

CHAPTER EIGHT: SYSTEM DEVELOPMENT COSTS

INTRODUCTION

Prior chapters of the Arizona State Airports System Plan resulted in a score card for current system performance. This score card showed how the system is currently performing related to the ability of individual airports to meet their respective facility and service objectives. It also showed how the system is now performing relative to each of the system goal categories and their individual performance measures. The score card showed where the Arizona aviation system is adequate or deficient and identified targets for how the system should perform in the future.

Costs for improving the system to meet the goals developed in Chapter One are presented in this chapter. These costs have been prepared for ADOT for internal planning purposes only in order to determine the overall long-term aviation needs of Arizona. The costs developed for the SASP are not intended to replace those developed in the airport master planning or capital improvement planning processes. These costs do not provide commitment of funding for projects. Actual funding of projects will be subject to the Arizona Revised Statutes, Arizona Transportation Board, and administrative policies as well as availability of funds.

METHODOLOGY/PROCESS

Development costs were estimated for each system airport by comparing existing conditions and applicable facility/service objectives established by the system plan. Development costs include all projects associated with bringing system airports into compliance with the objectives for their recommended system role. Costs to increase overall system performance, related to the SASP's performance measures, are also identified. Not all recommended actions have associated costs. In other instances, costs could not be developed because the full magnitude of the needed project could not be estimated, given the scope of this plan.

Generalized cost estimates associated with moving forward on objectives for the Arizona aviation system are discussed in this chapter. Costs identified in this section are only those associated with meeting established performance measures and facility and service objectives adopted as part of this study. It should be noted that further investigation and justification would be required before many projects stemming from the system plan could be implemented. In particular, projects seeking FAA funding would require additional study.

In this process, facility needs and costs were first identified on an airport-by-airport basis. This chapter of the system plan presents this information only in summary format, with no individual airport data presented.

Three methods were used in developing the cost estimates for the Arizona State Airports System Plan through 2030. The first two methods involved utilizing existing projects and costs for the airport by reviewing each airport's master plan, airport Capital Improvement Program (CIP) and ADOT's CIP. The cities of Phoenix and Tucson provided airport CIP information for their system of airports. It is important to note that only projects costs for the near-term were available for Phoenix Sky Harbor International. In addition, for the purpose of the SASP, terminal improvement costs at Phoenix Sky Harbor and Tucson International were

not included in the overall need. However, the costs for the SkyTrain at Phoenix Sky Harbor are included master plan/airport CIP costs.

For projects contained in both the master plan and/or airport CIP, and the ADOT CIP, the higher cost estimate of the two was used. In some cases where data was more than five years old, the master plan costs were increased by 15 percent to account for cost increases. In general, the CIP costs were included as listed.

The third method of developing the cost estimates used construction cost history for unit prices of typical construction projects to develop costs for projects identified by the SASP as part of facility and service objectives. The applicable area (or linear foot) was used and multiplied by the unit price to obtain the construction cost for the project. All costs are presented in 2009 dollars.

In addition, for the long term period, two pavement preservation projects were assigned for each area, such as runway, taxiway, and apron pavements. This is due to the fact that pavement preservation is typically performed every three to seven years. To establish a basis for pavement preservation, ADOT's Airport Pavement Management System was reviewed. This system has a Pavement Condition Index (PCI) for the majority of the state's airports. The rule of thumb in determining pavement preservation projects was for pavements with PCIs 70 and greater, a pavement preservation project was assigned; pavements with PCIs between 55 and 70 were assigned pavement overlays; while pavements with PCIs less than 55 were assigned pavement reconstructions. In general, the following process was used:

- If there is a reconstruction in the short term (due to the PCI levels), the follow up will be a pavement preservation every five years
- If there is a pavement preservation in the short term, the follow up will be two pavement preservations (every five years) and then an overlay project
- If there is a pavement overlay in the short term, the follow up will be two pavement preservations (every five years) and then a reconstruction project

Regardless of which costing method that was used, all projects were vetted against an ADOT master grant file list to verify that projects were not previously completed.

The analyses completed in previous chapters evaluated system development needs at airports over the next 20 years, based on each airport's role in the system as well as forecast activity and operational efficiency. One of the most critical elements in the planning process is the application of basic financial, economic and management rationale to determine the feasibility of each project contained in the system plan. It is not critical to develop all recommended projects in this study immediately. On the contrary, it would be more prudent to systematically implement improvements in order to spread development costs through the 20-year period and focus efforts on critical projects in the early stages. Short, medium and long-term implementation periods were established in order to prioritize individual projects over the next 20 years

SYSTEM PLAN COST SUMMARY BY GOAL OBJECTIVE

Total estimated costs are presented in the following sections. Airports may incur additional costs to have sufficient operating capacity; clear approaches; comply with Part 77 standards; acquire land in an airport's RPZ; meet runway-taxiway separation standards; or meet RSA standards. These costs have not been estimated unless they were identified as part of an airport-specific CIP or master plan, as this would require a master planning level of detail.

Specific projects costs have been estimated in the following categories:

- Development
 - Instrument approaches
 - Emergency medical transport aircraft accommodation projects
 - Weather reporting
 - Fuel
 - Master plans
 - Capacity (if noted in ADOT CIP or airport master plans)
 - Part 77 compliance projects (if noted in ADOT CIP or airport master plans)
- Economic Support
 - Business user needs accommodation projects
 - Pavement improvements/preservation
 - Facility and service objectives
 - Runway length projects
 - Runway width projects
 - Taxiway projects
 - Approach projects
 - Visual Aids (PAPIs, REILs, rotating beacon, segmented circle, wind cone)
 - Runway lighting projects
 - Taxiway lighting projects
 - Approach lighting projects
 - Perimeter fencing projects
 - Fuel
 - Terminal projects
 - Hangar storage
 - Apron parking spaces
 - Auto parking spaces
- Safety and Standards
 - Clear approach projects (if noted in ADOT CIP or airport master plans)
 - Security plans
 - Emergency response plan
 - RPZ land acquisition (if noted in ADOT CIP or airport master plans)
 - Runway/taxiway separation improvements (if noted in ADOT CIP or airport master plans)
 - RSA improvements/expansions (if noted in ADOT CIP or airport master plans)
- Environmental Sensitivity and Stewardship
 - Stormwater pollution prevention plans

System Costs by Goal Category: Development

Figure 8-1 details estimated project costs associated with the Development goal category. System-wide cost to meet these performance measures is estimated at \$445 million. It should be noted that the costs by performance measure presented in the table cannot be added together due to the overlap of measures and specific needs related to the measures. For example, if an airport is recommended for an instrument approach, this cost is included in the three performance measures: 1) Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach, 2) Percent of airports capable of supporting emergency medical transport aircraft, and 3) Percent of population and area within a 30-minute drive time of an all weather runway.

The Development goal category cost includes regular updates to airport master plans. Costs of on-site weather reporting projects are based on project recommendations in the ADOT *AWOS Network Study*.

Estimated costs to improve operational capacity were derived from airport master plans and CIPs only. Capacity improving projects in the Development goal costs include additional runways, additional taxiways, air traffic control towers, high-speed taxiway exits, and other taxiway system improvements. It should be noted that \$72 million of the funding identified for capacity improvements is for construction of the new runway at Tucson International. Additional projects are needed at several airports in order to fully meet the sufficient operating capacity performance measure. Costs for these additional projects have not been developed as part of the SASP due to the level of planning needed to develop appropriate costs and the inability of several airports to meet the objective. In the following chapter, It is recommended that an airspace and operational capacity study be undertaken by the state to fully understand the needs and costs of improving the operational capacity of the system.

System Costs by Goal Category: Economic Support

Figure 8-2 shows the cost estimates for projects in the Economic Support goal category, including all projects recommended for meeting minimum facility and service objective compliance. The system-wide cost to meet these performance measures is approximately \$1.85 billion. Similar to the Development goal category costs, the numbers presented in the table cannot be added together to arrive at a total due to double counting.

Included in this cost is periodic maintenance and upkeep of all airport pavements throughout the state in order to maintain pavement condition indexes (PCIs) of 70 or greater. Facility and service objective costs are estimated at \$448 million for landside facilities by 2030, \$228 million for airside facilities, and \$4.7 million for landside services.

Figure 8-1: Development Goal Category Project Costs 2010-2030*

Performance Measure	System Plan Cost (2010-2030)					Total
	Commercial Service	Reliever	GA-Community	GA-Rural	GA-Basic	
Percent of population within a 30-minute drive time of an airport and the number of airports with an instrument approach			\$2,320,000	\$4,775,000		\$7,095,000
Percent of airports within a 30-minute drive time of an airport with ILS or LPV	\$270,000	\$90,000	\$0	\$0	\$0	\$360,000
Percent of airports capable of supporting emergency medical transport aircraft: Full Airport System	\$900,000	\$0	\$3,560,000	\$6,920,000	\$0	\$11,380,000
Percent of airports with on-site weather reporting and percent of statewide area within 25 nautical miles of an airport with on-site weather reporting	\$395,000		\$440,000	\$1,630,000		\$2,465,000
Percent of population and area within a 30-minute drive time of an all weather runway (paved, instrument approach, AWOS)	\$485,000	\$0	\$2,590,000	\$6,110,000	\$0	\$9,185,000
Percent of airports with jet fuel	\$0	\$0	\$890,000	\$0	\$0	\$890,000
Percent of airports with 24/7 fuel	\$1,060,000	\$0	\$0	\$130,000	\$0	\$1,180,000
Percent of airports with sufficient operating capacity	\$308,920,000	\$57,770,000	\$0	\$0	\$0	\$366,690,000
Airports with current (past 5 years) master plans and/or ALP	\$6,215,000	\$9,032,000	\$12,500,000	\$8,725,000	\$1,890,000	\$58,362,000
Percent of airports that are compliant with Federal Aviation Regulation (FAR) Part 77*	\$0	\$2,320,000	\$5,280,000	\$0	\$0	\$7,600,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans

* Note: The costs for this goal category cannot be added together for a total due to double counting of projects within the various performance measures. FAR Part 77 project costs are only those included in airport master plans or state CIP.

Figure 8-2: Economic Support Goal Category Project Costs 2010-2030*

Performance Measure	System Plan Cost (2010-2030)					
	Commercial Service	Reliever	GA-Community	GA-Rural	GA-Basic	Total
Percent of population within a 30-minute drive time of a system airport meeting business user needs	\$270,000	\$4,100,000	\$11,060,000	\$0	\$0	\$15,430,000
Percent of airports with a primary runway pavement condition index (PCI) of 70 or greater	\$65,830,000	\$34,440,000	\$105,600,000	\$57,350,000	\$5,990,000	\$269,210,000
Percent of airports with an average pavement condition index (PCI) of 70 or greater	\$554,420,000	\$189,920,000	\$144,70,000	\$45,590,000	\$420,000	\$934,610,000
Percent of airports meeting minimum facility and service objectives	\$337,820,000	\$206,750,000	\$96,950,000	\$36,840,000	\$1,680,000	\$679,580,000
Airside Facilities	\$94,300,000	\$50,730,000	\$54,120,000	\$27,280,000	\$1,400,000	\$227,830,000
Runway Length	\$54,190,000	\$14,270,000	\$19,440,000	\$0	\$0	\$87,900,000
Runway Width	\$2,330,000	\$8,260,000	\$10,050,000	\$3,320,000	\$200,000	\$24,160,000
Runway Surface	\$0	\$0	\$0	\$0	\$0	\$0
Taxiway	\$4,660,000	\$8,080,000	\$9,320,000	\$7,420,000	\$0	\$29,490,000
Approach Capability	\$270,000	\$90,000	\$2,320,000	\$4,780,000		\$7,460,000
Visual Aids	\$510,000	\$270,000	\$950,000	\$1,100,000	\$550,000	\$3,380,000
Runway & Taxiway Lighting	\$5,200,000	\$0	\$5,250,000	\$10,260,000	\$0	\$20,720,000
Approach Lighting System	\$5,150,000	\$4,490,000	\$350,000	\$0	\$0	\$9,990,000
Fencing	\$21,990,000	\$15,270,000	\$6,430,000	\$400,000	\$660,000	\$44,740,000
Landside Services	\$1,060,000	\$0	\$1,220,000	\$2,010,000	\$420,000	\$4,710,000
Maintenance	\$0	\$0	\$150,000	\$0	\$0	\$150,000
Restroom	\$0	\$0	\$0	\$230,000	\$420,000	\$650,000
Fuel	\$1,060,000	\$0	\$1,070,000	\$1,790,000	\$0	\$3,920,000
Landside Facilities	\$242,600,000	\$156,030,000	\$41,420,000	\$8,020,000	\$50,000	\$448,130,000
Terminal	\$24,040,000	\$0	\$1,250,000	\$0	\$50,000	\$25,340,000
Hangar Space	\$15,490,000	\$112,750,000	\$33,940,000	\$6,350,000	\$0	\$168,520,000
Apron Space	\$132,390,000	\$40,370,000	\$3,120,000	\$1,050,000	\$0	\$176,940,000
Auto Parking	\$70,690,000	\$2,910,000	\$3,110,000	\$620,000	\$0	\$77,330,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans

* Note: The costs for this goal category can not be added together for a total due to double counting of projects within the various performance measures.

System Costs by Goal Category: Safety & Standards

Estimated project costs for the Safety and Security goal category are detailed in **Figure 8-3**. The system-wide cost to meet these performance measures is estimated at \$152 million by 2030. All costs associated with a runway protection zone, runway safety area, or runway-taxiway separation standards came from airport documents such as master plans and airport layout plans.

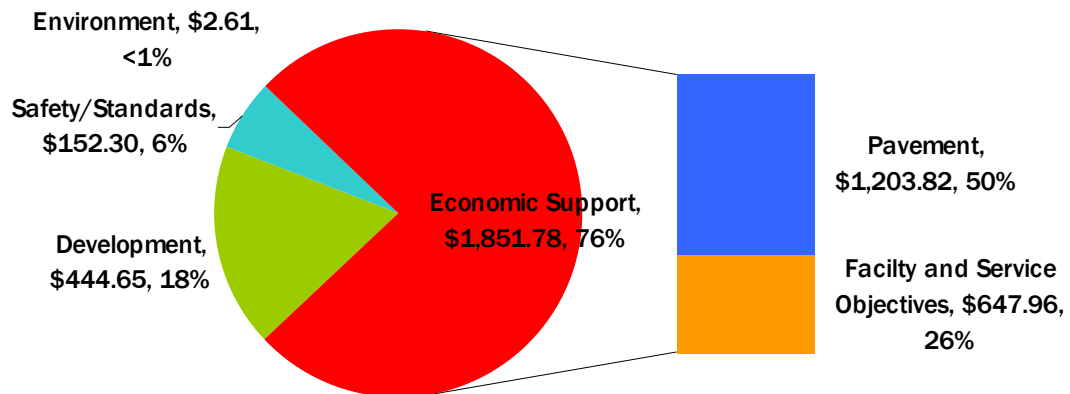
System Costs by Goal Category: Environmental Sensitivity and Stewardship

Under the Environmental Sensitivity and Stewardship goal category, only the Stormwater Pollution Prevention Plan performance measure was assigned an estimated cost. **Figure 8-4** details this cost by airport role, estimated at \$2.6 million system-wide by 2030.

System Plan Cost Summary by Goal Category

Figure 8-5 reflects the total 20-year development costs by goal category. The 20-year estimate of costs is \$2.45 billion. As previously noted, while there was some double counting of projects within specific performance measures as shown above, each project was counted in only one goal category in the totals reflected in Figure 8-5. Of the \$2.45 billion in total costs, Economic Support accounts for the largest portion (76 percent). Maintaining existing pavements, under the Economic Support goal category, accounts for half of the system costs over the time period. The costs of projects needed to meet facility and service objectives comprised 26 percent of the system costs. Development goal category projects account for 18 percent of the total estimated costs. The remaining six percent of the total \$2.45 billion development costs include projects to meet the Safety and Standards goal category. The cost to meet the Environmental Sensitivity and Stewardship goal category was less than one percent of the total costs.

Figure 8-5: Summary of SASP Costs, by Goal Category 2010-2030 (in millions)



Source: Wilbur Smith Associates

Figure 8-3: Safety and Standards Goal Category Project Costs 2010-2030

<i>Performance Measure</i>	<i>System Plan Cost (2010-2030)</i>					
	<i>Commercial Service</i>	<i>Reliever</i>	<i>GA-Community</i>	<i>GA-Rural</i>	<i>GA-Basic</i>	<i>Total</i>
Percent of airports with clear approaches to primary runway ends	\$0	\$0	\$540,000	\$500,000	\$0	\$1,040,000
Percent of airports with adopted Security Plans	\$210,000	\$300,000	\$1,350,000	\$1,200,000	\$230,000	\$3,290,000
Percent of airports that have a written emergency response plan	\$0	\$70,000	\$0	\$0	\$0	\$70,000
Airports controlling all runway end Runway Protection Zones (RPZs)	\$1,020,000	\$69,270,000	\$12,370,000	\$3,140,000	\$0	\$85,800,000
Percent of airports that meet runway/taxiway separation criteria for their current ARC	\$0	\$1,930,000	\$13,270,000	\$0	\$0	\$15,210,000
Percent of airports that have RSAs on their primary runway that meet the standards for their current ARC	\$21,450,000	\$20,020,000	\$5,280,000	\$150,000	\$0	\$46,900,000
Total	\$22,680,000	\$91,590,000	\$32,810,000	\$4,990,000	\$230,000	\$152,310,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans

Note: Project cost for RPZ, RSA, and runway-taxiway separation standards are only those included in airport master plans or state capital improvement plans.

Figure 8-4: Environmental Sensitivity and Stewardship Goal Category Project Costs 2010-2030

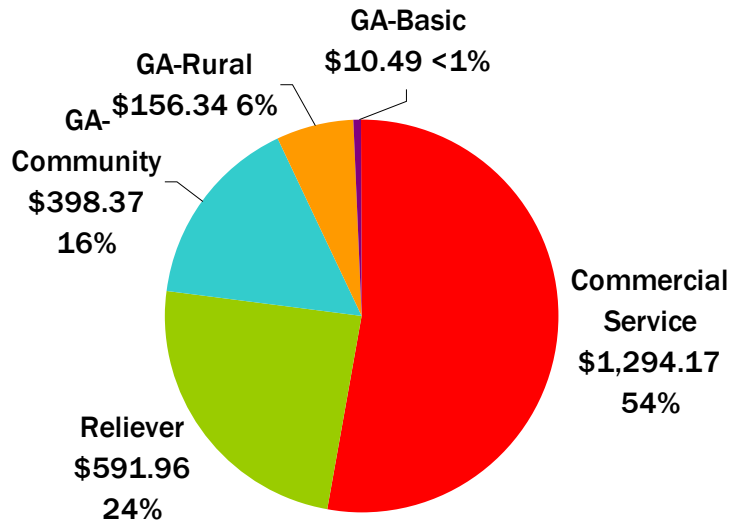
<i>Performance Measure</i>	<i>System Plan Cost (2010-2030)</i>					
	<i>Commercial Service</i>	<i>Reliever</i>	<i>GA-Community</i>	<i>GA-Rural</i>	<i>GA-Basic</i>	<i>Total</i>
Percent of system airports that have Storm Water Pollution Prevention Plan (SWPPP)	\$830,000	\$130,000	\$810,000	\$750,000	\$90,000	\$2,610,000

Source: Arizona Department of Transportation, Wilbur Smith Associates, Airport Master Plans

SYSTEM PLAN COST SUMMARY BY AIRPORT ROLE

Figure 8-6 summarizes the estimated 20-year costs by airport role. As shown, 78 percent of these costs relate to raising the level of performance for Commercial Service and Reliever airports in Arizona (54 and 24 percent, respectively). The remaining 22 percent is needed to raise the level of performance of GA-Community, GA-Rural, and GA-Basic airports.

Figure 8-6: Summary of System Costs, by SASP Role 2010-2030 (in millions)



Source: Wilbur Smith Associates

ADDITIONAL SYSTEM COSTS

New Airports

As noted in the SASP, local communities have proposed the development of three new airports. They include Maricopa Municipal Airport in Pinal County, a new airport near Pinon in Navajo County, and a new airport near Lukachukai in Apache County. In addition, plans are underway for the replacement of following airports: Polacca, Cibecue, Superior, and Ganado. The cost for developing, constructing, and maintaining (only the existing sites) these seven airports through the forecast period would be \$164.5 million. This cost is in addition to the system costs noted above.

AWOS Data Center

In addition to recommending AWOS units at various Arizona system airports, the AWOS Network Study also recommends the installation of the ADOT AWOS Data Center to coordinate the system, connecting existing and planned AWOS sites in Arizona to the National Airspace Data Interchange Network (NADIN). The study estimates the initial cost of establishment of the center at approximately \$200,000, with an annual operating cost of \$100,000. The total cost of the center through the forecast period would be \$2.3 million.

State Continuous Planning

The system plan provides ADOT with a blueprint for the future development of the airport system. As the aviation industry changes and the state’s socioeconomic and demographic characteristics evolve, the system plan should again be updated. It is recommended that ADOT consider updating the system plan at five-year intervals with updates in 2013, 2018, 2023, and 2028. The estimated cost for updating the system plan and its database through the forecast period would be \$3.0 million.

CIP AND MASTER PLAN COST SUMMARY NOT INCLUDED IN SASP DEVELOPMENT COSTS

In addition to the projects identified in the System Plan, most of the airports in Arizona have identified additional projects through local planning and goal setting. Airport-specific capital projects and costs are identified in each airport’s master plan. Many of the airports in Arizona have updated their master plans in the last five years. Many planned projects in airport master plans that will use federal and state funds are identified in the current state CIP. The current state CIP has estimated project and cost information annually to 2015. **Figure 8-7** presents the additional project costs identified in the state CIP and published airport master plans. In addition to the \$2.45 billion identified to meet System Plan recommendations, an additional \$7.1 billion could be needed to meet airport needs (\$504 million for other State CIP costs and \$6,595 million for other master plan/airport CIP costs).

Figure 8-7: Other Future Airport Costs (in millions)

<i>Cost Category</i>	<i>Near Term 2010-2014</i>	<i>Mid-Term 2015-2019</i>	<i>Long-Term 2020-2030</i>	<i>Total</i>
Other State CIP Costs	\$504.35	\$0	\$0	\$504.35
Other Master Plan/Airport CIP Costs	\$1,241.22	\$1,847.36	\$3,506.47	\$6,595.04

Sources: WSA; Airport Master Plans; Tucson International and Phoenix Sky Harbor International Airport CIPs, Navajo Nation CIP, Arizona DOT

This cost summary is not exhaustive of all the airport projects that are needed through 2030. Several larger system airports including Phoenix Sky Harbor International, Yuma International, Laughlin/Bullhead City International, and Scottsdale currently have master plans underway. Improvement costs that will come from these master plans are not included in this SASP. Many airports also do not provide project costs throughout the entire System Plan’s forecast period (through 2030). Most master plans only provide costs through a 15 or 20-year period.

Also, pricing in many construction-related aspects has increased, decreased, and increased again in recent years due to economic conditions worldwide. These rising construction costs impact original project cost estimates developed in the state CIP or the airport master plans including pavement projects, runway and taxiway extensions, and apron projects. The cost estimates provided for these types of projects in older master plans tended to be lower than the costs actually needed to perform the project today.

TOTAL FUTURE DEVELOPMENT FUNDING NEEDS

Figure 8-8 presents the additional project costs identified in the state CIP and published airport master plans by near-term, mid-term, and long term time periods. For the near-term alone, approximately \$2,767 million has been identified for projects from the SASP, additional system costs, other State CIP costs, and other master plan costs. This indicates that in addition to the \$934 million identified to meet System Plan recommendations in the near term, an additional \$1.8 billion could be needed to meet all airport needs through 2014 alone.

Figure 8-8: Total Airport Development Costs 2010-2030 (in millions)

<i>Cost Category</i>	<i>Near Term 2010-2014</i>	<i>Mid-Term 2015-2019</i>	<i>Long-Term 2020-2030</i>	<i>Total</i>
SASP Implementation Costs	\$933.79	\$542.38	\$975.17	\$2,451.34
Additional System Costs*	\$87.90	\$24.72	\$57.55	\$170.17
Other State CIP Costs	\$504.35	\$0	\$0	\$504.35
Other Master Plan Costs	<u>\$1,241.22</u>	<u>\$1,847.36</u>	<u>\$3,506.47</u>	<u>\$6,595.04</u>
Total Costs	\$2,767.27	\$2,414.45	\$4,539.19	\$9,720.91

Sources: WSA, Airport Master Plans, ADOT Aeronautics

Note:*includes costs developed for the construction and maintenance of new airports, the development and maintenance of the AWOS Network Center, and future state system planning needs.

Although the longer term funding needs are uncertain, if near term funding needs continue into the future, it is estimated that an additional \$2.4 billion will be incurred in the mid term (2015 to 2019) and \$4.5 billion in the long term (2020 to 2030). Throughout the forecast period it is estimated that \$9.7 billion will be needed to fund Arizona airports. This equates to an average annual need of \$486 million to fund system-wide development.

Between 2010 and 2030, the approximate annual cost to raise the level of performance of airports to meet System Plan objectives would be at least \$122.6 million. However, when other desired airport projects are considered as well, the annual costs are estimated to reach \$486 million on average over the 20-year forecast period. Due to incomplete information on funding needs, especially from larger airports who do not conduct long-term capital development planning to this level of detail, the long term costs are considered incomplete and probably understated. The following discussion provides an overview of the funding currently available to Arizona's airports and a summary of the anticipated shortfall through the 20-year forecast period.

FUNDING SOURCES

Funding for airport improvement projects is an important issue when considering the future of Arizona’s aviation system. In order to meet user needs, airports typically rely on funding sources beyond their own revenue. Airport development is typically driven by the ability of individual airport sponsors to identify funding sources and to successfully obtain funding.

There are various sources of funding available to airports in Arizona; however, each year, the funding requested far outweighs available funding. In general, funding for capital improvement projects can be secured from the following sources: federal, state, local, or private funds. Implementation of the recommendations presented in the SASP will require significant effort on the part of all funding agencies. A brief description of each source of funding is presented in the following sections.

Federal Funding Sources

The FAA, through Airport Improvement Plan (AIP) grants, distributes federal funds to the nation’s airport system from the Aviation Trust Fund. The Aviation Trust Fund was originally established in 1970 and has since been amended on numerous occasions. The Aviation Trust Fund establishes a source of funds, collected only from the users of the nation’s airport system that can be used to fund airport improvements. Only airports included in the National Plan of Integrated Airport Systems (NPIAS) are eligible to apply for FAA funding. Fifty-eight of Arizona’s 83 system airports are currently part of the NPIAS and are eligible for federal funding.

Figure 8-9 presents total AIP funding for all eligible U.S. airports for the fiscal years 2000 through 2009.

Figure 8-9: All U.S. Historical AIP Funding (Billions)

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total AIP Funding	\$3.3	\$3.4	\$3.4	\$3.5	\$3.6	\$3.7	\$3.6	\$3.6

Source: FAA Airports Financial Assistance Division

Vision 100 was signed into law in December 2003 and reauthorized the AIP Program through 2007. Because Vision 100 expired at the end of FY2007 and a long term reauthorization is not in place at the time of the SASP writing, there have been no funding targets for 2008 and beyond. While FY2008 and FY2009 funding was eventually appropriated at the FY 2006 level of \$3.6 billion, the future of the AIP is largely unknown without a program reauthorization. The future AIP program may include changes to federal share amounts, non-primary entitlements, set-asides, and passenger facility charges (PFCs), among other items.

Commercial Service Entitlement Funding for Arizona

Commercial service airports receive entitlement funds based on the number of passengers they enplane during the prior calendar year. Entitlement funding is based on a graduated methodology that provides a lower per enplanements entitlement as the total enplanement level increases. This process is used to offset funding disparity that results from the vastly different levels of enplanements occurring at U.S. airports. The minimum passenger entitlement for Primary Airports (those airports enplaning at least 10,000 passengers per year) is \$1 million. In Arizona, nine airports were considered Primary Airports in FY2009 including Laughlin/Bullhead City International, Flagstaff-Pulliam, Grand Canyon National

Park, Grand Canyon West, Page, Phoenix Sky Harbor International, Phoenix Mesa Gateway, Tucson International, and Yuma International. According to the FAA, these airports received \$16.3 million in Primary Entitlements in FY2007 (the most recent data available from the FAA). Not all of this money is spent in the year it is received. Commercial service airports may also receive cargo entitlement funding based on the landed weight of cargo aircraft. Phoenix Sky Harbor will receive \$1.4 million in Cargo Entitlements in FY2009 and Tucson International will receive over \$200,000.

State Apportionment & Non-Primary Entitlement Funding for Arizona

General aviation airports (included in the NPIAS) are eligible for State Apportionment funds and Non-Primary Entitlement funds. State Apportionment funds are allocated to states based on a formula using population and geographic size. Those funds are distributed to airports based on FAA prioritization of projects. According to the FAA, Arizona non-primary airports will receive approximately \$8.3 million in State Apportionment funds in FY2009 for federally funded projects at non-primary airports only.

General aviation airports are also eligible for up to \$150,000 in Non-Primary Entitlement funds. To obtain the funds, airports must have a 5-Year CIP with eligible projects that meet AIP funding guidelines. In FY2009, 48 Arizona airports received Non-Primary Entitlement funds for a total of \$7.0 million.

Federal Discretionary Funding for Arizona

General aviation and commercial service airports also compete for Federal Discretionary funds, which are awarded based on priority ratings given to each potential project by the FAA. The prioritization process ensures that (from the FAA's viewpoint) the most important and most beneficial projects are the first to be completed, given the availability of adequate discretionary funds. This source of funding is over and above entitlement funding, and is provided to airports for projects that have a high federal priority for enhancing safety, security, and capacity of the Airport, and would be difficult to fund otherwise. The dollar amounts of individual grants vary and can be significant in comparison to entitlement funding.

Between FY2007 and the first six months of FY2009, the discretionary funding for Arizona airports from the FAA Western Pacific Region was over \$94 million. The following Arizona airports received discretionary funds during the two and a half year period:

- Avi Suquilla (\$3.5m)
- Bagdad (\$0.3m)
- Bisbee Municipal (\$1.1m)
- Chandler Municipal (\$2.1m)
- Flagstaff Pulliam (\$1.6m)
- Grand Canyon West (\$17.8m)
- Kayenta (\$5.8m)
- Laughlin/Bullhead City (\$10.2m)
- Marana Regional (\$1.0m)
- Mesa Falcon Field (\$1.0m)
- Page Municipal (\$22,000)
- Phoenix Deer Valley (\$9.3m)
- Phoenix Goodyear (\$19,000)
- Phoenix Mesa Gateway (\$15.6m)
- Phoenix Sky Harbor (\$3.0m)
- Scottsdale (\$2.4m)
- Show Low Regional (\$0.1m)
- Tucson International (\$15.5m)
- Winslow Regional (\$0.1m)
- Yuma International (\$3.7m)

American Recovery and Reinvestment Act (ARRA) of 2009

President Barack Obama signed the \$787 billion American Recovery and Reinvestment Act (ARRA) of 2009 in February 2009. This one time economic stimulus package included \$48.1 billion in domestic spending on infrastructure improvements. Of this, \$1.1 billion was provided to the FAA for airport projects. Priority was given to projects that were ready to go (also referred to as shovel ready) and could be completed within two years. Six Arizona airports were awarded one of these 100 percent federal funded grants for a total of \$28.7 million. These airport projects include the following:

- Phoenix-Sky Harbor International taxiway rehabilitation (\$10.5m)
- Sierra Vista Municipal/LAA runway rehabilitation (\$6.0m)
- Kingman apron rehabilitation (\$5.0m)
- Taylor runway rehabilitation (\$3.5m)
- Avi Suquilla taxiway rehabilitation (\$1.8m)
- Tucson international security enhancements (\$1.85m)

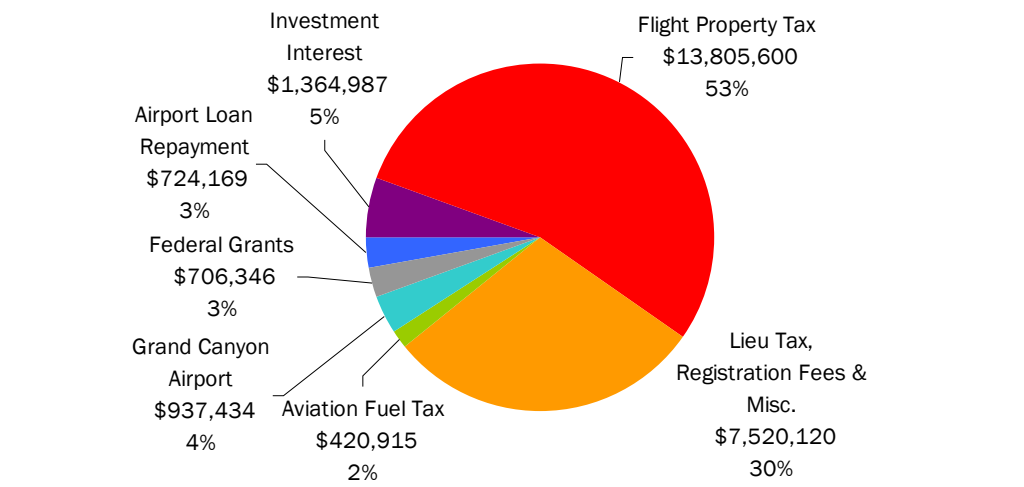
Summary

Federal funding is limited to development that is justified to meet aviation demand, according to FAA standards. Each airport development project, including those recommended in the SASP, will be subject to eligibility and justification requirements in the normal AIP funding process.

State Funding

In support of the state aviation system, the State of Arizona also participates in airport improvement projects through its own grant program. State funding is available for all publicly-owned airports in Arizona, excluding native-owned airports. The source for state airport improvement funds is the Arizona Aviation Fund administered by the Arizona Department of Transportation (ADOT) Aeronautics Division and funded mainly through flight property taxes, aircraft lieu taxes and registration fees, and aviation fuel taxes. **Figure 8-10** presents the sources of the aviation fund in FY2008. In FY2008, \$25.5 million was deposited into the State Aviation Fund.

Figure 8-10: Arizona Aviation Fund Sources FY2008 - \$25.5 million



Source: ADOT Aeronautics

State aviation funding is “non-dedicated.” Aeronautics relies on two annual appropriations from the Legislature each year: one for the operating budget of the Aeronautics Division and Grand Canyon National Park Airport and the other for the airport projects including matching grants for FAA funding, pavement preservation, airport loans, and other state projects. Between FY2001 to FY2009, the Arizona Aeronautics Division received a total of \$144 million from the State Aviation Fund for aviation projects:

- 2001-\$9.9 million
- 2002- \$7.1 million
- 2003- \$25.9 million
- 2004- \$8.7 million
- 2005- \$15.5 million
- 2006- \$24.9 million
- 2007- \$28.4 million
- 2008- \$20.8 million
- 2009- \$2.8 million
- 2010E- \$3.5 million

In FY2008, the State Legislature moved \$18.1 million from the State Aviation Fund to help balance the state budget. This sweep moved dedicated grant money from planned airport projects. In FY2009, the State Aviation Fund will be swept by another \$22.5 million to the Legislature, terminating 28 approved airport projects. It is uncertain when the State Aviation Fund will once again be dedicated for use for aviation-related projects only. Based on this uncertainty, the Aeronautics Division is anticipating funding just \$3.5 million in federal matching grants in FY2010.

The State Transportation Board establishes the policies for distribution of the State Aviation Fund across the following categories of airport development assistance:

- Federal/State/Local Grants
- State/Local Grants
- Airport Pavement Management System (APMS) (including projects maintaining and protecting aviation pavement surfaces)
- System Planning
- Airport Loan Program (including economic development/revenue generating loans, grant match loans, and grant advance loans)

These programs are discussed in more detail below.

Federal/State/Local and State/Local Grant Programs

The state’s Airport Development Grants Program is designed to provide 50 percent of the local share for projects receiving federal AIP funding. These are referred to as Federal/State/Local grants. Current sponsor obligations on federal projects for most airports are five percent of a project’s total cost, making the state share 2.5 percent. However, the local share of federal projects for Phoenix Sky Harbor International is 25 percent and the local share for Tucson International is nine percent, making the state share 12.5 and 4.47 percent, respectively.

Projects must be included in ADOT’s Capital Improvement Program (CIP) and require approval by the STB in order to receive the matching funds for Federal/State/Local grants. The Arizona Revised Statutes and STB policy provides guidance on funding limits and

eligibility. Types of projects eligible for this funding as well as State/Local grants include planning, design, development, land acquisition, construction, and improvement of publicly-owned and operated airport facilities. There is currently a cap on the maximum annual state grant funding that an individual airport can receive; in any fiscal year; no airport can receive more than 10 percent of the total aviation fund.

The state also participates in State/Local grants. The state funds 90 percent of projects at state-defined primary airports and 95 percent of the project cost of secondary airports. These projects must also be included in ADOT's CIP and approved by the STB. Due to limited funding in FY 2009 and FY2010, the state was not able to fund any State/Local grants in those years.

Airport Pavement Management System (APMS)

Arizona's Airport Pavement Management System also may fund up to 90 percent of a primary airport pavement maintenance project and 95 percent of a secondary airport pavement project (primary and secondary are Arizona airport classifications) which is not eligible for AIP funding, such as crack seals, slurry seals, pavement overlays, and pavement markings. The APMS is updated every three years and provides an eight-year list of needed projects.

Airport Loan Program

ADOT Aeronautics Division has an Airport Loan Program, established to enhance the utilization of state funds and provide a flexible funding mechanism to assist airports in funding improvement projects. Eligible projects include runways, taxiways, aircraft parking ramps, aircraft storage facilities (hangars), fueling facilities, general aviation terminal buildings or pilot lounges, utility services (power, water, sewer, etc.) to the airport runway or taxiway lighting, approach aids (electronic or visual), ramp lighting, airport fencing, airport drainage, land acquisition, planning studies, and under certain conditions, the preparation of plans and specifications for airport construction projects. Projects not eligible for funding under other programs but are designed to improve an airport's ability to be financially self-sufficiency may also be considered.

There are three types of loans available through the program: Matching Fund Loans, Revenue Generating Loans, and Economic Development Loans. The Matching Fund Loans are provided to meet the local matching fund requirement for securing federal airport improvement grants. This loan is available for construction projects and projects must be included in the ADOT five-year CIP. These loans cannot be repaid with future airport development grant funds. The Revenue Generating loan funds are provided for airport related construction projects, which are not eligible for funding, in whole or part, under other programs and are designed to improve airport financial self-sufficiency. Economic Development Loans are available for projects that promote airport self-sufficiency but are not considered a direct revenue-producing project.

Summary

Programming of aviation capital projects is difficult and funding is subject to uncertainty. Historically, needs greatly outweighed available funds, and the unknown financial situation of available money each year makes funding high priority and multi-year projects difficult. In

addition, due to rising project construction costs, the funding has been spread over fewer projects in recent years.

Local Funding

Local public airport sponsors such as counties, cities, towns, and airport authorities are responsible for costs associated with airport development projects that remain after federal and state shares have been applied. Beginning in 2004, the local and state match for federal projects is 2.5 percent. However, the local share of state projects for Phoenix Sky Harbor International is 12.5 percent and the local share for Tucson International is 4.47 percent. For state projects, the local share has varied from 10 percent to 50 percent, depending on the nature of the improvement.

Local government funding of airport development projects is derived from the following sources:

- General Fund Revenues
- Bond Issues
- Airport-Generated Revenues
- Private Funding

Of these, general fund revenues and general obligation bonds are by far the most common funding sources. Revenue bonds supported by airport generated revenues are seldom used because most general aviation airports do not generate enough money to pay operating expenses and the debt service of capital funding requirements.

General Fund Revenues

Capital development expenditures from general fund revenues have been somewhat difficult to obtain in recent years. One reason for this difficulty is the seemingly universal shortfall in local general fund revenues. Budgetary problems have created an environment where local funding is uncertain. The amount of general fund support for airport improvement projects varies by airport and is based upon the local tax base, priority of the development project, historical funding trends, and, of course, local attitudes concerning the importance of aviation.

Bond Issues

Airport authorities can issue bonds without approval from the city or county. However, they must use their own revenue to repay the bonds. Airport revenue and property tax revenue are typically used to repay these bonds.

A city or county can also operate an airport. For these airports, bond issues funding the local share of airport development projects must compete with bond issues for other types of community improvements such as schools, highways, and sewer systems. As with the general fund apportionment, bond issues supporting airport development depend greatly on the priority assigned to such projects by the local community.

Airport-Generated Revenues

Airport-generated revenues for general aviation airports are those revenues associated with the services that the airport provides. After expenses, net revenues can be used to pay the

local share of capital improvement projects. Historically, most general aviation airports have not been able to realize enough revenue to completely cover their expenses and, therefore, often operate at a deficit. As a result, general aviation airports do not typically generate revenues to fund the local share of most development projects.

Commercial service airports, in most cases, do generate enough revenue to cover expenses and also fund the local share of capital improvement projects. These revenue sources typically come from landing fees, space rentals, auto parking, and fees and commissions on gross sales.

Another means for commercial airports to generate revenue for eligible capital improvement projects is a Passenger Facility Charge (PFC). The PFC program is part of the Aviation Safety and Capacity Expansion Act of 1990, enacted November 5, 1990. The ruling under this act requires the Department of Transportation to issue regulations under which a public agency may be authorized to impose an airport passenger facility charge of up to \$4.50 per enplaned passenger at a commercial service airport it controls. The proceeds from such PFCs are to be used to finance eligible airport-related projects. PFC-generated revenue can be used to pay all or part of the allowable costs of an approved project. PFCs can be used to pay debt service and financing costs incurred on that portion of a bond issued to carry out approved projects. PFCs may be used in combination with airport grant funds to accomplish an approved project. PFCs can be used to meet the non-federal share of the cost of projects funded under the federal airport grant program. It is estimated that over \$97 million was collected in PFCs at Arizona airports in 2007. The following Arizona commercial service airports currently charge passengers a PFC surcharge:

- Laughlin/Bullhead International \$2.00
- Flagstaff Pulliam \$3.00
- Grand Canyon West \$3.00
- Phoenix Mesa Gateway \$4.50
- Phoenix Sky Harbor International \$4.50
- Tucson International \$4.50
- Yuma International \$4.50

Private Funds

At publicly owned airports, items such as storage and maintenance hangars, fuel systems, and pay parking lots are not typically eligible for federal or state grant funding because they generate income for the airport. If a local airport sponsor does not wish to undertake the responsibility of financing, constructing, and managing hangar construction, a fixed-base operator is likely to build these facilities. This is provided that the FBO has the long-term lease agreement and that the financial market allows the project to be economically feasible. Some communities have also worked with local businesses to fund improvements.

Funding Summary

Figure 8-11 presents a summary provided by ADOT Aeronautics and the FAA of total funding for airports in Arizona over the last five fiscal years (July 1 through June 30). The funding includes federal, state, and local funding for this time period. Projects that use 100 percent of local funds or PFC funding are not included. On average between FY2004 and FY2008, funding for Arizona airports has been nearly \$100 million, considerably less than the needs of the system presented above. As shown in Figure 8-11, due largely to state funding cuts, FY2009 total funding was estimated to be just \$68.3 million, well below the \$100 million

average of the previous five years. If the total funding level from FY2009 of \$68.3m is compared to the future annual funding needs developed in the beginning of this chapter, (\$486 million per year), this equates to an annual shortfall of approximately \$417 million.

Figure 8-11: Arizona Airport Historic Funding FY2004-2009E

<i>Project Type</i>		<i>FY2004</i>	<i>FY2005</i>	<i>FY2006</i>	<i>FY2007</i>	<i>FY2008</i>	<i>FY2009E</i>
<i>Source</i>							
Federal/State/Local							
Federal							
Entitlement		\$26,720,416	\$28,699,722	\$28,464,159	\$32,011,370	\$29,152,343	\$25,000,000
Discretionary		<u>\$57,573,182</u>	<u>\$50,362,308</u>	<u>\$41,303,198</u>	<u>\$36,379,767</u>	<u>\$38,738,304</u>	<u>\$38,000,000</u>
<i>Federal Total</i>		\$84,293,598	\$79,062,030	\$69,767,357	\$68,391,137	\$67,890,647	\$63,000,000
Local Match		\$3,012,812	\$2,519,266	\$1,965,907	\$2,235,419	\$2,325,214	\$2,487,674
State Match		\$1,201,868	\$1,433,836	\$1,522,461	\$6,684,138	\$1,069,318	\$2,487,674
Total		\$88,508,278	\$83,015,132	\$73,255,725	\$77,310,694	\$71,285,179	\$67,975,347
State/Local							
State		\$1,945,476	\$9,752,682	\$17,937,687	\$21,703,979	\$19,667,548	\$0
Local		<u>\$212,497</u>	<u>\$1,892,083</u>	<u>\$2,249,242</u>	<u>\$2,626,163</u>	<u>\$2,178,613</u>	<u>\$0</u>
Total		\$2,157,973	\$11,644,765	\$20,186,929	\$24,330,142	\$21,846,161	\$0
APMS							
State		\$3,424,888	\$4,256,517	\$3,328,179	\$0	\$0	\$0
Local Match		<u>\$380,541</u>	<u>\$0</u>	<u>\$151,105</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Total		\$3,805,429	\$4,256,517	\$3,479,284	\$0	\$0	\$0
State		\$2,104,566	\$2,104,567	\$2,155,000	\$0	\$85,000	\$277,359
Total Funding		\$96,576,246	\$101,020,980	\$99,076,938	\$101,640,836	\$93,216,340	\$68,252,706
Total State Funding		\$8,676,798	\$17,547,602	\$24,943,327	\$28,388,117	\$20,821,866	\$2,765,033

Source: ADOT Aeronautics

Note: E=estimate

RETURN ON INVESTMENT

Arizona is continually facing increasing demand for limited financial resources. The SASP identified the importance of addressing safety and capacity related projects in the near and mid-term. The challenge is to prioritize which additional airport capital investment projects should be funded with state assistance. Factors considered in the decision-making process include aviation activity (i.e., aircraft operations and based aircraft), emergency access, and economic development (business attraction and retention). From an economic development perspective, the objective is to identify how the greatest benefit can be achieved given aviation's role compared to many other economic development factors, such as labor (availability, skill levels and rates), taxes, accessibility, etc.

Airports are responsible for creating significant economic benefit through the aviation services that they support. Airports create economic impacts through their operation, businesses that are located on the airports, and through spending by visitors who arrive via the airport. Economic impact studies provide estimates of jobs, annual payroll, and annual economic activity (output) supported by the airport, its tenants, its operations, and visitors who arrive via the airport. A 2002 study completed by the Arizona Department of Transportation for public airports in Arizona concluded that there are an estimated 395,000 jobs throughout the state that are linked directly to the airports and their operations. Total

economic output contributed by the public-use airports included in the SASP was over \$38.5 billion in 2002.

While the results of the airport economic impact analysis are extremely useful in illuminating the importance of Arizona's aviation industry they do not shed light on the potential return on investment (ROI) of aviation as a whole. The return on investment goes beyond the airport itself, and extends into the local and regional economies that they operate within. Without the availability of airports, the ability of the local or regional economy to expand is impacted. Airports serve an important role in providing access for the local business, as well as access for visitors and vendors of the business that is not easily quantified as a specific return on investment.

When a company is looking to expand or relocate, there are many factors that affect their decision-making process. In a survey conducted as part of the SASP of more than 2,500 Arizona businesses, the survey asked the business to rank the importance of the following factors when considering expansion or relocation. The factors are listed from most important to least in terms of the results:

- Convenient highway access
- Availability of trained workforce
- Cost of living
- **A commercial service airport**
- Tax incentives
- Proximity of suppliers
- An urban business district
- Academic or cultural centers
- Universities or R&D centers
- **Airport with international flights**
- **A general aviation airport**
- Historic location of business
- Raw materials/natural resources
- Rail transportation facilities

As shown, the location of a commercial service airport ranks very high (fourth out of 14 factors), indicating the economic value of commercial airline service to businesses and the overall economy. Proximity to a general aviation airport ranks 11th in the listing, just below airport with international flights.

The survey confirmed that many businesses depend on the State's airports for the transport of employees, clients, and suppliers, as well as goods. Without access to commercial and general aviation airports, some companies would be forced to cut employment or possibly locate outside the State. It is the off-airport, valued added benefit that non-aviation businesses gain through their use of aviation that is extremely difficult to quantify.

Role of the Airport in Economic Development

Airports are often catalysts for economic development; however, investment in airport infrastructure does not necessarily stimulate economic development. Airport investment (development) is more often an important facilitator of growth, not the origin or the cause of growth. Within any market area, rising demand for goods and services stimulates economic growth, and subsequently the need to invest in and grow airports.

Rising demand for goods and services is most often linked to growth in population and employment, capital investment (public and private), and/or technological progress. These three measures are not easily quantified. Studies have shown that when a market area has certain characteristics, there is a greater propensity for rising demand for goods and services. Rising demand for goods and services equates to the need to invest in and grow airport facilities. When certain characteristics are present in a market area, these characteristics generally indicate a higher demand for aviation services and hence a greater potential for return when investment is made in airports. It is more often the characteristics of an airport's market area, and not the airport specific development project, which determine if there will be a positive off-airport return on investment.

SUMMARY

The Arizona State Airports System Plan has identified costs to elevate the overall performance of the state's airport system and to enable individual airports in the system to fulfill their designated roles. Through 2030, the approximate annual average cost to raise the level of performance of airports throughout Arizona to meet SASP recommendations alone would be at least \$123 million. When additional funding needs are considered based on airport CIPs, ADOT's current CIP, and airport master plans, the annual level of need is estimated to jump to \$486 million or a total of \$9.7 billion over the 20-year forecast period.

Historically and prior to FY 2009, when federal, state, and local funding sources are all considered, each year an average of approximately \$100 million has been invested in the Arizona airport system. With an estimated \$486 million in annual estimated need, this results in a deficit of \$386 million per year in funding shortfall. Immediate action is needed at all levels to help ensure that Arizona's airports can be appropriately maintained and improved. State funding for Arizona's airport system has been cut drastically in the last two fiscal years. ADOT Aeronautics relies on funds appropriated from the Legislature to maintain a healthy and safe statewide aviation system. With the recent State Aviation Fund sweeps, the limited funding has made it difficult for the state just to match federal grants. In addition, this limits the ability of the state to fund any special programs, including airport pavement maintenance. Aside from funds to match federal grants, additional dedicated state funding is needed for the maintenance and development of public airports in Arizona.

The importance of Arizona's airports to the economies of the state, cities, and counties is undeniable. The system must be maintained and justifiably expanded not only to meet the needs of the aviation community but also the economic objectives of the state. The return on the investment in Arizona's airports can be great, if the funding is in place to maintain and support its system.