# 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

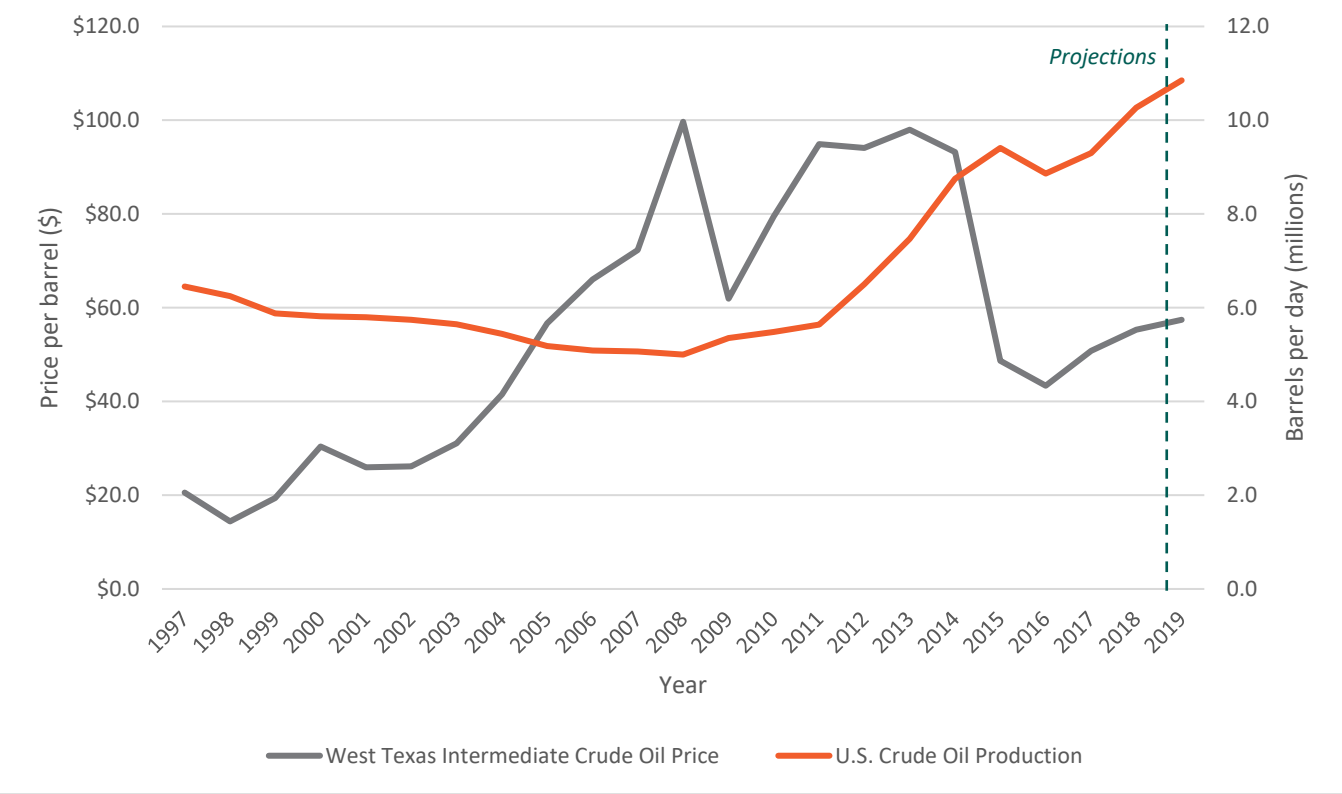
Planning for these types of future pressures also provides the opportunity to develop preemptive plans should significant changes occur to the state's aviation system. This proactive planning approach supports the system's ability to respond to future challenges and effectively function when the unexpected 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.

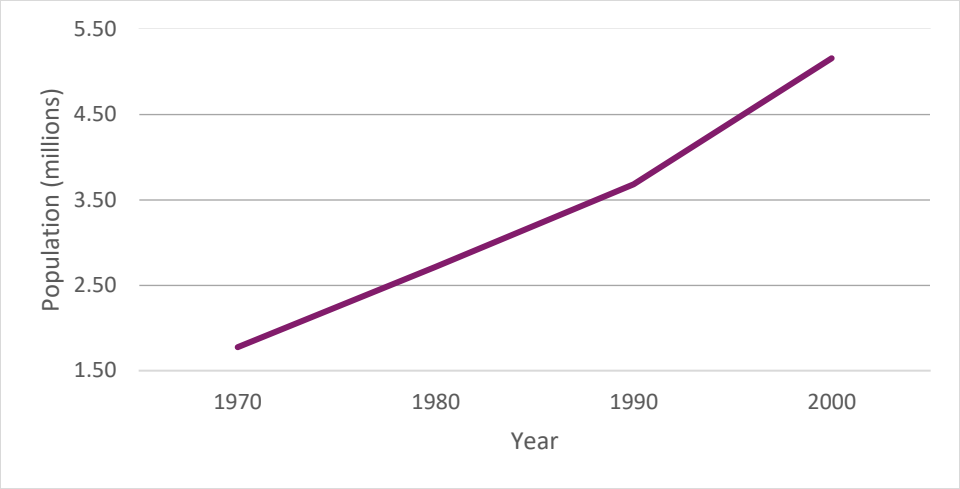
Such fluctuations in oil prices can be realized by passengers and the airports that serve them in several connected ways. When oil prices drop, ticket prices may or may not similarly decline. Ticket costs and the growing acceptance of amenity fees have spurred the growth and expansion of low-cost and 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**

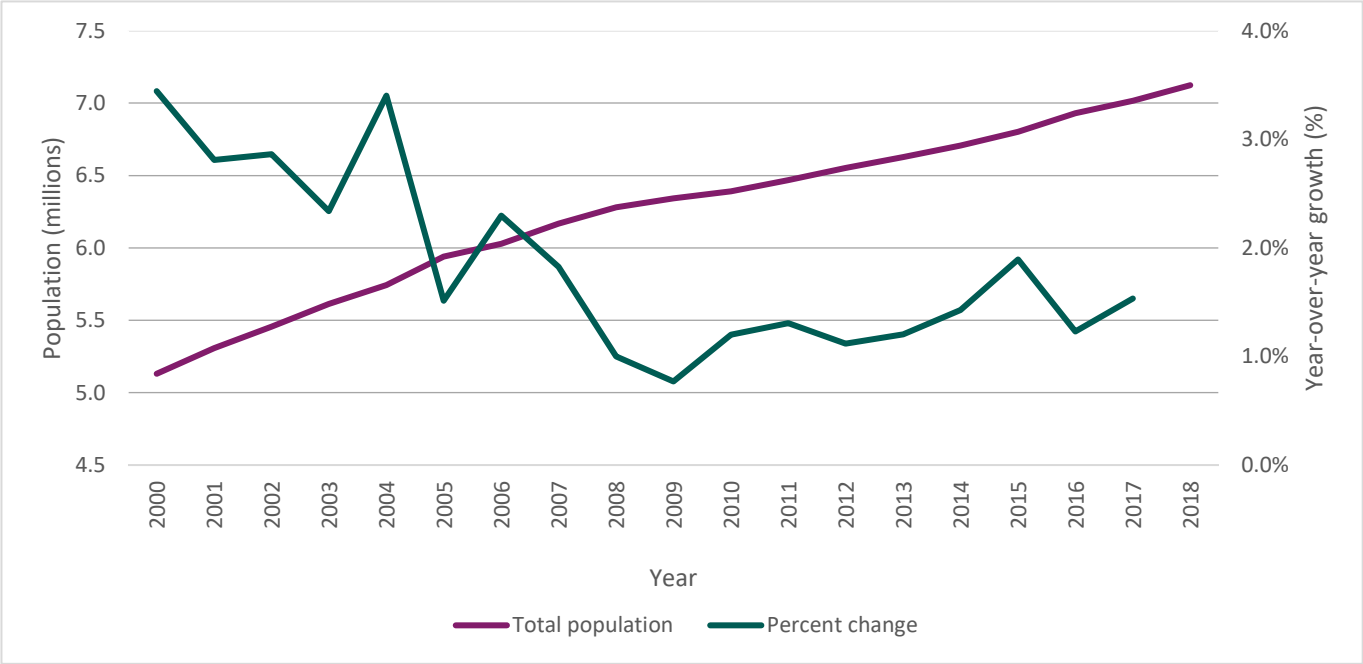
Population continues to be one of the most important indicators of aviation demand, especially when that growth catalyzes associated expansion industries such as construction, retail, hospitality, business services, and others. During the last three decades of the 20th century, Arizona's population increased 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.

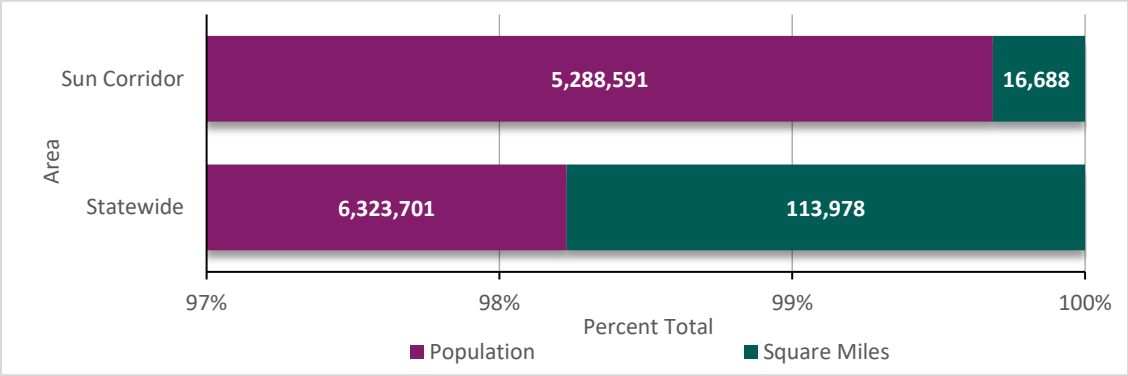
### Sun Corridor Growth

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)**

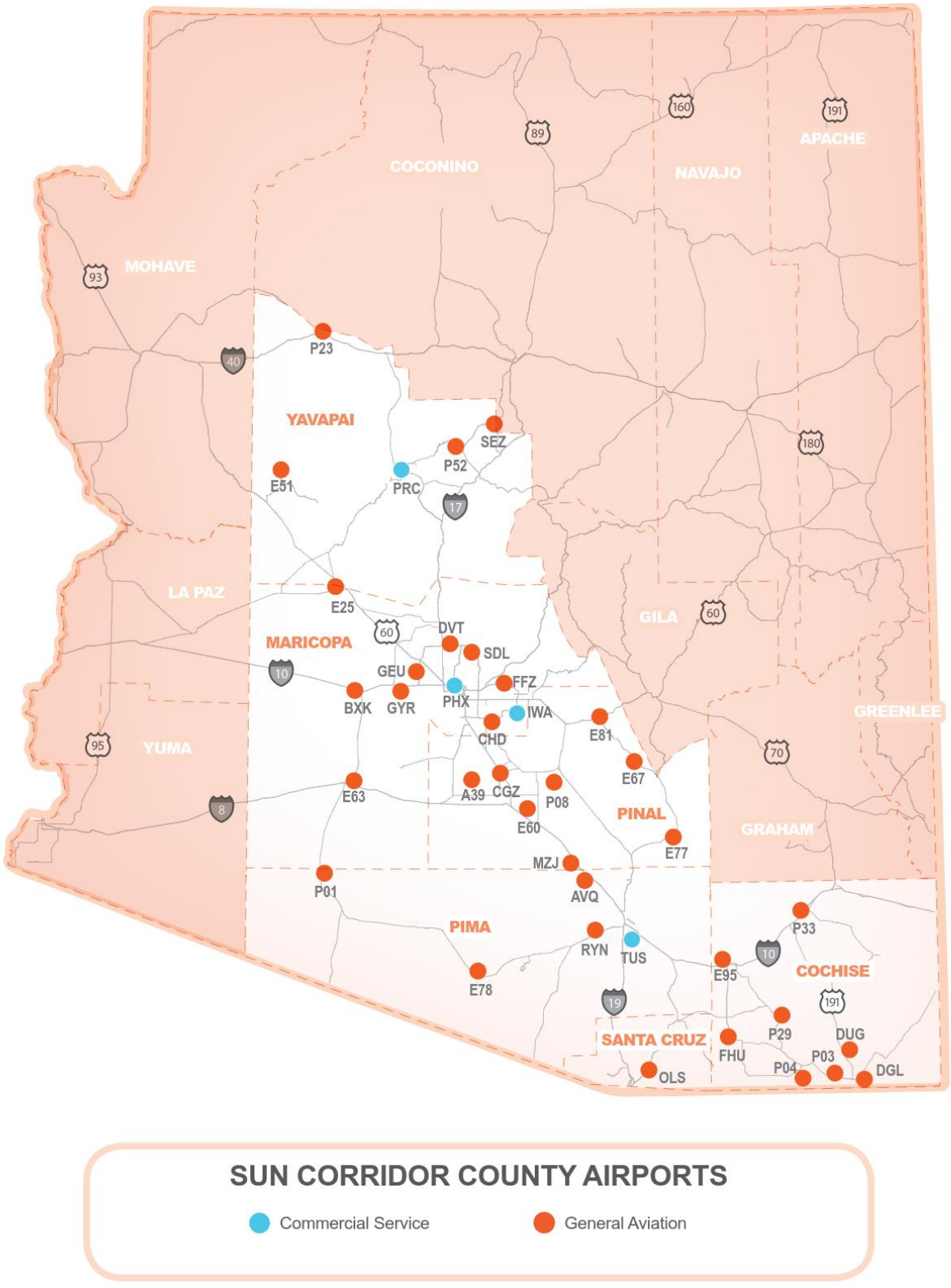
As the Sun Corridor grows, it will become increasingly important for the area to be connected to global markets. According to a report issued by the Morrison Institute for Public Policy at Arizona State University, "Potential investors from Europe or Asia shouldn't have to stop in New York or Las Vegas 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*

## 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.

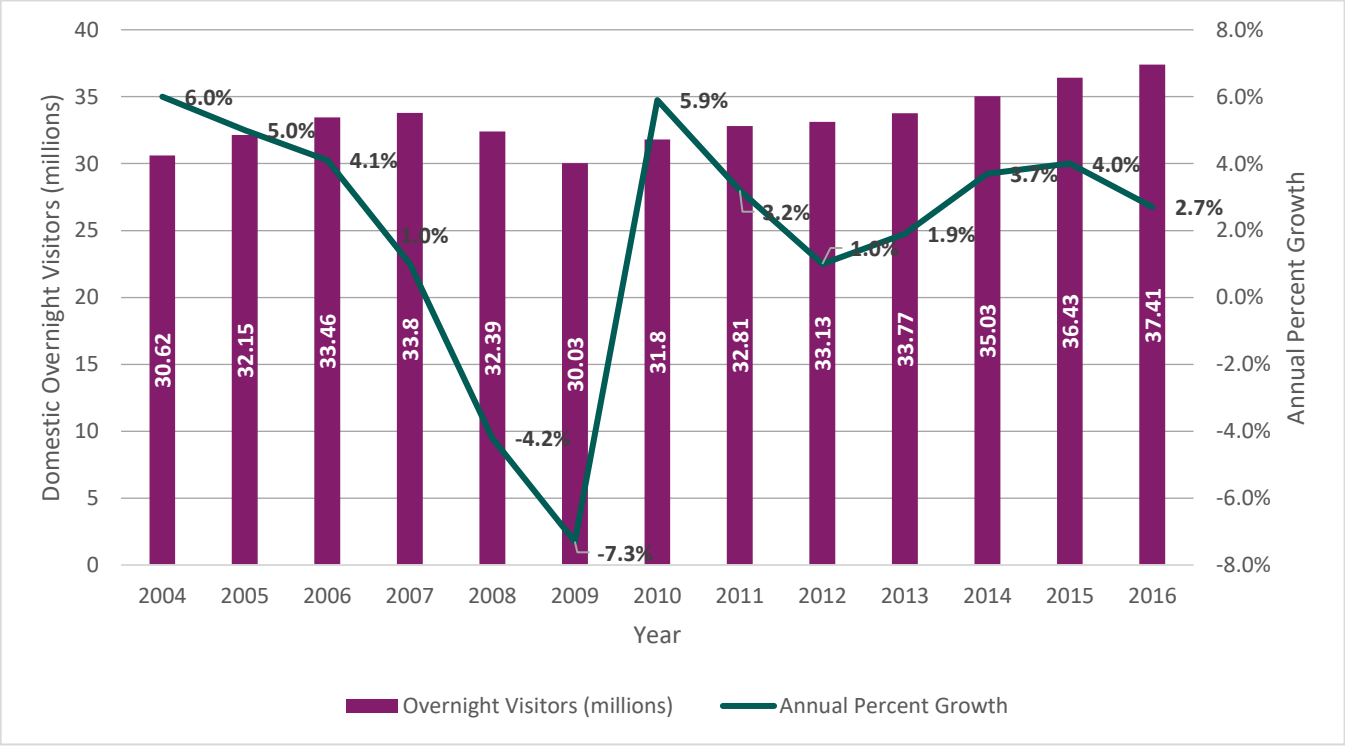
In a very direct way, aviation is inherently linked with the trajectory of the state's economy. As Arizona's economy continues to grow and evolve in the coming years, commercial service and GA airports can anticipate an uptick in business/corporate aviation. As such, airports with the facilities and 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.

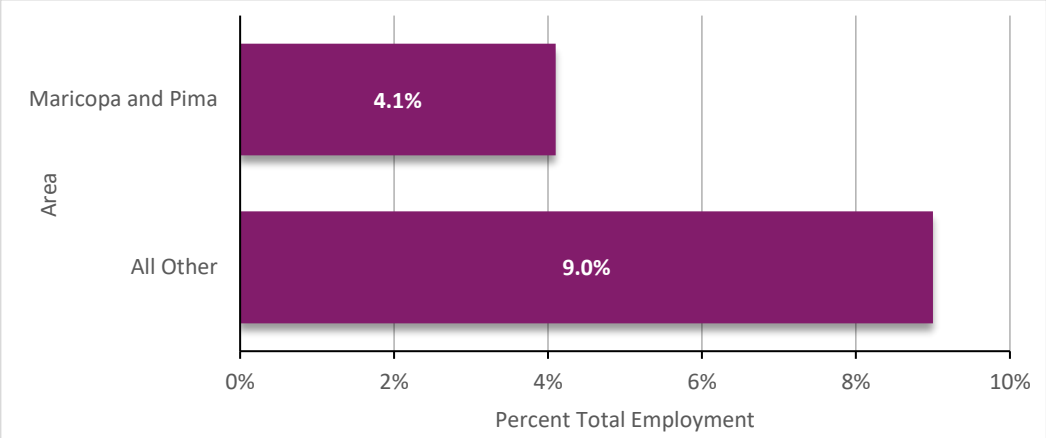
As summarized in **Figure 6**, tourism has steadily increased since 2009 at the bottom of the economic downturn, with rates reaching historic peaks in recent years. The state saw the largest year-over-year growth between 2009 and 2010 (13.2 percent), followed by 2015 to 2016 (4.0 percent). Visitors arriving 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**

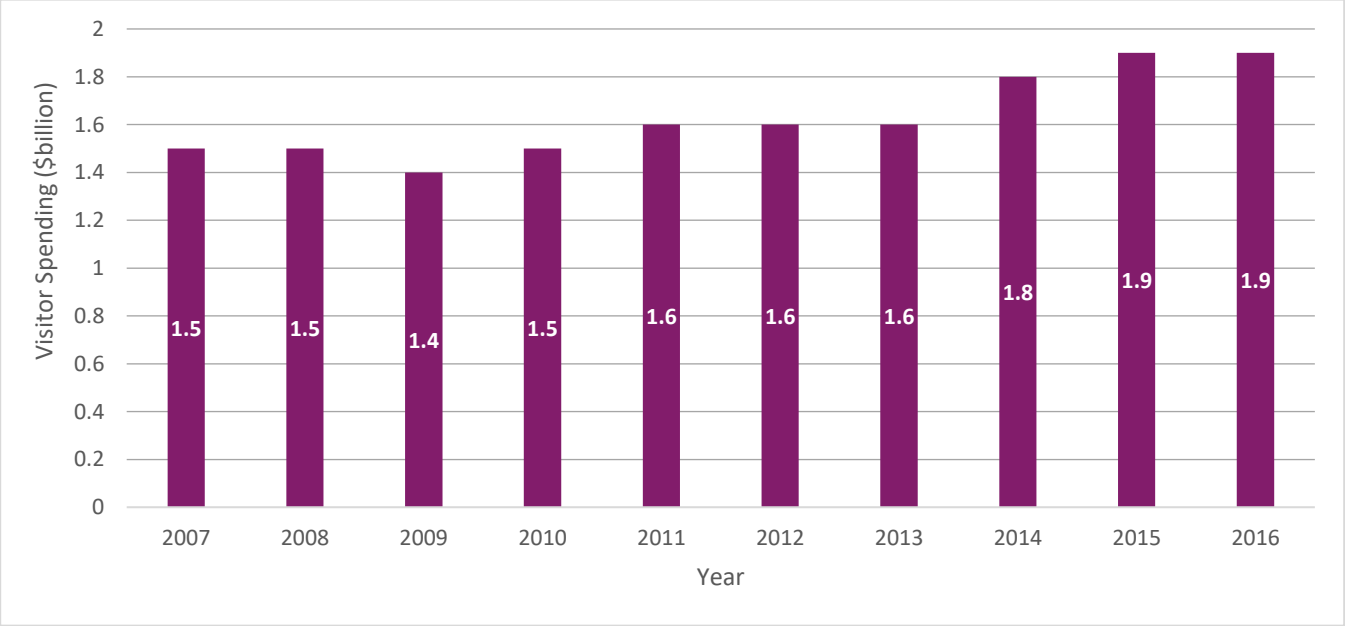
| County | Jobs | | Travel-Related Jobs (Percent Total) |
|---|---|---|---|
| | Total | Travel-Related | |
| **Apache** | 28,010 | 1,700 | 6.1% |
| **Cochise** | 50,570 | 3,580 | 7.1% |
| **Coconino** | 84,420 | 12,640 | 15.0% |
| **Gila** | 20,700 | 2,920 | 14.1% |
| **Graham/Greenlee** | 17,180 | 920 | 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

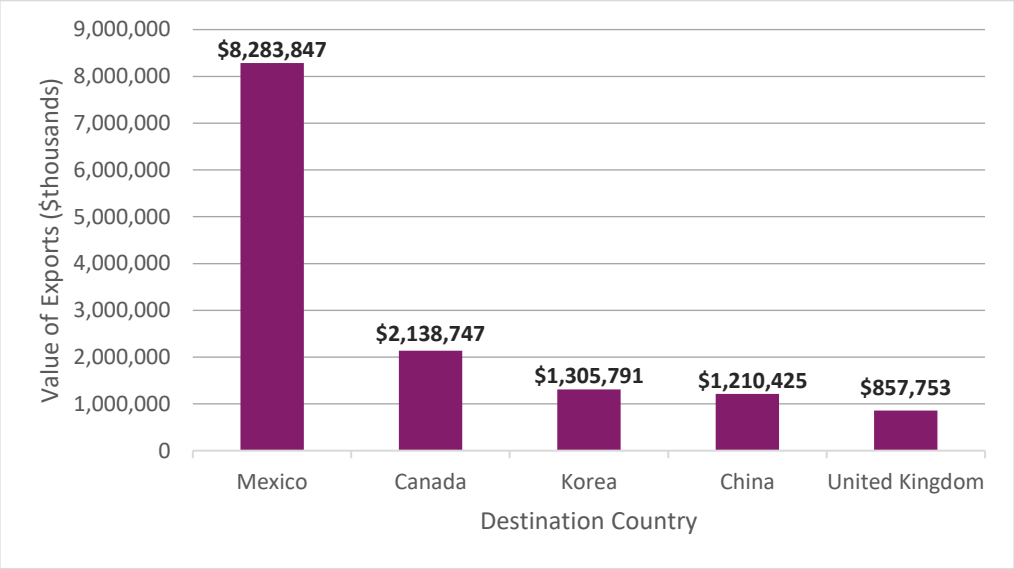
In addition to more traditional tourism, in which a person travels to a destination or point of interest for pleasure for a relatively limited duration of time, Arizona is host to large numbers of seasonal residents. These so-called "snowbirds" spend approximately two to four months in central and southern 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

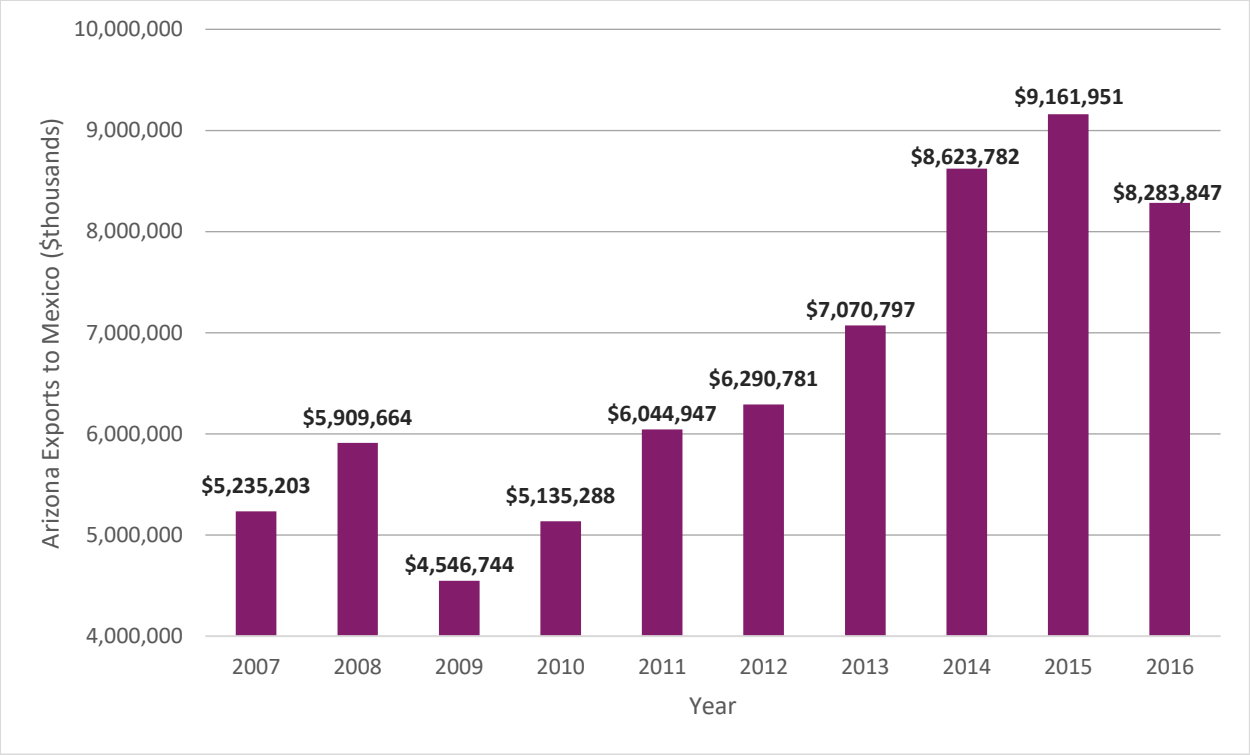
Arizona exported $22.0 billion in goods to international markets in 2016. The U.S. Department of Commerce's International Trade Administration reports that Arizona's foreign exports supported 101,579 U.S. jobs in 2015—an increase of 23,000 jobs since 2009. Mexico is the state's top foreign trading partner, 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:<br>• Carrow to Stephens: Three-mile widening project north of Wikieup ($35.5 million)<br>• "The Gap" Tegner Drive to SR 89: Three-mile widening project near Wickenburg ($49 million)<br>• West Kingman TI: New TI in downtown Kingman ($70 million)<br>• 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.