CHAPTER ONE: AVIATION SYSTEM GOALS AND PERFORMANCE MEASURES

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.

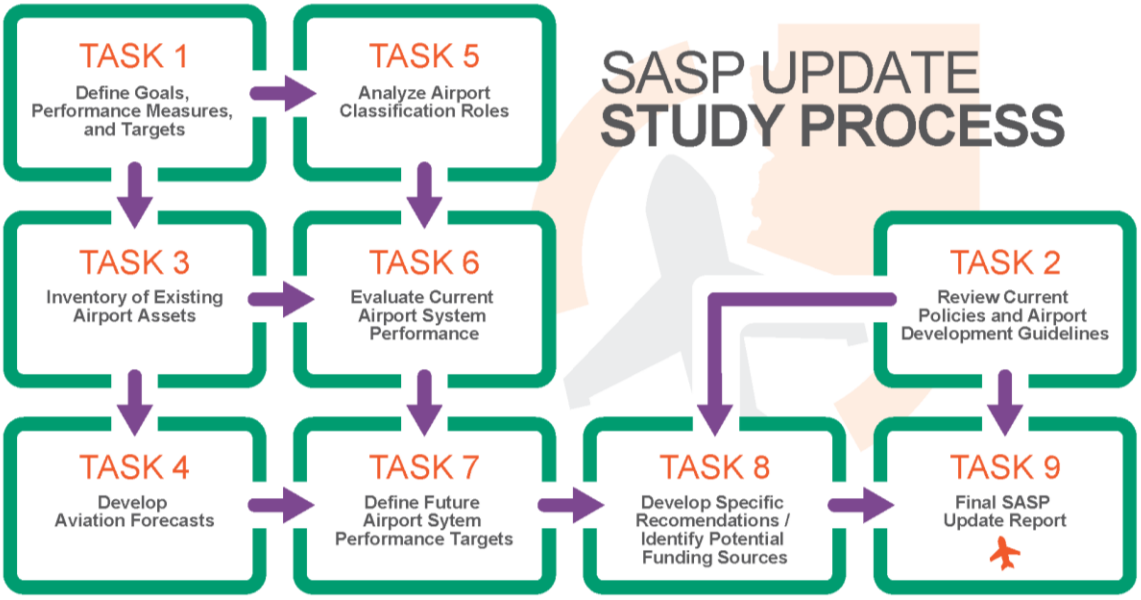

Figure 1. SASP Update Study Process

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.

[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