenance, Jet A, AvGas, Snow Removal, Ground Transportation, On-Site Rental Car, Restroom, U.S. Customs	Phone Access	No
GA-Basic: Ground Transportation, Phone Access				
Ajo	Eric Marcus Municipal	Restroom	Ground Transportation, Phone Access	No
Bagdad	Bagdad	N/A	Ground Transportation, Phone Access	No

Associated City	Airport Name	Existing Services	Missing Objective Services	Meets Objective
Cibecue	Cibecue	N/A	Ground Transportation, Phone Access	No
Clifton	Greenlee County	AWOS, Restroom	Ground Transportation, Phone Access	No
Globe	San Carlos Apache	AWOS, AvGas	Ground Transportation, Phone Access	No
Kayenta	Kayenta	AWOS, Jet A, Snow Removal, Restroom	Ground Transportation, Phone Access	No
Kearny	Kearny	Aircraft Maintenance, AvGas, Ground Transportation, Restroom	Phone Access	No
Polacca	Polacca	N/A	Ground Transportation, Phone Access	No
Seligman	Seligman	Restroom	Ground Transportation, Phone Access	No
Sells	Sells	N/A	Ground Transportation, Phone Access	No
Superior	Superior	N/A	Ground Transportation, Phone Access	No
Tombstone	Tombstone Municipal	N/A	Ground Transportation, Phone Access	No
Tuba City	Tuba City	Snow Removal	Ground Transportation, Phone Access	No

Source: Airport Inventory and Data Survey 2017

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APPENDIX F: OUTSIDE INFLUENCES

INTRODUCTION

As preliminarily discussed in **Chapter 7: Future System Performance**, aviation is affected by variables beyond and independent of the Arizona airport system. These variables range is scale from global geopolitical forces, to federal and state-specific concerns, through local planning-level issues that affect how and when an airport can operate. Such demands are ever-changing. Further, some influences are chronic, while others arise far more acutely. Events like September 11, 2001 cause major industry overhauls seemingly overnight, while issues such as state and local population, employment, and residency trends exhibit their influence slowly over time. Economic variables like global oil prices provide ongoing pressures that can catalyze industry growth, contraction, and change.

While these types of influences exist independently from the aviation system, they are major components of the broader context in which airports operate and can play a major role in the system's ability to achieve existing and anticipated future aviation demands. For example, outside influences can affect how and when air transportation is used for the movement of goods and people and the associated manner in which airports respond to such demands. As such, reviewing the key outside influences affecting an aviation system is an important task when assessing the system's historical, current, and projected future performance.

For the purposes of the 2017 State Aviation System Plan (SASP) Update, it is primarily important to focus on those factors with the greatest potential to affect future demands. By understanding the future context in which the aviation system will function, policy, funding, and other recommendations developed as one of the final outcomes of the SASP Update can be designed to support optimal performance over time. In effect, embracing this long-term perspective supports the ongoing alignment of the system with contemporary demands and may help the Arizona Department of Transportation (ADOT) Aeronautics Group and airports maximize investments by ensuring improvement projects support long-term needs.

Accordingly, the following appendix provides an overview of key influences outside of aviation with the greatest potential to affect future aviation demand in Arizona, including:

1. Stability of oil prices
2. Population growth
3. Employment and industry trends
4. Business use of aviation services
5. Tourism and seasonal residency
6. International trade developments
7. Major surface transportation improvements

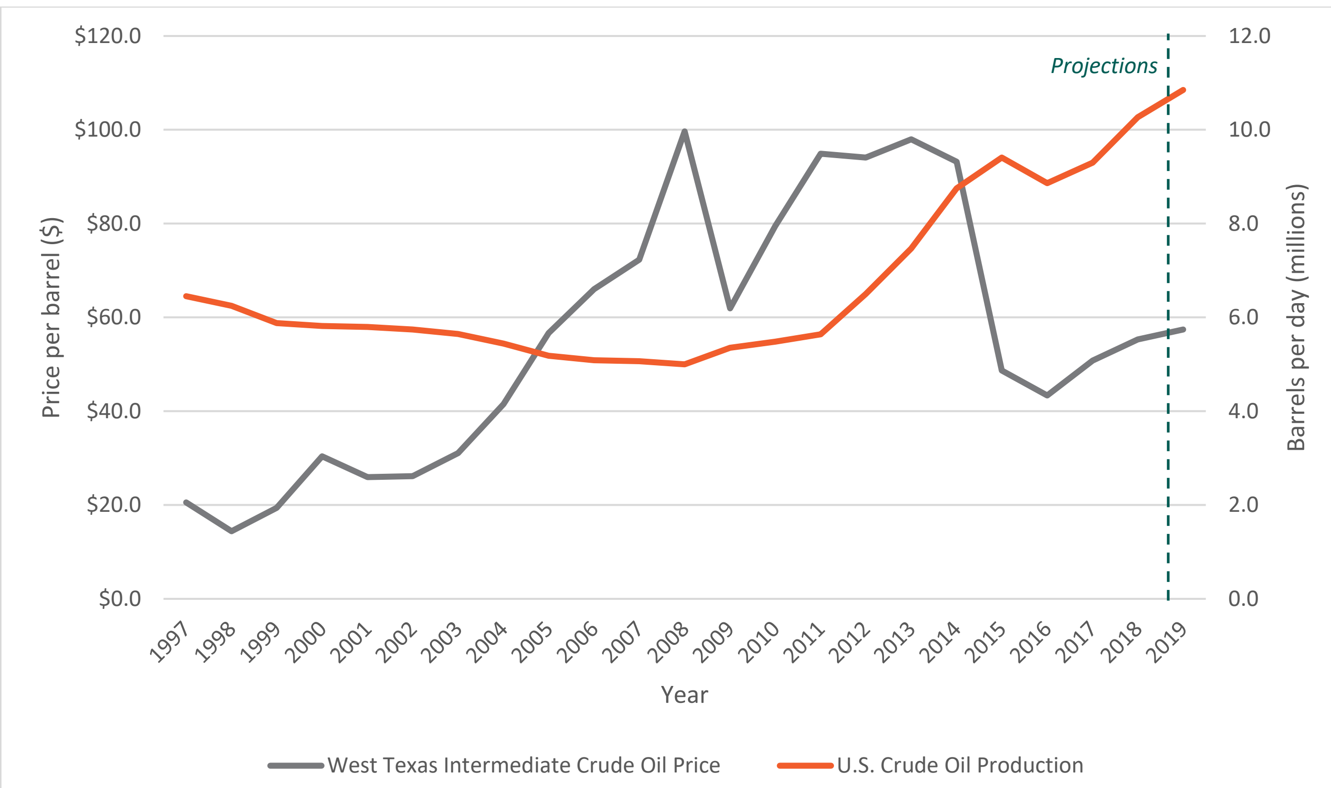
Planning for these types of future pressures also provides the opportunity to develop preemptive plans should significant changes occur to the state's aviation system. This proactive planning approach supports the system's ability to respond to future challenges and effectively function when the unexpected does occur, both of which are key components of a resilient airport system.

As previously noted, this appendix expands upon the information first presented in **Chapter 7: Future System Performance.**

STABILITY OF OIL PRICES

Because fuel is the largest operating expense for all types of aviation operators, the price of oil has a dramatic impact on the industry as a whole. According to the 2017 *Boeing Industry Outlook,* fuel comprises 20 to 30 percent of a commercial airline's operating cost. The general aviation (GA) community is similarly affected, including those pilots who fly for recreational and business purposes. For these pilots, flying may no longer be economic compared to other modes of transportation when the price of oil and, in turn, fuel costs rise.

As shown in **Figure 1**, the cost of oil over the past two decades has oscillated between $20.59 per barrel in 1997 to a high of $99.67 per barrel in 2008. After plummeting at the height of the economic downturn in 2009, prices generally returned to pre-recession levels by 2011. Oil prices reached historic lows in 2014 and appear to be stabilizing in recent years. However, oil production and costs remain contingent upon global geopolitical forces—moderating any appearance of long-term stability. As apparent in the figure below, costs do not always align with production, underlining the many factors that affect the global energy market. The *Federal Aviation Administration (FAA) Aerospace Forecast Fiscal Years 2017 – 2037* assumes that the price of oil "will rise to exceed $100 [per barrel] by 2026 and approach $132 by the end of the forecast period" (FAA 2017, 1).



Source: U.S. Energy Information Administration Short-term Energy Outlook 2018

Figure 1. West Texas Intermediate Crude Oil Price and U.S. Production (1997 – 2019)

While all segments of the aviation industry are affected by the stability of oil's cost, variability affects commercial airlines and the GA community differently. Commercial airline passengers may realize higher operational costs in ticket fares and amenity fees, such as seat selection, checked and carry-on baggage, early check-in, and food. Market volatility creates uncertainty in commercial airline's profitability outlooks (Boeing 2017). The industry has undertaken various strategies to mitigate this uncertainty, such as hedging oil prices on at least a portion of their fuel volume. Many carriers are replacing their fleets with newer, more fuel-efficient aircraft to mitigate profitability risks. In yet another strategy to protect against fuel spikes, Delta Air Lines purchased an oil refinery in Pennsylvania in 2012 for $150 million (with an additional $100 million required in refurbishments). While the refinery helps Delta control refinery costs, it does not control the price of crude oil, which continues to comprise the largest percent of jet fuel price.

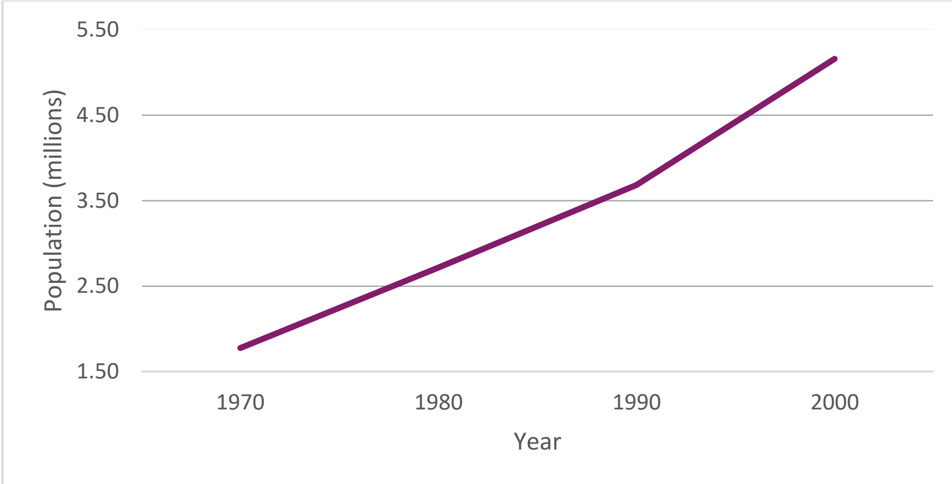
Such fluctuations in oil prices can be realized by passengers and the airports that serve them in several connected ways. When oil prices drop, ticket prices may or may not similarly decline. Ticket costs and the growing acceptance of amenity fees have spurred the growth and expansion of low-cost and ultra-low-cost carriers (LCC/ULCC), such as Spirit, Southwest, Allegiant, and Frontier airlines. Like many places with high tourism rates, fluctuating ticket prices and associated service levels may have a particularly acute impact on Arizona as potential visitors decide where and how to travel.

Ticket costs are also a major driver of airline capacity. When tickets drop and demand increases, airlines may increase capacity by expanding their fleets or adding operations. Conversely, decreased demand associated with higher ticket costs may cause airlines to contract service levels as carriers strive to balance demand with capacity.

Like the commercial service market, the GA community faces its own challenges associated with oil prices. Increased oil costs can quickly make flying prohibitively expensive for many GA pilots and passengers, including businesses that use aviation services. It may also serve as a barrier for potential new pilots and aviation enthusiasts from entering the industry, further exacerbating the international shortage in pilots, mechanics, and other aviation professionals. Volatile and higher oil prices may cause some aircraft owners to purchase newer, more fuel-efficient engines, which could lower fuel sales for airport owners and fixed-base operators (FBOs). As fuel generally composes the highest percentage of a GA airport's revenue stream, any reduction in consumption could negatively impact airports and their tenants.

POPULATION GROWTH

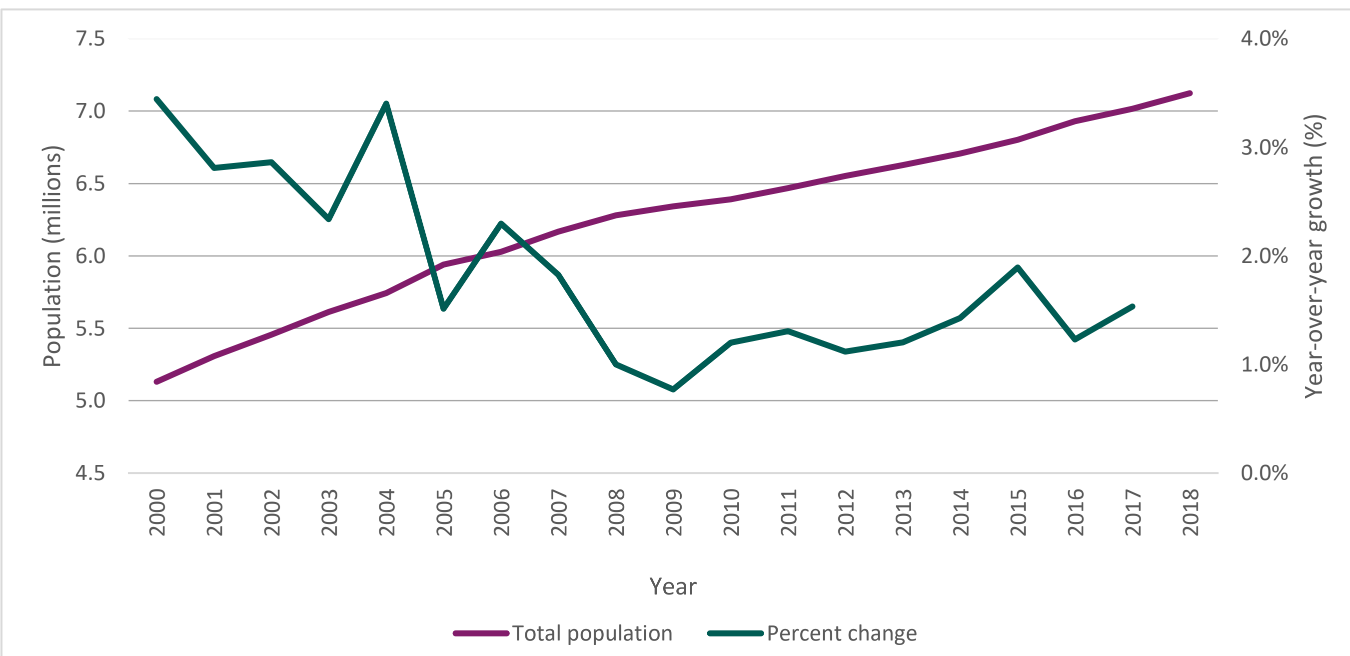
Population continues to be one of the most important indicators of aviation demand, especially when that growth catalyzes associated expansion industries such as construction, retail, hospitality, business services, and others. During the last three decades of the 20th century, Arizona's population increased from 1.78 million in 1970 to 5.16 million by 2000, as shown in **Figure 2**. During this period, the state's population growth witnessed a 3.63 percent compound annual growth rate (CAGR) or a decade-over-decade growth rate of nearly 43 percent.



Source: U.S. Census Bureau 2018

Figure 2. Arizona's Historic Population Growth (1970 – 2000)

Between 2002 and 2007, the state continued to experience some of the highest rates of growth in the county with an average annual increase 2.56 percent. However, the effects of the Great Recession became evident by 2007. The year-over-year population growth rate began to slow in 2008 before plummeting to just 0.77 percent between 2009 and 2010. Population growth rates have steadily increased since that time, reaching 1.89 percent by 2015 and leveling to an estimated 1.53 percent between 2017 and 2018. Arizona's total population and annual growth rates since 2000 are depicted in **Figure 3**.



Source: U.S. Census Bureau 2018

Figure 3. Arizona's Total Population and Growth Rates (2000 – 2018)

With the turbulence of Great Recession seemingly behind us, the state appears to be returning to its long history of record-setting in-migration. In 2017, Arizona cities ranked as some of the top in the country for overall population growth. Phoenix, Arizona's largest metropolitan region, surpassed Philadelphia, Pennsylvania to become the fifth largest city in the U.S.—adding 32,112 residents between July 2015 and 2016. Buckeye, Arizona ranked seventh in the county for its growth rate. During that same time period, Maricopa County experienced the highest annual growth rate in the U.S. at 1.95 percent, gaining 81,360 people—or an average of 222 people per day. The county also remains the fourth-largest in the nation. Across the state, nearly all counties witnessed some level of growth between July 2015 and 2016, with the only losses apparent in the southeastern-most portions of the state.

Looking ahead, Arizona is expected to continue to add jobs, income, and residents at a rate faster than the rest of the nation. The population is projected to increase by 1.36 percent per year over the next 30 years, gaining 3.5 million new residents by 2047—far outpacing the national average of 0.6 percent per year (Office of Employment and Population Statistics n.d.). Despite this positive economic indicator, a report published by University of Arizona's Economic and Business Research Center states that Arizona's per capita income is not anticipated to keep pace with the national average (Hammond 2017). According to the study's author, "That means Arizona is forecast to lose ground to the nation on a key measure of prosperity."

It is this final point that may have the most significant effects on the state's airports. This means while Arizona will have far more potential travelers through the forecast horizon, those travelers may not have access to the same level of discretionary resources as in previous years. As a result, leisure travelers may choose destinations that are accessible by car or other modes of travel in lieu of scheduled commercial flight or use of GA. GA will likely remain inaccessible to many Arizona residents, and business and corporate aviation will continue to be reserved for a small percentage of executive-level staff and businesses that have historically utilized GA for their activities.

On the other hand, LCCs and ULCCs may witness an uptick in demand. These carriers typically cater to a large concentration of leisure travelers drawn to low ticket prices, often at the expense of scheduling flexibility and amenity fees. Airports that primarily host LCCs and ULCCs should carefully consider their region's anticipated growth and economic shifts that could push travelers away from the state's largest commercial service airports. Airports located on the outskirts of major metropolitan areas may be particularly well positioned to take advantage of the state's population trends as housing developments move further into historically undeveloped areas outside of the existing urban core.

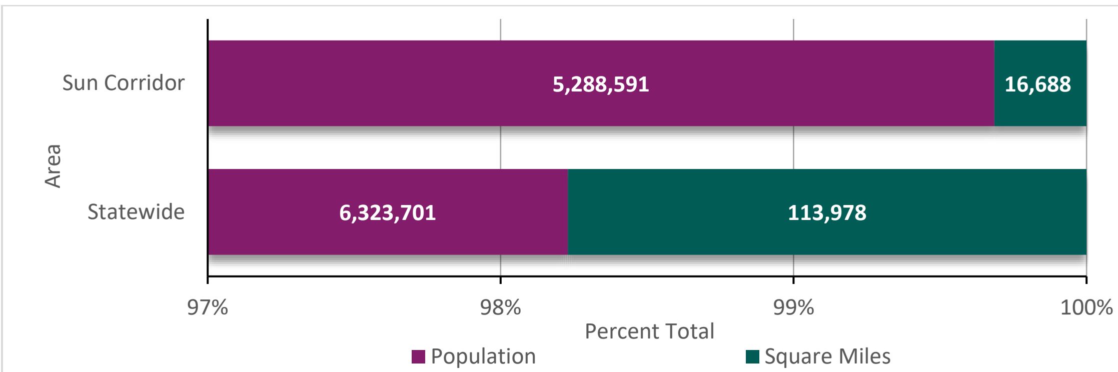
Sun Corridor Growth

While it is clear that most of the state will grow in several key ways, much of the growth will be concentrated in the Sun Corridor. While the Sun Corridor can be defined both in terms of economic and social connectivity as well as geographic space, the area generally spans six counties running from the middle of Yavapai County in central Arizona through western Cochise County to the south (**Figure 5**). In 2007, a report published by the Metropolitan Institute at Virginia Polytechnic Institute and State University (Virginia Tech) identified this so-called "megapolitan area" as one of 10 in the nation with the greatest potential for growth.[1] When comparing

[1] The Metropolitan Institute at Virginia Tech defines megapolitan areas as "clustered networks of metropolitan areas that exceed 10 million total residents (or will pass that mark by 2040)" (Lang and Dhavale, Beyond Megalopolis: Exploring Amercia's New "Megapolitan" Geography 2005).

megapolitan areas across the U.S., report authors note, "The highest flyer of all should be in the Sun Corridor, home to the rapidly merging Phoenix and Tucson metropolitan areas" (Lang and Nelson, The Rise of the Megapolitians 2007).

In 2010, the Sun Corridor's population was 5.7 million; by 2025, that figure is anticipated to increase by 29.6 percent to reach 7.4 million. By 2040, the area will grow by an additional 23.4 percent (9.2 million total residents). In short, between 2010 and 2040, the Sun Corridor is expected to grow by 60 percent—a rate second in the nation to Las Vegas, Nevada (Nelson and Lang 2011). On a statewide scale, the Sun Corridor comprises just 15 percent of the Arizona's land area but 84 percent of the total population (**Figure 4**).



Source: U.S. Census Bureau 2010

Figure 4. Sun Corridor Population Versus Land Area (2010)

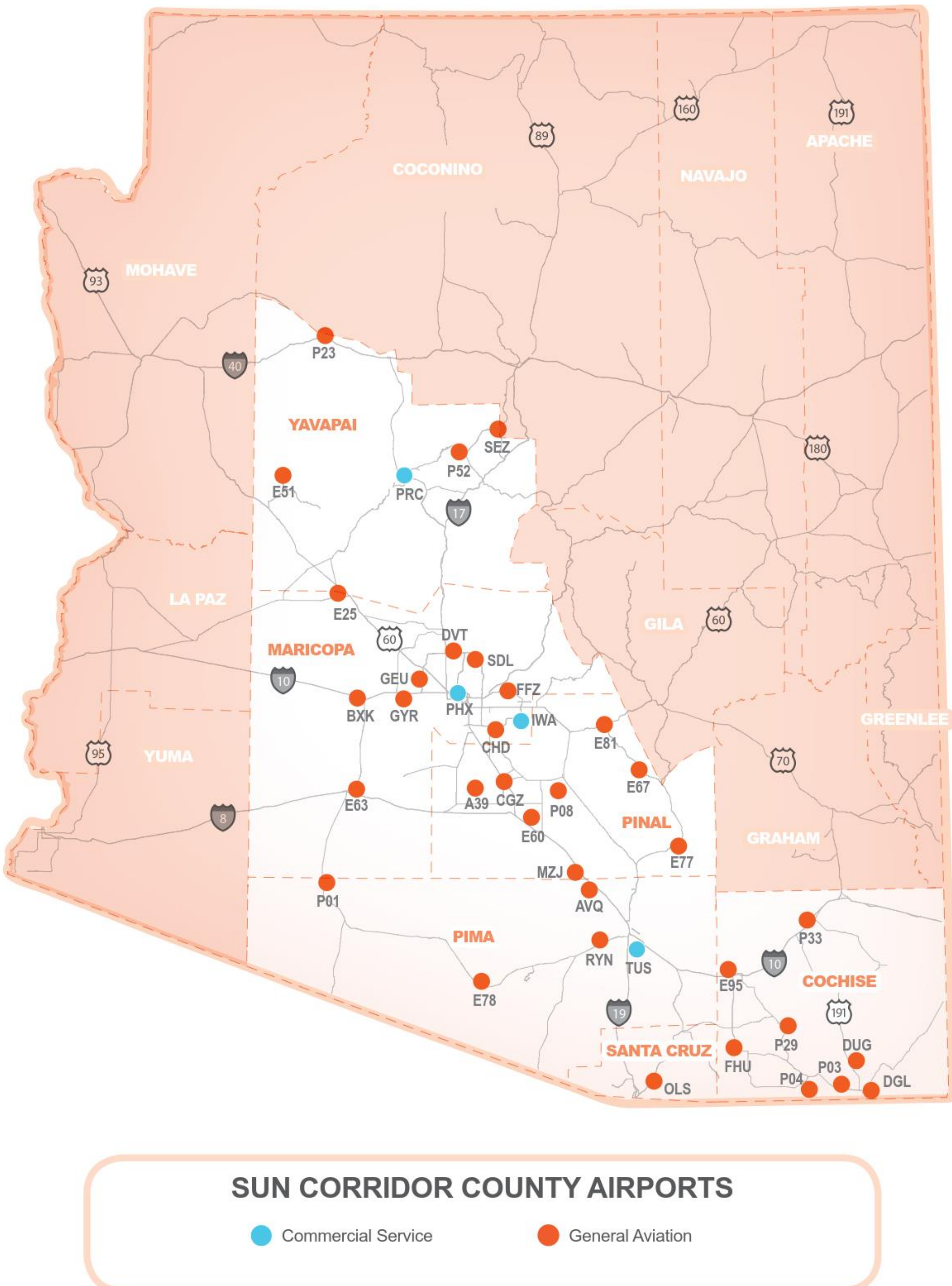
As the Sun Corridor grows, it will become increasingly important for the area to be connected to global markets. According to a report issued by the Morrison Institute for Public Policy at Arizona State University, "Potential investors from Europe or Asia shouldn't have to stop in New York or Las Vegas on their way to scout industrial locations in Arizona" (Gammage and Hunting 2014). Arizona's airports within the Sun Corridor are shown in **Table 1** and highlighted in **Figure 5**.

Table 1. Arizona System Airports within the Sun Corridor

County	FAA Identifier	Airport
Cochise	E95	Benson Municipal
	DUG	Bisbee-Douglas International
	P04	Bisbee Municipal
	P03	Cochise College
	P33	Cochise County
	DGL	Douglas Municipal
	FHU	Sierra Vista Municipal-Libby Army Airfield
	P29	Tombstone Municipal
Maricopa	BXK	Buckeye Municipal
	CHD	Chandler Municipal
	FFZ	Falcon Field
	E63	Gila Bend Municipal
	GEU	Glendale Municipal
	DVT	Phoenix Deer Valley
	GYR	Phoenix Goodyear

County	FAA Identifier	Airport
	IWA	Phoenix-Mesa Gateway
	PHX	Phoenix Sky Harbor International
	SDL	Scottsdale
	E25	Wickenburg Municipal
Pinal	A39	Ak-Chin Regional
	CGZ	Casa Grande Municipal
	P08	Coolidge Municipal
	E60	Eloy Municipal
	E67	Kearny
	MZJ	Pinal Airpark
	E77	San Manuel
	E81	Superior
Pima	P01	Eric Marcus Municipal
	AVQ	Marana Regional
	RYN	Ryan Field
	E78	Sells
	TUS	Tucson International
Santa Cruz	OLS	Nogales International
Yavapai	E51	Bagdad
	P52	Cottonwood Municipal
	PRC	Ernest A. Love Field
	SEZ	Sedona
	P23	Seligman
Yuma	44A	Rolle Airfield
	NYL	Yuma International

Source: Kimley-Horn 2018



Source: Kimley-Horn 2018

Figure 5. Airports in the Sun Corridor

Table 2 highlights the total population and percent population growth by county between 1980 and 2036. Maricopa and Pinal counties have witnessed the highest rate of growth since 1980; this trend is anticipated to continue through the study horizon. Pinal County, with eight system airports (including one of the two Commercial Service-International airports in the state), will experience the highest rate of growth through the study horizon.

Table 2. Population Projections (2016 – 2036) and Number of Airports by County

County	System Airports (No.)	Population (thousands)					Compound Annual Growth Rates (%)			
		1980	2016	2021	2026	2036	1980 to 2016	2016 to 2021	2016 to 2026	2016 to 2036
Apache	4	52	73	77	80	88	1.0%	1.0%	1.0%	0.9%
Cochise*	**8**	**86**	**130**	**138**	**146**	**161**	**1.2%**	**1.1%**	**1.1%**	**1.1%**
Coconino	6	75	142	153	164	188	1.8%	1.5%	1.5%	1.4%
Gila	2	37	54	57	59	64	1.0%	0.9%	0.9%	0.9%
Graham	1	23	39	40	42	45	1.5%	0.8%	0.8%	0.8%
Greenlee	1	11	9	10	10	11	-0.5%	0.8%	0.8%	0.7%
Maricopa*	**11**	**1,522**	**4,231**	**4,620**	**5,041**	**5,952**	**2.9%**	**1.8%**	**1.8%**	**1.7%**
Mohave	3	56	209	222	237	267	3.7%	1.3%	1.3%	1.2%
Navajo	9	67	110	116	122	133	1.4%	1.0%	1.0%	0.9%
Pima*	**5**	536	1,029	1,095	1,165	1,307	1.8%	1.3%	1.2%	1.2%
Pinal*	**8**	**91**	**419**	**467**	**519**	**637**	**4.3%**	**2.2%**	**2.2%**	**2.1%**
Santa Cruz*	**1**	**21**	**48**	**52**	**56**	**65**	**2.4%**	**1.6%**	**1.6%**	**1.5%**
Yavapai*	**5**	**69**	**226**	**245**	**265**	**307**	**3.4%**	**1.6%**	**1.6%**	**1.6%**
Yuma & La Paz	2	89	230	246	263	299	2.7%	1.4%	1.4%	1.3%
Arizona	67	2,736	6,949	7,537	8,169	9,525	2.6%	1.6%	1.6%	1.6%
United States	N/A	227,226	324,507	339,812	355,802	387,690	1.0%	0.9%	0.9%	0.9%

Note: These counties are located in the Sun Corridor, with all affiliated data denoted in bold.

Sources: Woods & Poole 2017, Kimley-Horn 2017

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EMPLOYMENT GROWTH AND INDUSTRY TRENDS

According to the Arizona Department of Commerce, "Arizona is a nationally ranked as the best state for business, number one for job growth, [and] one of the fastest-growing states in the U.S., with a superior quality of life" (Arizona Commerce Authority n.d.). Coupled with an increasingly diversified economic base, each of these factors place new and growing demands on the state's aviation system. Businesses often make relocation, expansion, and other major economic decisions based on the availability of commercial service and GA airports. Further, a reliable and accessible system is a vital piece of the supply chain by facilitating the quick and efficient transport of goods between suppliers, manufacturers, and consumers. Airports can open the door to global commerce for small communities and rural populations by linking remote areas with customers across the world. In essence, an effective and well-connected transportation system is a critical piece of the state's sustained economic growth.

In October 2016, the Arizona Office of Economic Opportunity (AOEO) released its latest occupational employment projections for the 2014-2024 period. During this timeframe, employment in Arizona is anticipated to increase from approximately 2,728,012 to 3,305,314—representing 21.2 percent growth. Nationally, the employment growth rate is projected at just 6.5 percent. **Table 3** shows Arizona's projected job growth by region. The Phoenix Metropolitan Statistical Area (MSA) will grow by 24.1 percent, accounting for roughly 81 percent of all statewide employment growth. The Tucson MSA is projected to add 54,460 jobs at a growth rate of 14.4 percent. All other areas combined are projected to add 54,923 jobs at a growth rate of 13.6 percent. While the fastest areas of growth are concentrated in the Sun Corridor, all areas of the state are anticipated to experience employment gains that far exceed the national average.

Table 3. Projected Job Growth by Region (2014-2014)

Region	Total Jobs		Growth	
	2014 (Estimated)	2024 (Projected)	Numeric	Percent
Arizona	2,728,012	3,305,314	577,302	21.2
Phoenix MSA[1]	1,944,933	2,412,852	467,919	24.1
Tucson MSA[2]	378,762	433,222	54,460	14.4
Balance of State[3]	404,317	459,240	54,923	13.6

Notes: [1]Maricopa and Pima Counties; [2]Pima County; [3]All other areas except Maricopa, Pima, and Pinal counties.

Source: AOEO 2016

Business Use of Aviation Services

While airports can have a major impact on all types of industries, certain segments are consistently recognized by aviation analysts as being particularly reliant on this mode of transportation. Air cargo, for example, is typified by high-value, time-sensitive shipments, such as perishables, electronics, and pharmaceuticals. Facilities that manufacture, handle, or process these types of goods are often located near airports and rely on surrounding surface transportation networks to efficiently transport goods to air cargo handling facilities. As a result, the presence of industries with a propensity to use aviation services can drive airport development within a particular geographic area. Conversely, the presence of certain aviation facilities and services can draw these types of industries to their vicinities. In short, airports have a reciprocal relationship with businesses with a propensity to

use aviation by driving both the areas in which they are located and the aviation facilities and services provided therein.

The AOEO projects that four industries will exceed the average growth rate of all industries combined (21.2 percent) as follows: construction (49.9 percent), professional and business services (34.0 percent), financial activities (28.6 percent), and education and health services (25.5 percent). According to Airport Cooperative Research Program (ACRP) Report 132, *The Role of U.S. Airports in the National Economy*, professional and businesses services and financial activities both rank amongst the top industries in which air travel improves sector productivity (National Academies of Sciences, Engineering, and Medicine 2015). In addition to the market segments identified by the AOEO, the Arizona Commerce Authority (ACA) has recognized six key sector opportunities upon which to focus its business growth and recruitment efforts:

1. Aerospace and defense
2. Technology and innovation
3. Advanced manufacturing
4. Bioscience and healthcare
5. Advanced business services
6. Film and digital media

Each of the key market opportunities identified by the ACA has a tendency to rely on aviation while providing the greatest potential for Arizona to maintain and expand its position in the global marketplace. While each has strong ties with the airport system, none is more connected than aerospace and defense. In fact, a recent report published by the National Business Aviation Association and NEXA Advisors notes that 100 percent of aerospace and defense companies on the Forbes Global 2000 list are business aircraft users (2013).[2] A 2015 International Trade Administration report cited by the ACA observes that Arizona's aerospace and defense total exports rose by more than 21.8 percent from 2011 to 2014, reaching a total of $3.47 billion, primarily due to a near $400 million increase in the export of aircraft, engines, and parts. A 2012 Deloitte study reported that Arizona ranks fourth nationwide in aerospace revenue at $14.99 billion. More than 1,200 aerospace and defense companies are located in the state, including some of the largest names in the industry like Boeing, Honeywell Aerospace, Northrop Grumman, and Raytheon.

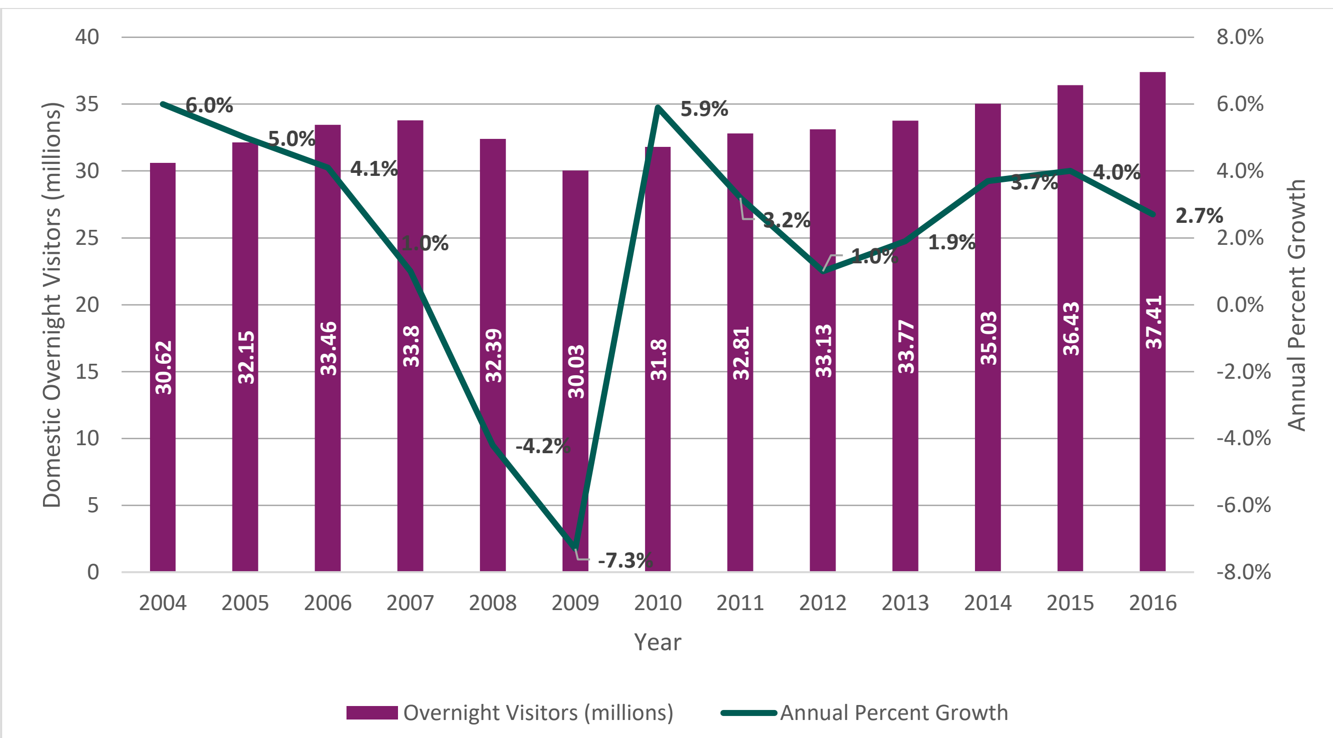
In a very direct way, aviation is inherently linked with the trajectory of the state's economy. As Arizona's economy continues to grow and evolve in the coming years, commercial service and GA airports can anticipate an uptick in business/corporate aviation. As such, airports with the facilities and services capable of serving jet aircraft typified by this type of aviation activity will be best positioned to benefit from the approaching growth. More broadly, Arizona must have a transportation system that provides the accessibility and mobility needed to travel between the state and other major economic centers in the region, such as California, Mexico, and Texas, as well as across the globe. Furthermore, the system should also focus on intrastate connectivity so areas beyond the major metropolitan regions can fully participate in the economy of tomorrow.

[2] This same study reports that 85 percent of pharmaceutical companies (one segment of the bioscience and healthcare industry) are business aircraft users.

TOURISM RATES

The Arizona Department of Tourism estimated 37.4 million people visited Arizona in 2016, drawn by the state's ideal weather, rich natural wonders, world-class sport and entertainment events, and numerous other attractions—making tourism the state's number one export industry. Visitors spent $21.2 billion in the state, generated $3.09 billion in tax revenue, and supported 184,200 industry jobs. In addition to supporting the state by paying for transportation and lodging, visitors spend money on entertainment, food, and retail purchases. Wages that workers earn in those industries are in turn spent in local communities, which then generate secondary impacts that ripple through entire economies. These secondary impacts generated 158,300 jobs with $6.8 billion in earnings. In total, the 2016 gross domestic product of the travel industry in Arizona was $9.2 billion.

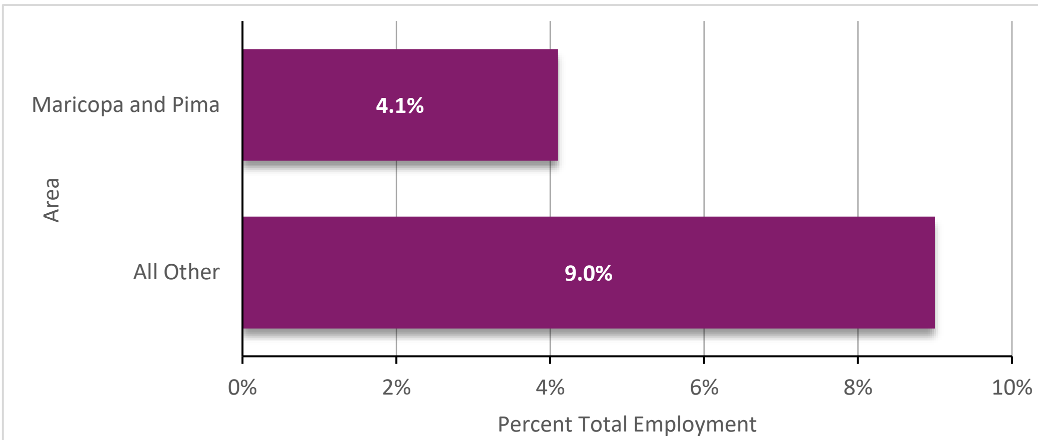
As summarized in **Figure 6**, tourism has steadily increased since 2009 at the bottom of the economic downturn, with rates reaching historic peaks in recent years. The state saw the largest year-over-year growth between 2009 and 2010 (13.2 percent), followed by 2015 to 2016 (4.0 percent). Visitors arriving on domestic flights to Arizona increased faster than overall visitor rates, with 5.4 and 7.0 percent increases in 2015 and 2016, respectively.



Source: Arizona Department of Tourism (report prepared by Tourism Economics) 2017

Figure 6. Arizona Annual Visitation (2004 – 2016)

In 2016, the travel industry generated $1,186 in local, state, and federal tax receipts for each Arizona household—more than 10 percent of all local and state revenues in the state (Ibid). These impacts are relatively more important in non-urban counties, as leisure and hospitality businesses (e.g., restaurants, lodging, and entertainment-related businesses) are generally more dependent on visitors than local residents. Further, non-urban areas often have less access to diversified economic bases, so any one economic input generally has a higher impact on the percent of total employment. **Figure 7** shows that 4.0 percent of all employment in Maricopa and Pima counties is travel-related, while that proportion is more than double for all other areas of the state at 9.0 percent.



Source: Dean Runyan Associates 2017

Figure 7. Travel-Generated Employment as a Percent of Total by Region (2016)

Table 4 shows travel-generated employment by Arizona county. La Paz, Coconino, Gila, and Santa Cruz counties respectively have the highest rate of travel-related jobs as a percent of total. La Paz, Gila, and Santa Cruz counties rank amongst the least populated areas of the state. While Coconino County is more moderately populated, most of the population is centralized in Flagstaff, as most of the county is federally owned. Coconino County's inclusion here is likely due to Grand Canyon National Park. The park is Arizona's most popular tourist attraction, and cities such as Flagstaff and Winslow host millions of visitors each year as they travel to the canyon.

Table 4. Travel-Generated Employment by Arizona County

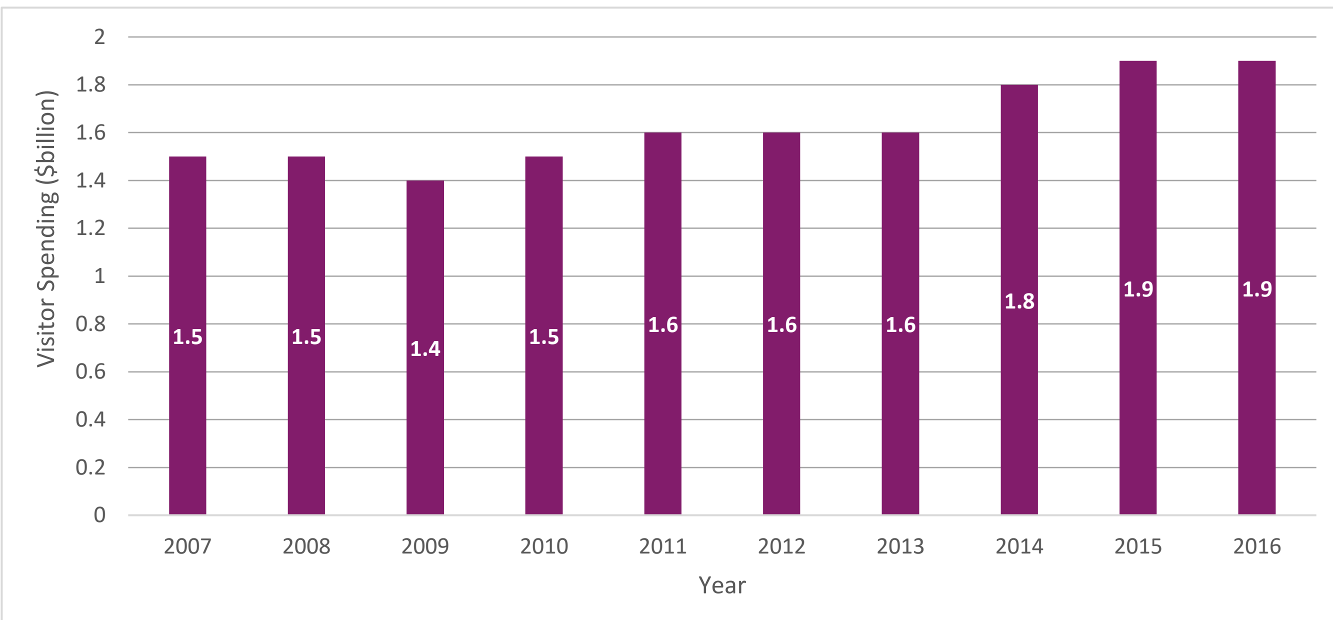
County	Jobs		Travel-Related Jobs (Percent Total)
	Total	Travel-Related	
Apache	28,010	1,700	6.1%
Cochise	50,570	3,580	7.1%
Coconino	84,420	12,640	15.0%
Gila	20,700	2,920	14.1%
Graham/Greenlee	17,180	920	5.4%
La Paz	8,160	1,350	16.5%
Maricopa	2,518,950	101,270	4.0%
Mohave	68,500	6,710	9.8%
Navajo	43,760	4,000	9.1%
Pima	508,740	24,700	4.9%

County	Jobs		Travel-Related Jobs (Percent Total)
	Total	Travel-Related	
Pinal	97,320	6,840	7.0%
Santa Cruz	20,220	2,110	10.4%
Yavapai	99,730	9,040	9.1%
Yuma	87,620	6,370	7.3%
Arizona Total	**3,653,880**	**184,160**	**5.0%**

Note: Details may not add to totals due to rounding. Percentages calculated on unrounded numbers.

Sources: Dean Runyan Associates, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis 2017

Demand for air travel often mirrors overall visitor rates. Visitor air arrivals to Arizona increased 7.0 percent from 2015 to 2016, following a 5.4 percent increase the preceding year. From 2009 through 2013, visitor air arrivals were essentially flat. **Figure 8** depicts spending in Arizona by visitors who arrived by air transportation. More visitors are arriving in Arizona than ever before and spending more when they arrive.



Source: Arizona Travel Impacts 2018

Figure 8. Arizona State Spending, Visitor Air Transportation

As the top industry in the state, tourism drives the Arizona economy and, in turn, places significant demand on the aviation industry. As a result, any reductions in tourism rates would have a notable impact on the state's commercial service and GA airports. The impacts would most severely affect those airports that primarily cater to leisure travelers, with LCCs and ULCCs conducting a high percentage of aviation operations. Airports without diversified operations would be least well positioned to absorb the potential impacts that may occur should tourism rates decline. Furthermore, airports in rural areas would also face a disproportionate economic impact in this scenario, as these economies are more reliant on the tourism-related spending than their urban counterparts.

As a result, it is important for airports—especially in rural Arizona—to diversity operations to hedge against potential tourism reductions. Airports should also continue to support LCCs and ULCCs to facilitate tourism in Arizona.

Seasonal Residency

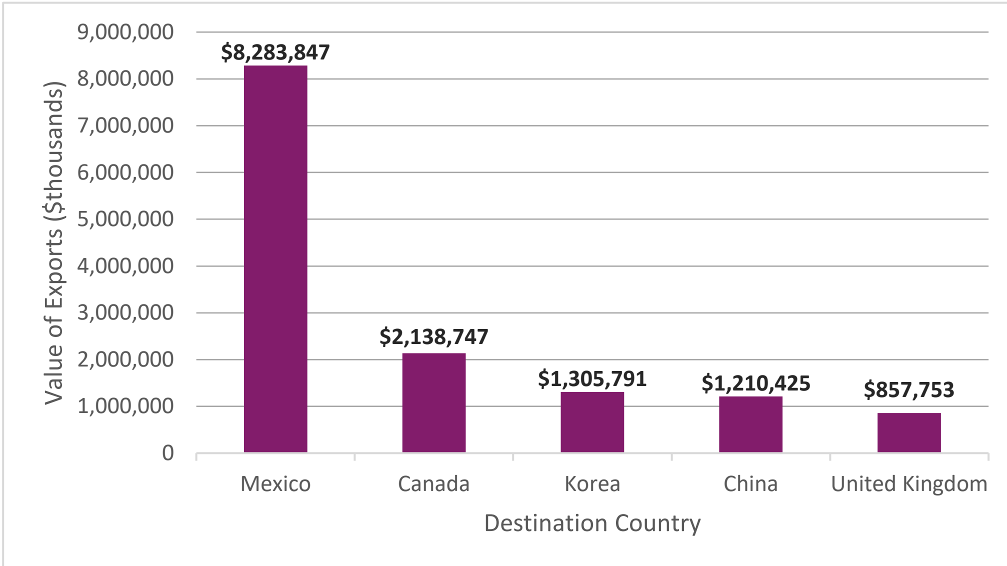
In addition to more traditional tourism, in which a person travels to a destination or point of interest for pleasure for a relatively limited duration of time, Arizona is host to large numbers of seasonal residents. These so-called "snowbirds" spend approximately two to four months in central and southern Arizona to escape winter temperatures in the northern U.S. and Canada. The economic impact of such activity is difficult to determine, with the last reliable study completed by Arizona State University in the early 2000s. That study, which analyzed the 2003-2004 visitor season, estimated that Arizona's seasonal population swelled by about 300,000 long-term visitors with a $1.0 billion spending impact (Coppola 2015). A more recent study conducted by the Canada Arizona Business Council reported that Canadian visitors spend an average of $3,500 per month during their tenures in the state (Akao 2017). Long-term seasonal residents from Canada provide a $1.4 billion boost to the Arizona economy each year, with short-term visitors contributing an additional $1.0 billion. These snowbirds own or rent approximately 100,000 residences in cities across the state, with Yuma, Apache Junction, Desert Mountain, and Scottsdale drawing the highest number of seasonal residents.

As many Arizona residents know, the annual arrival of snowbirds is heralded by a notable increase in traffic congestion and busier shopping malls, restaurants, and retail establishments. Arizona's airports in the warmer areas of the state likewise witness increased activity; however, like seasonal residency, snowbird-related demand is difficult to capture. Anecdotally, GA airports report that short-term aircraft storage facilities, including hangars and tie-downs, typically become more occupied from October through April. This issue can exacerbate existing storage facility shortages. Similarly, commercial service facilities see an uptick in activity during winter months.

While the influx of seasonal residents may increase congestion at some airports, it concurrently presents revenue-producing opportunities for airports in warm climates. Seasonal residents generate fuel sales and may improve the return on hangar development for investors which, in turn, could improve ground lease rates for airport sponsors. It is also important for airports and ADOT Aeronautics Group to consider the potential impacts of seasonal residents during long-term planning efforts. International visitors also provide an additional layer of risk mitigation for airports that cater to foreign leisure travelers, as they may not be subject to the same economic forces as domestic visitors. For example, the Arizona Office of Tourism reported that travel amongst Canadians remained strong during the recession due to a favorable exchange rate with the U.S. dollar (Coppola 2015).

INTERNATIONAL TRADE DEVELOPMENTS

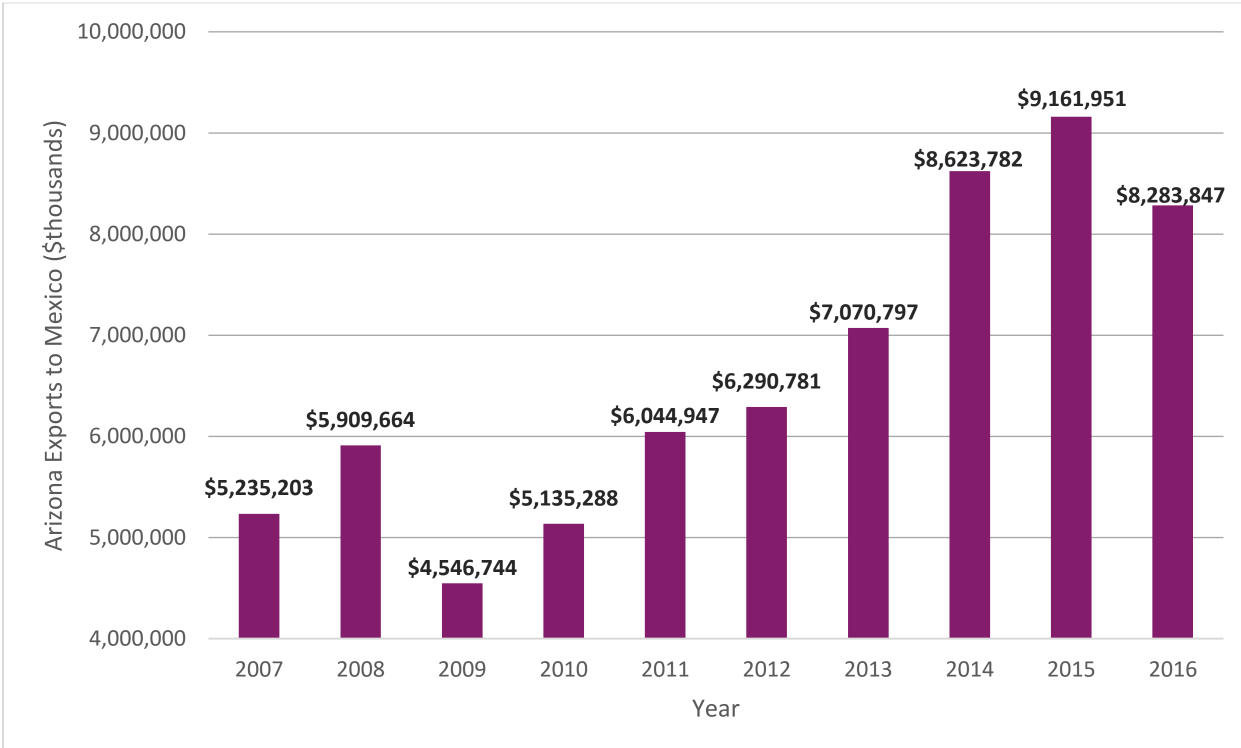
Arizona exported $22.0 billion in goods to international markets in 2016. The U.S. Department of Commerce's International Trade Administration reports that Arizona's foreign exports supported 101,579 U.S. jobs in 2015—an increase of 23,000 jobs since 2009. Mexico is the state's top foreign trading partner, receiving 37.6 percent of Arizona's international exports, followed by Canada, which accounts for 9.7 percent (**Figure 9**). Combined, exports to Mexico and Canada totaled 10.4 billion in 2016—nearly 50 percent of Arizona's total exports that year.



Source: Office of Trade and Economic Analysis, Industry and Analysis, International Trade Administration, U.S. Department of Commerce 2018

Figure 9. Arizona's Top Foreign Trading Partners (2016)

Figure 10 depicts Arizona's trade with Mexico over time. Trade has steadily increased after hitting a low in 2009, with some level of volatility evident in recent years. Yet while overall trade has fallen, growth in air freight between Arizona and Mexico annually grew 30 percent between 2011 and 2015—or 180 percent during that four-year timeframe. Airfreight has outpaced all other modes of transport and currently totals $390 million per year; this figure is anticipated to reach $650 million by 2025 (Office of the Governor 2018).



Source: Office of Trade and Economic Analysis, Industry and Analysis, International Trade Administration, U.S. Department of Commerce 2018

Figure 10. Arizona Trade with Mexico (2016)

Capitalizing on the massive growth projected for Arizona-Mexico trade, Phoenix-Mesa Gateway recently announced that it will be home to SkyBridge Arizona (SkyBridge), the first international cargo hub to house both U.S. and Mexican customs (Ibid.). Through the Unified Cargo Processing (UCP) Program at SkyBridge, both U.S. and Mexican customs officers will approve incoming and outgoing freight bound for customers on either side of the border. Suppliers can bypass cumbersome international customs procedures in Mexico City and ship directly to customers in Mexico (and eventually across Latin America). According to Mesa Mayor John Giles, “Consumers in Latin America want the ability to purchase goods online and receive them the next day—SkyBridge Arizona will make that a reality” (Ibid.). As a result of SkyBridge, Phoenix-Mesa Gateway Airport is anticipating an increase of 2,000 cargo flights per year by 2036. The airport is also planning for the construction of 800,000 square feet of air cargo operations as part of a $230 million, 360-acre development plan.

Like Phoenix-Mesa Gateway, other airports have too recognized the growing opportunities presented by international trade. Phoenix Goodyear, Yuma International, and several other airports (including Phoenix-Mesa Gateway) have established foreign-trade zones (FTZs) on airport property. Because FTZs are considered outside U.S. customs territory, goods received into these zones are generally not subject to duties, tariffs, or quotas until (or if) they leave the zone. FTZs offer companies significant financial incentives, including a 72.9 percent reduction in state real estate and personal property taxes; an effective mechanism to manage duty payments; and logistical benefits such as streamlined Customs and Border Protection (CBP) procedures. There are seven FTZs across the

state.[3] Structured similarly to FTZs, Phoenix-Mesa Gateway and Phoenix Goodyear airports are also designated Military Reuse Zones (MRZs). MRZs were established in 1992 to minimize the impact of military base closures on local economies by providing tax incentives to aviation or aerospace companies and airport authorities located therein.

Such massive growth in international trade coupled with the growing expectation for overnight delivers promised by e-commerce giants like Amazon and Wal-Mart will place new demands on air cargo providers. While air cargo is most commonly associated with commercial service airports, GA facilities play a significant role in the industry and provide advantages such as less congested airspace and surrounding roadway networks, quicker turn-around times for pilots, and closer proximity to certain markets and customers. In fact, most Arizona airports already host some level of air cargo operations.

In addition to basic airport infrastructure requirements such as adequate flight support services and airside facilities, airports with a significant amount of air cargo operations must also provide access to cargo processing facilities for trucks, security and customs facilities, and support personnel. Additionally, the airport must have a functional roadway network in its immediate vicinity, as the majority of air cargo is transferred to trucks for the next leg of its journey. Traffic congestion and bottlenecks around airports can cause major delays and exponentially increase costs as goods are transported between the airport and their next destinations. Roadway congestion may cause a mismatch between the amount of freight arriving at an airport and the ability of the surface network to efficiently receive and distribute it. If delays and associated costs are too high, shippers may choose to use other modes of transport in lieu of air freight.

As demand for air cargo and global trade increases, airports may too experience congested airspace, pushing GA pilots to airports further outside of the urban core and causing shift demand/capacity ratios across the broader system.

MAJOR SURFACE TRANSPORTATION IMPROVEMENTS

Airports depend on surface transportation systems to efficiently transport people and goods to and from their facilities. As described above, traffic congestion in the vicinity of airports is a major obstacle for air cargo, as well as for major commercial service airports such as Phoenix Sky Harbor International and Tucson International. Enhancing the accessibility of airports can have a major impact on aviation demand for both commercial service and GA airports. Access is often an important factor as people choose which airports to fly into and out of, base aircraft, and conduct other types of aviation-related activities. Further, the surface transportation network directly impacts the population coverage of certain types of airports and is a critical component of the state's overall mobility. In short, a functional and efficient surface transportation network with the ability to support capacity demands supports the efficient movement of goods and people across multiple modes while supporting Arizona's economic competitiveness.

In addition to its responsibility for the state's airports, ADOT is mandated to construct and maintain all interstate and state highways in Arizona. **Table 5** outlines the ongoing (as of spring 2018) and planned major roadway improvement projects through 2022. All planned projects are outlined in ADOT's Five-Year Transportation

[3] Not all of these sites are located at airports. More information about FTZs and their locations in Arizona are available at enforcement.trade.gov/ftzpage/letters/ftzlist-map.html#arizona.

Facilities Construction Program, which establishes the agency's plan to allocate funds over the next five years. As discussed in **Chapter 2**, the Airport Capital Improvement Program (ACIP) is one component of the Five-Year Transportation Facilities Construction Program.

Many of these projects are aimed at increasing roadway capacity through and around the Sun Corridor. ADOT has begun or is planning multiple safety and capacity improvements along Interstate 10 (I-10) between Phoenix and Tucson. I-10 serves as part of the CANAMEX Corridor, a series of multimodal transportation facilities linking Canada to Mexico through the U.S. Together with Interstate 19 (I-19) south of Tucson, I-10 serves as one of the busiest overland trade routes between the U.S. and Mexico. Additionally, the I-10 improvements include several traffic interchange (TI) reconstruction projects in metropolitan Tucson, which will likely improve mobility and access to Tucson International Airport for both passengers and air cargo.

The Loop 202 (South Mountain Freeway) project in metropolitan Phoenix will connect the east and west regions of the city via 22 miles of new freeway. Scheduled for completion in late 2019, this project should relieve traffic congestion for roadway networks adjacent to and in the vicinity of Phoenix Sky Harbor International Airport. The South Mountain Freeway is anticipated to draw motorists away from existing roadways near the airport to provide increased capacity for travelers and air cargo handlers actually destined for the airport. Freight forwarders will likely receive the most significant benefits from improved mobility to and from Phoenix Sky Harbor, as traffic delays can cause significant impacts to their profitability.

ADOT has also begun a series of improvements to U.S. 93, which currently provides the quickest route for motorists traveling between Phoenix and Las Vegas, Nevada. This improvement may negatively impact some commercial service and GA airports in the Phoenix area. While air travel currently provides a faster alternative to driving, capacity improvements to U.S. 93 may shorten the driving time between the two cities. As a result, more travelers may opt for the convenience and lower cost of driving over the reduced time savings gained by air travel.

Table 5. Major Planned and Ongoing Roadway Improvement Projects

Project Name	Overview	Status[1]
Ehrenberg Port of Entry - Phase II Reconstruction	The Ehrenberg Port of Entry is currently in phase II of a major reconstruction to facilitate travel between Arizona and California along I-10 in La Paz County.	Ongoing
Interstate 8 (I-8)/Araby Road (SR 195) TI Improvements	This project will improve the I-8 TI with Araby Road (SR 195) to improve safety and ease congestion in Yuma. Among several other roadway improvements, this project will construct two, two-lane modern roundabouts and associated ramps.	Ongoing
I-8/Giss Parkway TI Construction	This project will construct a two-lane modern roundabout at the intersection of westbound I-8 and Giss Parkway in Yuma. The project is designed to improve safety and ease congestion at this busy interchange.	Ongoing
I-10: Houghton Road TI Reconstruction	This $39 million project will reconstruct the I-10 TI at Houghton Road in Tucson.	Planned (FY 2020)
I-10: Ruthrauff Road TI Reconstruction	This $105 million project will reconstruct the I-10 TI at Ruthrauff Road in Tucson.	Planned (FY 2018)
I-10: Ruthrauff Road Widening	This $144 million project will widen I-10 between Ina and Ruthrauff roads in Tucson.	Planned (FY 2020)
I-10: State Route (SR) 87 to Town of Picacho Widening and Improvements	This $109 million project will improve I-10 through the community of Picacho, including the reconstruction of the I-10/SR 87 TI, between mileposts 209.59 and 213. I-10 will be realigned and widened from two lanes to three lanes in each direction and replace the bridges at the SR 87 TI underpass and over the UPRR on SR 87.	Ongoing
I-10: SR 85 to Verrado Way Widening	This $103 million project will widen I-10 to added a general-purpose lane in each direction from SR 85 to Verado Way in Buckeye.	Planned (FY 2018)
Interstate 17 (I-17): Happy Valley Road and Pinnacle Peak Road TI Reconstructions	This project will reconstruction the TIs on I-17 at Happy Valley and Pinnacle Peak Roads to improve regional traffic flows as the population grows and development continues into areas north of Phoenix.	Ongoing
I-17: Anthem to the Sunset Point Rest Area Widening	This program will widen specific segments of I-17 between Anthem and Sunset Point north of Phoenix. The program is still in the planning phase, with $15 million for design and $178 million for construction.	Planned (FY 2019)
I-19: Ajo Way TI Improvements	This multi-phase project will improve the existing I-19/Ajo Way TI in Tucson to improve traffic efficiency and safety.	Phase I, Ongoing/ Phase II, Planned (FY2018)
Loop 101, Price Freeway: U.S. 60 to Loop 202 San Tan Freeway Widening	This project will widen Loop 101 in the east valley to add a general-purpose lane in each direction from the U.S. 60 to the Loop 202 San Tan Freeway in Chandler.	Planned (FY 2018)
Loop 202 (South Mountain Freeway) Construction	The Loop 202 (South Mountain Freeway) will add 22 miles of freeway to connect the east and west valleys while providing relief to existing freeway corridors and arterial streets. The freeway will extend the existing Loop 202 east/west before shifting to meet a new north/south freeway segment under construction from I-10 at approximately 59th Avenue.	Ongoing
Loop 303: Maricopa County Road (MC) 85 to Van Buren Construction	This $119 million project will construct a new freeway between MC 85 and Van Buren Street in Goodyear.	Planned (FY 2019)

Project Name	Overview	Status[1]
SR 30: Loop 303 to Loop 202 South Mountain Freeway Construction	This $292 million, multi-phase project will construct a new freeway to connect Loop 303 with Loop 202 to provide additional traffic capacity south of I-10 through the cities of Goodyear, Avondale, and Phoenix, as well as a portion of unincorporated Maricopa County.	Planned (FY 2020)
SR 86 Valencia Road to Kinney Road Widening	This project will widen and improve SR 86 (Ajo Way) between Valencia and Kinney roads to enhance safety, improvement traffic flow, and meet current and future traffic needs in Tucson.	Ongoing
SR 89 to Deep Well Ranch Road Widening	Located in Prescott, this project will widen approximately one mile of SR 89 from Deep Well Ranch Road just south of the SR 89A junction. The road will be widened from two lanes to a four-lane divided highway with a raised center median.	Ongoing
SR 189: Nogales to I-19 Improvements	This $69 million project will improve SR 189 from Nogales to I-19 in Tucson to ensure international commerce can efficiently and safely travel between Arizona and Mexico vis the Mariposa Port of Entry, one of the busiest land ports in the U.S.	Planned (FY 2019)
SR 260: Lion Springs Section Improvements	This $50 million project will improve the Lion Springs section of SR 260 in eastern Arizona.	Planned (FY 2020)
SR 260: Thousand Trails and I-17 Widening	This $62 million project will upgrade nine miles of SR 260 to a four-lane divided highway between Camp Verde and Cottonwood west of I-17 to enhance safety and improve traffic flow in a growing area of the Verde Valley.	Ongoing
U.S. Route 93 Corridor Widening and Improvement Projects	ADOT has undertaken a series of roadway improvement projects along U.S. 93 from Wickenburg to the Hoover Dam with the long-term goal of transforming this highly traveled route into a four-lane divided highway along the entire 200-mile stretch. Construction funding is programmed through fiscal year 2020. U.S. 93 projects in the 2018-2022 Five-Year program include: • Carrow to Stephens: Three-mile widening project north of Wikieup ($35.5 million) • “The Gap” Tegner Drive to SR 89: Three-mile widening project near Wickenburg ($49 million) • West Kingman TI: New TI in downtown Kingman ($70 million) • Cane Springs and Big Jim Wash: Two widening projects identified in the Six- to Ten-year Development Program ($10 million design)	Ongoing/Planned (FY 2018)

Note: [1]Planned projects as provided in ADOT’s 2018-2021 Five-Year Transportation Facilities Construction Program. The fiscal year provided reflects the initial year of funding, with all projects slated to receive allocations for several years following.

Sources: ADOT 2018-2021 Five-year Transportation Facilities Construction Program, ADOT Statewide Projects 2018

In addition to these roadway improvement projects, ADOT is currently conducting several major planning studies, most of which are directly related to international trade with a particular focus on the rapidly expanding Sun Corridor:

1. **Sonoran Corridor Tier 1 Environmental Impact Statement (EIS):** This study initiated the environmental review process for a potential new transportation route to connect I-19 to I-10 south of the Tucson International Airport.

2. **SR 189, International Border to Grand Avenue:** This study will develop a long-range plan for future improvements between the U.S.-Mexico border and Grand Avenue in Phoenix.

3. **North South Corridor:** This study is evaluating the feasibility and need for a new highway in Pinal County to improve regional connectivity, provide a new route for traveling around the Sun Corridor, and address current and future transportation needs.

4. **I-11 and Intermountain West Corridor:** This collaborative study between ADOT and the Nevada Department of Transportation provided a detailed corridor plan to develop an interstate link between Phoenix and Las Vegas and high-level visioning to extend the corridor south to Mexico and north to Canada. ADOT is now continuing the process by beginning a Tier 1 EIS to identify a selected corridor alternative between Nogales and Wickenburg, Arizona.

CONCLUSIONS

In the coming decades, Arizona is anticipated to experience growth outpacing the rest of the nation in key segments affecting aviation demand including population; tourism; international trade; and industries such as aerospace and defense, technology, and manufacturing. Much of this growth will be centered in Arizona's Sun Corridor, an area roughly comprising six counties from Cochise and Santa Cruz in southeastern Arizona; traversing Pima, Pinal, and Maricopa counties in the center of the state; before reaching its upper boundary in Yavapai County to the northwest.

ADOT has already recognized the need to improve the surface connectivity within the Sun Corridor, as well as with markets across Arizona, in surrounding states, and amongst our North American Free Trade Agreement (NAFTA) partners (i.e., Mexico and Canada). Each of these and numerous other outside influences have shaped and will continue to shape the evolution of individual airports—as well as the system more broadly—over the next two decades. The ever-growing demands anticipated for Arizona aviation underline the importance of a coordinated and proactive planning approach for all airports in the state system.

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