3. Aviation Activity Forecast

Background

This chapter is a revision to the forecast chapter originally developed in the first half of 2020 as part of the Colorado Springs Airport (COS or Airport) Land Use Compatibility Study. Since the land use forecast is less than two years old, it had been intended to be directly incorporated into this follow-on Airport Master Plan Update. However, the advent of the pandemic at the time of land use study publication as well as its potential implications on aviation industry and COS operations necessitated an update. The following revision addresses the coronavirus pandemic (COVID-19) and recovery as it applies to the aviation activity at COS. It also incorporates Southwest Airlines, a new commercial air service provider within the market area that initiated service in 2021. Pertinent demographic and socioeconomic information have been also updated. Comparisons to the newly released Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) are also presented. Note that since this chapter is a revision to the original forecast published in 2020 as part of the land use study, only those sections containing relevant and time-sensitive data and information have been updated.

Introduction

Forecasts of aviation activity at COS are generated to support key elements of the Airport Master Plan, such as facility requirements and future capital project identification. For these elements, projections are required for aircraft operational patterns that occur at the Airport, aircraft fleet mix, enplanements, cargo, and aircraft operations over a 20-year period. Specifically, projections of aviation demand from 2021 through 2041 were formally prepared in this study for commercial service and general aviation aircraft operations, passenger enplanements, air cargo, based aircraft, and aircraft fleet mix. These projections were created through updates to the 2019 through 2039 projections originally generated presented in the Colorado Springs Airport Land Use Compatibility Study.

This forecast chapter includes methodologies that consider aviation trends being experienced at the Airport and throughout the nation. Local historical data were collected from the FAA TAF and Airport records. In addition, demographic and socioeconomic data for the Colorado Springs Metropolitan Statistical Area (MSA) and the Airport's market area were used to track local trends and conditions that have the potential to impact demand levels. The base year for these forecasts is 2021, while the projections of aviation activity for the Airport were prepared for the near-term (2026), mid-term (2031), and long-term (2041) timeframes.

It should also be noted that while forecasting considers the most accurate information currently available, it is not an exact science. Divergences from a prepared forecast can often occur due to any number of factors that simply cannot be anticipated. However, when soundly established, a forecast will provide a reasonable and defensible rationale for a projection of future airport activity. The projections of aviation demand are documented in the following sections:

- Overview of the Airport Market Area
- Commercial Aviation Industry Trends
- General Aviation Industry Trends
- Historical and Current COS Aviation Activity
- Forecast Methodologies
- Projections of Passenger Enplanements
- Projections of Cargo Volume
- Projections of Aircraft Operations
- Based Aircraft Projections
- Peaking Characteristics
- Critical Aircraft Determination
- Summary

Finally, it is important to recognize that these preferred forecasts for COS are considered to be "unconstrained," meaning that it is assumed that any and all facilities necessary to accommodate the forecasted growth could and will be constructed, regardless of potential constraints to development or other possible limiting factors.

Overview of the Airport Market Area

There is often a strong correlation between an area's demographic and economic factors and its resultant demand for aviation activities. This section defines the COS market area and the various factors that have the potential to drive its current and projected need for aviation services.

Airport Market Area Defined

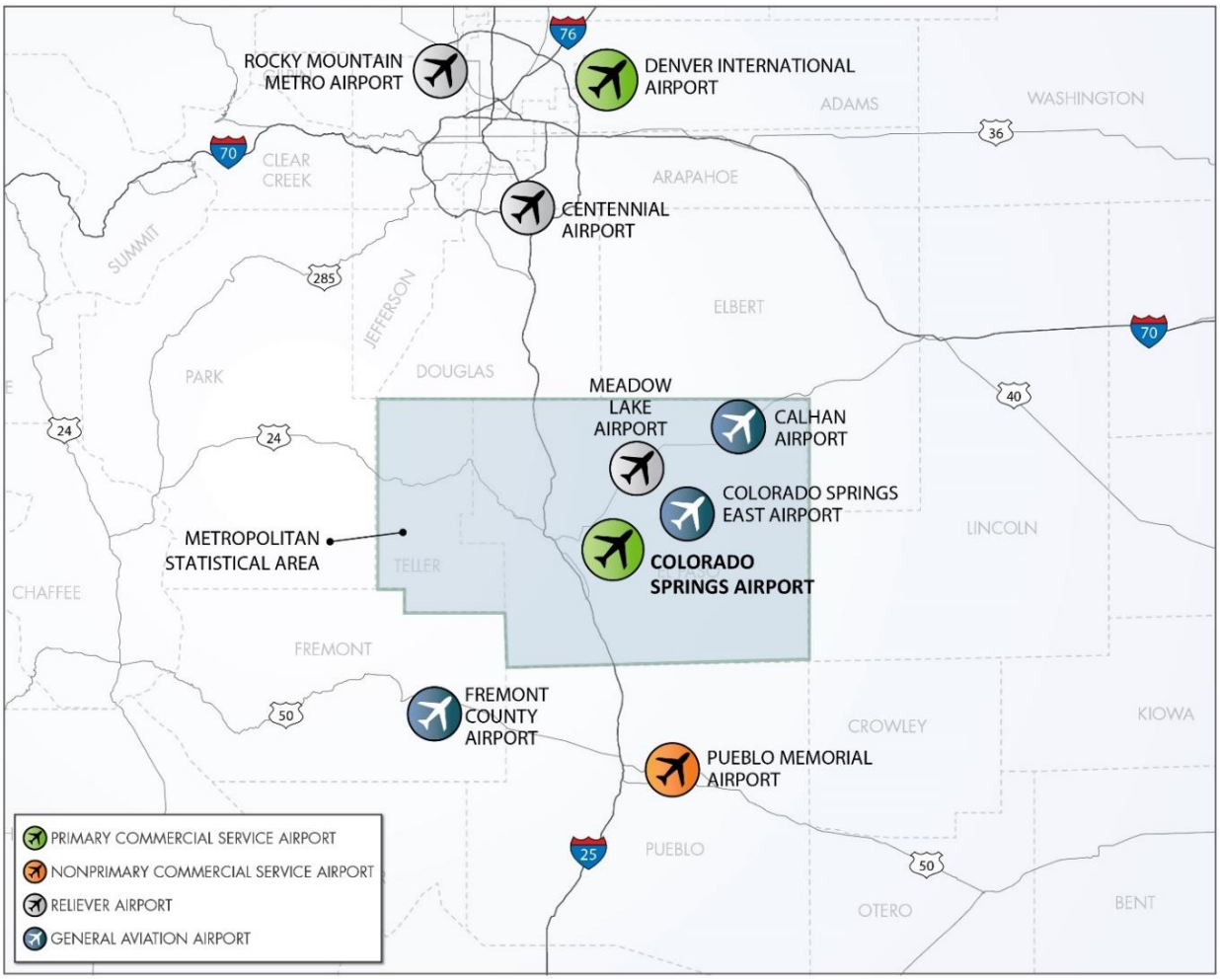
An airport's market area represents the geographic region from which a significant portion of aviation and commercial passenger demand originates. For COS, it can reasonably be assumed that most of the aviation-related demand originates within a two-county region (El Paso and Teller Counties) known as the Colorado Springs Metropolitan Statistical Area (MSA). This is particularly relevant for commercial airline passenger operations since proximity can be a primary consideration in passengers selecting an airport from which to travel, and COS is projected to remain as the MSA's only commercial service airport throughout the planning period.

Counties surrounding the Colorado Springs MSA comprise the secondary market area for COS (notably including Pueblo County which could be considered part of the primary market area by other definitions). Commercial airline passengers that originate from these extended areas are less proximate to COS and may be more inclined to also consider other factors in choosing a particular commercial service airport such as specific flight characteristics, availability, cost, and convenience, among others. For example, at only 86 miles from Colorado Springs, Denver International Airport is the Rocky Mountain region's largest and most active commercial air service airport and frequently attracts passengers from the northern counties of the secondary COS market area (e.g., Lincoln, Elbert, Douglas, Jefferson, and Park counties) and beyond. Pueblo Memorial Airport lies south of COS and may draw passengers from southern counties of the COS secondary market area including Crowley, Pueblo, and Fremont counties. It is important to remember that the exact market area that COS serves can change depending on the level of service and airfares offered at COS and the area's competing airports.

There are several other general aviation airports located within and surrounding COS's primary and secondary market areas that accommodate the region's general aviation demand. Although these airports do impact the COS market area with respect to general aviation, it is assumed that the existing general aviation usage pattern within the region will remain generally consistent. For COS, an exception to this may be in its increased utilization by corporate/business aircraft operators as regional economic development continues to evolve and grow.

Figure 3-1 illustrates the Colorado Springs MSA, surrounding counties and area airports.

Figure 3-1: Colorado Springs Airport Market Area



Source: Jviation, a Woolpert Company

Socioeconomic Trends Introduction

The demand for air transportation at COS is largely driven by a combination of the trends currently being realized within the airline industry and the socioeconomic conditions within the market area. This section summarizes those recent trends and projections in the COS market area with respect to population, employment, and income.

Population

According to the latest population data prepared by the Colorado Department of Local Affairs (DOLA), the population of the COS market area in 2021 totaled 765,423 residents (**Table 3-1**) with El Paso County accounting for over 96 percent of the total market area population. Teller County had a total population of 25,544 in 2021 and has grown at 0.81 percent annual rate over the past 20 years. The COS market area accounted for 13 percent of Colorado's total 2021 population, a percentage that is expected to increase over the next 20 years. The population of the COS market area has increased at an average annual growth rate of 1.6 percent since 2001, outpacing that of the state as a whole (1.4 percent). However, as the overall population of the COS market area continues to climb, its growth rate is projected to decline slightly to 1.3 percent over the next 20 years. These factors result in a COS market area population of approximately 989,617 residents by 2041.

Table 3-1: Historical and Projected Market Area Employment

	Teller County	El Paso County	COS Market Area	Colorado	Market Area % of Colorado
Historical					
2001	21,738	536,336	558,074	4,444,513	12.6%
2011	23,339	638,640	661,979	5,124,143	12.9%
2021	25,544	739,880	765,423	5,865,418	13.0%
Average Annual Growth Rate					
2001 - 2011	0.7%	1.8%	1.7%	1.4%	-
2011 - 2021	0.9%	1.5%	1.5%	1.4%	-
2001 - 2021	0.8%	1.6%	1.6%	1.4%	-
Projected					
2026	26,812	788,066	814,877	6,204,443	13.1%
2031	27,587	847,708	875,295	6,627,760	13.2%
2041	28,787	960,829	989,617	7,380,748	13.4%
Average Annual Growth Rate					
2021 - 2026	1.0%	1.3%	1.3%	1.1%	-
2026 - 2031	0.8%	1.4%	1.4%	1.2%	-
2031 - 2041	0.4%	1.3%	1.2%	1.1%	-
2021 - 2041	0.6%	1.3%	1.3%	1.2%	-

Source: Colorado Department of Local Affairs, 2021

Employment

Table 3-2 presents historical and projected employment data for the COS market area. According to data provided by DOLA, estimated employment (total jobs) in the COS market area in 2011 was 340,007 and grew to 398,069 jobs in 2021. This represents an average annual growth rate of 1.6 percent, which is significantly higher than any year since 2001. Overall employment in the COS market area is projected to reach 496,322 jobs by 2040, growing at an average annual growth rate of 1.2 percent. (Data were not available beyond 2040.)

Table 3-2: Historical and Projected Market Area Employment

	Employment
Historical	
2001	321,226
2011	340,007
2021	398,069
Average Annual Growth Rate	
2001 - 2011	0.6%
2011 - 2021	1.6%
2001 - 2021	1.1%
Projection	
2026	434,578
2031	462,432
2040	496,322
Average Annual Growth Rate	
2021 - 2026	3.0%
2026 - 2031	1.3%
2031 - 2040	0.8%
2021 - 2040	1.2%

Source: Colorado Department of Local Affairs, 2021

Based on the U.S. Bureau of Labor Statistics, the latest reported (June 2021) unemployment rate in the COS market area was 6.5 percent, slightly higher than that of Colorado at 6.2 percent and the U.S. at 5.9 percent. An increase of jobs in the service and educational sectors as well as the health care sector have been the primary contributors to the market area's overall employment growth. Prior to the pandemic, the COS market area unemployment rate typically fell between that of Colorado's on the higher side and the U.S. on the lower side. In February 2020, the month prior to the start of the pandemic, the unemployment rate was 3.0 percent for Colorado Springs MSA and 4.5 percent for Colorado as a whole. To provide additional context for the area's economy, the largest employers in the market area are provided in **Table 3-3.**

Table 3-3: Market Area Major Employers/Non DOD

Private Employers	Industry	Public Employers	Industry
The Broadmoor Hotel	Hospitality	Charter Spectrum West	Back Office/Customer Service
California Casualty Group	Back Office/Customer Service	City of Colorado Springs	City Government
CaptionCall LLC	Back Office/Customer Service	Colorado Springs Utilities	Power/Water/Wastewater/Gas
Cherwell Software	Information Technology	Discover Goodwill	Other Office
Cheyenne Mountain, Dolce Resort	Hospitality	El Paso County	County Government
Children's Hospital of Colorado	Health Care	Fort Carson	Military Installation
Cobham Semiconductor Solutions	Manufacturing	Lockheed Martin Corp.	Aerospace/Aviation
Colorado College	Higher Education	Microchip Technology	Information Technology
Compassion International	Nonprofit	Peterson Space Force Base	Military Installation
EviCore	Back Office/Customer Service	Pikes Peak Community College	Higher Education
Firstsource Solutions, Ltd.	Back Office/Customer Service	Progressive Insurance Company	Insurance
Focus on the Family	Nonprofit	School District #2	Public Education
Luce Research	Back Office/Customer Service	School District #3	Public Education
Parsons	Information Technology	School District #8	Public Education
Peak Vista Community Health	Healthcare	School District #11	Public Education
Penrose-St. Francis/Centura	Healthcare	School District #20	Public Education
UCHealth – Memorial Health	Healthcare	School District #49	Public Education
United Service Automobile Assoc.	Financial/Insurance Serv.	Schriever Air Force Base	Military Installation
Western Forge Corporation	Manufacturing	United States Air Force Academy	Higher Education/Military

Source: Colorado Springs Chamber & EDC, 2019

Income

Income is a socioeconomic indicator that often correlates directly with aviation forecasts. Broadly speaking, historical personal income data for the COS market area showed strong positive growth prior to the pandemic in 2020. From 2000 to 2015 personal income for the area increased at an average annual growth rate of 5.8 percent. However, after consultation with the State of Colorado, it was understood that personal income projections have been currently removed from state analyses and subsequent forecasting considerations due to what is assumed to be the outlier years of 2020 and 2021. Pandemic-related considerations include increased job loss and governmental income supplementation, neither of which are expected to continue and are unlikely to represent income dispersion in future years. Thus, income factors have not been included in this forecasting effort due to recent volatility and the inability to draw appropriate conclusions in such conditions.

Business Climate

The COS market area offers many competitive advantages for area businesses including excellent transportation systems, communication networks, utility infrastructure, and an attractive lifestyle. Impressive growth in the market area is being experienced within a variety of business sectors. One important reason that companies are choosing to locate and/or grow offices in the region is that the City

of Colorado Springs has consistently ranked at or near the top of the list for most desirable places to live in the U.S. by various media outlets. Another factor in the region's attractiveness for business growth is the proactive and aggressive approaches taken by the region's various economic development advocates and agencies, as well as the business-friendly policies advocated by its local governments.

COS is positioned to not only be a critical asset in attracting businesses to the region, but it also plays a key role in business and economic development. As home to the Peak Innovation Park, a 900-acre master planned business park that accommodates office, industrial, entertainment, recreation, and hospitality businesses and activities, COS is directly promoting regional economic growth by offering development opportunities that have the potential to be directly or indirectly integrated with Airport operations. One example of the growth and expansion of the Airport and region is a partnership between COS and the U.S. Forest Service in building a $17 million regional firefighting base that will allow air tankers to load retardant to fight forest fires within a 15-state region. Additionally, in December 2019, President Trump signed a law that would establish Space Force, a 6th independent military service branch to undertake missions and operations in the rapidly evolving space domain. Peterson Space Force Base (PSFB), which shares COS airfield facilities, may be one of several locations to accommodate Space Force operations. Lastly, Amazon's development of a 3.7-million square foot fulfillment center is another example of a commercial project that is already spurring additional development in the Park.

Tourism

For many tourists, COS serves as a convenient means to access the Rocky Mountain region for hiking, skiing, and other outdoor activities provided by the region's many well-known resort towns. According to Visit Colorado Springs, the region welcomed over 23 million visitors in 2019, generating more than $6.6 million a day for local economies, 7.0 percent more than 2017. Similarly, hotel demand in Colorado Springs in 2019 grew 2.6 percent faster than in 2018, representing continued signs of rapid growth.

State and Local Incentives

The Colorado Springs MSA offers a wide variety of local and state tax incentives, tax credits, and employee training programs designed to incentivize business development and promote regional economic growth. Several of these initiatives have been codified in the tax codes of the state and local taxing authorities, including tax exclusions for manufacturing equipment, inventory stock, and others. There are also multiple aviation-related incentive programs that are highlighted below:

- **Aviation Development Zone Tax Credit** – This is a statewide, calendar year performance-based job creation incentive. The Colorado Springs Airport is a recognized Aviation Development Zone (ADZ) through the Colorado Office of Economic Development and International Trade. A business or any portion of

a business that is involved in aircraft manufacturing or maintenance and repair, completion or modification of aircraft located within the boundaries of an ADZ may qualify for a state income tax credit of $1,200 per net new full-time employee.

- **Colorado Sales and Use Tax Exemption on Aircraft and Aircraft Parts** – Aircraft used in interstate commerce by a commercial airline and parts permanently affixed to aircraft are exempt from state sales and use tax.

- **Commercial Aeronautical Zone** – The Airport is located within a regionally created Commercial Aeronautical Zone (CAZ), which recognizes significant tax incentives for aeronautical businesses. All local sales and use taxes are abated for companies located within the CAZ and specifically engaged in a variety of aeronautical activities.

- **Pikes Peak Enterprise Zone** – This program is designed to promote job creation, business growth, and development opportunities in areas targeted for economic stimulation. The Airport is located within the Pikes Peak Enterprise Zone and nearby businesses may be eligible for one or several of the Colorado Business Income Tax Credits related to hiring new employees, making investments in equipment, training employees, or conducting research and development activities.

- **Federal Opportunity Zone** – This program is a federal tax incentive to invest in low-income urban and rural communities through the favorable treatment of reinvested capital gains and forgiveness of tax on new capital gains. COS is located within this zone.

- **Colorado Springs Foreign Trade Zone** – A Foreign Trade Zone is a restricted access area located within the United States and Puerto Rico that is considered legally outside the customs territory of the United States. The key benefits in a Foreign Trade Zone are duty deferral, duty reduction and duty avoidance for the transfer, use, and storage of imported materials. Import duties are deferred until the materials physically leave the Foreign Trade Zone or reduced if used in a product with a lower duty rate. There is no import duty if the materials, or products in which imported materials are used, are re-exported. COS is located within the Colorado Springs Foreign Trade Zone.

Commercial Aviation Industry Trends

In preparing a forecast of activity for COS, it is important to have an appreciation of recent and anticipated national aviation industry trends that have the potential to impact the development of aviation activity projections. These trends, including the COVID-19 pandemic and recovery, will have varying degrees of relevance for COS, so it is likely that some trends discussed below may ultimately have limited or no pronounced impact on the Airport.

Commercial Aviation History and Current Conditions

Prior to the passing of the Airline Deregulation Act of 1978, the airline industry was controlled by the Civil Aeronautics Board (CAB), an agency of the U.S. federal government. CAB regulated airline routes, fares, and the entry of new airlines into the market. Since deregulation and the inception of a free market, there have been five distinct business cycles in the U.S. airline industry:

- **Expansion and Consolidation (1978 – 2000):** Legacy airlines expanded service and there were many new entrants to the market like America West Airlines and ValuJet Airlines. Eventually, many of the new entrants failed or were acquired by larger, legacy carriers during the mid-1990s. Airline consolidation, or the merger of two airlines, continued into the 2000s. Carriers consolidated in the 1980s to build regional hubs. Consolidation in the 1990s was more focused on buying assets like international route authorities. Consolidation in the 2000s was largely necessary for airlines to survive financially.

- **Status Quo (2001 – 2006):** During the early 2000s, the airline industry was significantly impacted by the events of 9/11, its aftermath, and the beginning of a rise in fuel prices. The average cost of a barrel of oil from 1978 to 2004 was less than $50.0F[1] Oil prices peaked at $165 per barrel in 2008. This was critical since jet fuel is the second largest cost center after labor for an airline. This rapid increase in oil cost made the majority of commercial airline service unprofitable and unsustainable. There was little relationship between growth in U.S. gross domestic product (GDP) and the number of available airline seats (seat capacity). Historically, there had been a high and positive correlation between GDP and airline service.

- **Rationalization (2007 – 2009):** The Great Recession and the "new normal" of higher fuel prices sent macroeconomic shocks into the airline industry. In response, airlines underwent an active reduction in available seat capacity. The industry also moved its focus from mainline operations to the use of regional operators or "feeders" that used smaller aircraft. This trend further reduced the number of available seats. As the supply of available seats decreased, the remaining seats became more valuable because of the scarcity, and fares subsequently rose. This resulted in increased revenues per seat for the airlines.

- **Capacity Discipline (2010 – 2014):** During this period, seat capacity growth continued to be restricted by network carriers, including Southwest Airlines (a "Low-Cost Carrier"), even as increased passenger enplanements persisted. A growing demand for seats, as demonstrated by increased enplanements, coupled with restricted supply in available seats, led to even higher airline revenues per available seat.

[1] "Crude Oil Prices – 70 Year Historical Chart," Macrotrends.net, accessed March 25, 2020, https://www.macrotrends.net/1369/crude-oil-price-history-chart.

- **Capacity Regeneration (2015 – present):** The seat capacity discipline exhibited by airlines prior to 2015 began to give way to new, measured seat growth that more closely mirrored growth in the U.S. economy. Seat growth since 2015 has been the result of a general trend toward larger aircraft, in addition to added service. Air carriers continue to trend toward replacing smaller 50-seat regional jets with larger aircraft that can seat at least 70 to 90 passengers.[2]

In 2000, eleven mainline carriers were operating in the United States. Today, after seven major airline consolidations, only five mainline carriers remain (Delta Air Lines, United Airlines, Southwest Airlines, American Airlines, and Alaska Airlines). Together with low-cost carriers jetBlue, Spirit Airlines, Frontier Airlines, Allegiant Air, and Sun Country Airlines, these carriers provide the vast majority of U.S. scheduled domestic service.

Over the last two decades, airlines also began to shift their business model from maximizing market share to maximizing earnings. They accomplished this as they exercised more growth discipline. Specifically, the industry has worked to correlate its overall capacity growth (as reflected in Available Seat Miles [ASM]) with growth in the U.S. economy (in the form of real gross domestic product [GDP]). During the 1991 – 2001 period, ASMs had grown by 100 percent as compared to the base period, whereas real GDP had grown by 66 percent. The fact that ASMs were growing much faster than the growth in the economy made it difficult for airlines to price the seats and earn a sufficient profit. As a result, when available seats were significantly higher than growth in the economy, the U.S. airline industry lost billions of dollars. As rates of seat growth have become more aligned with GDP growth, airlines have become more profitable.

Airline and airport/community interests have diverged as the industry has evolved and matured. Early airline strategies were to grow market share. To do so, airlines aggressively added seats to the system. In the era immediately following deregulation, airlines sought out cities where they could concentrate service to increase their market share in a “city-pair” (origin city and destination city). The result of this market-focused model meant business development in local communities followed available air service, which acted as a utility to the community.

Under the profit-focused business model more prevalent today, airlines seek out a strong, established local economy that can support air service and therefore maximize the airlines’ revenue. Airports still want growth, while airlines are much less aggressive in adding seats as they focus on profits.

Community-driven goals of airports are to attract air service that business and leisure passengers in a community demand. In addition, air service brings passengers who spend money on hotels, meals, rental cars, and other items that

[2] Federal Aviation Administration, *Report to Congress: National Plan of Integrated Airport Systems (NPIAS) 2019-2023*, www.faa.gov, September 26, 2018, p. 33, https://www.faa.gov/airports/planning_capacity/npias/reports/media/NPIAS-Report-2019-2023-Narrative.pdf.

have an economic impact on that community. With the existence of competition for air service in virtually every region of the U.S., communities must be assertive in their air service development strategies or risk losing service to another market.

According to the FAA, U.S. passenger carriers posted their 11th consecutive year of profits in 2019, with ancillary revenues a contributing factor to the favorable outcome. During 2019, domestic enplanements increased 4.1 percent, totaling 813 million. As a result, the domestic average load factor reached 85.1 percent, a new historic high, and domestic yields increased for the second time since 2014. All network and low-cost carriers reported strong profits in 2019, as they raised prices and created ever more efficient operational structures. Relatively low fuel prices also contributed to US airline profitability.

The recent world-wide grounding of Boeing 737 Max aircraft has had an impact on operations for carriers that are heavily reliant on Boeing. While most customers have been re-accommodated on alternate aircraft, airlines have had to cancel thousands of flights and delay growth plans. The aircraft was authorized to return to service in November 2020.

In addition to commercial passenger service, COS accommodates cargo freight and express services. FedEx is one of the Airport's largest and most active cargo operators, with multiple 757 aircraft operations daily. On a national level, domestic and international air cargo revenue ton miles have increased 2.2 percent annually from 2010 to 2018. All-cargo carriers, those that carry cargo exclusively, carry 42 percent domestically while the greater share goes international.

COVID-19 Pandemic Industry Impacts and Recovery

In 2020 and 2021, COVID-19 negatively impacted the aviation industry as well as the world economy more than any other previous crisis. During the height of the pandemic, non-essential travel was significantly reduced resulting in airlines making deep capacity cuts, grounding fleets, and initiating massive layoffs. Aircraft production came to a halt. According to Airports Council International-North America (ACI-NA), it is estimated passenger activity declined 73 percent from March 2020 through June and total enplanements in the U.S. decreased by 349 million passengers for the year[3]. For a period, general aviation activity and aircraft orders slowed drastically, but recovered relatively quickly as general aviation aircraft afforded users the ability to travel while avoiding commercial service aircraft. Additionally, after a near shutdown of three months, flight training operations rapidly improved as those with interest took advantage of being house-bound by taking flight lessons. Essential missions throughout the military continued during the pandemic. Local training, however, was reduced as evidenced by the 25 percent reduction in military local operations at COS.

In 2021, the impact to the aviation industry of COVID-19 has lessened considerably, especially in the United States. Aviation recovery, notably of

[3] https://airportscouncil.org/wp-content/uploads/2020/03/Economic-Impact-of-Coronavirus-on-U.S.-Commercial-Airports.pdf

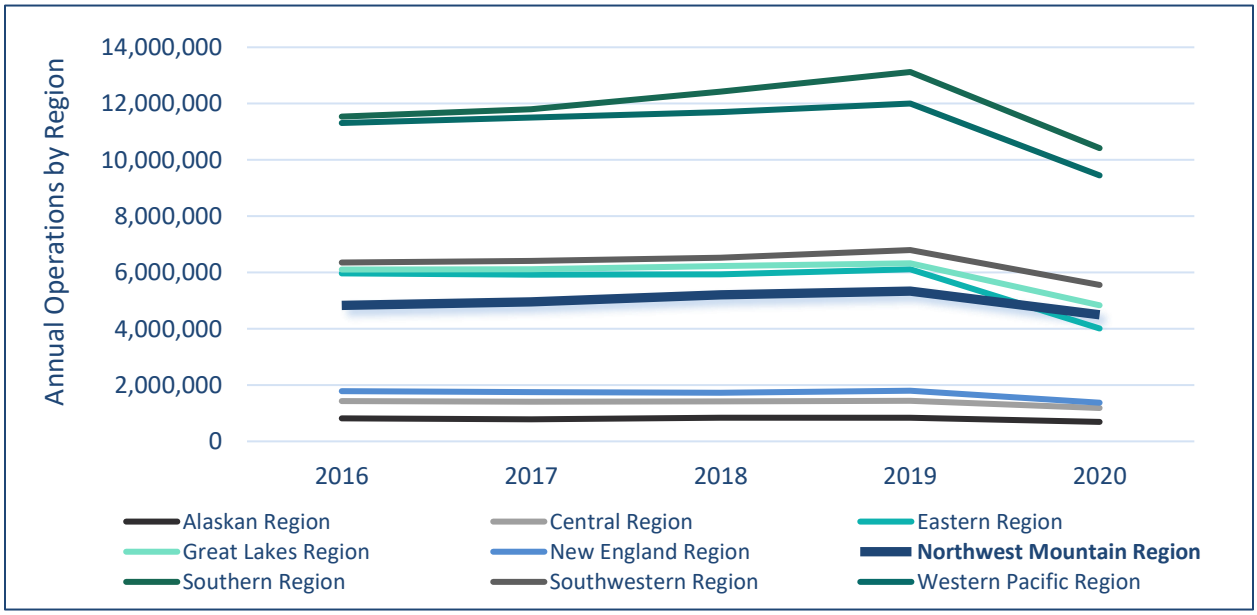
commercial passenger service, is progressing in earnest, although multiple hurdles still exist for the final stages of recovery. The major airlines have begun hiring, and new service and routes have been instigated across the country, including the new Southwest service at COS.

While the long-term implications of the pandemic on the aviation industry are still unknown, the impacts are trending towards lessened significance. Terminal design, passenger handling, and other items are still being discussed and researched and best practices will be developed for implementation in the future. The resilience of the aviation industry, with support from the U.S. government, has been demonstrated throughout history. The following sections show some of the recovery of the aviation industry and presents data pertinent to activity at COS, the region, and the country.

Regional Perspective

The FAA divides the United States into eight regions, with COS residing in the Northwest Mountain Region (Colorado, Wyoming, Utah, Montana, Idaho, Washington, and Oregon). The total operations (take-off or landing) by region over the past five years are shown below in **Figure 3-2**; note that every region reflects a sharp drop in operations from 2019 to 2020 due to the pandemic. However, it should also be recognized that the Northwest Mountain Region experienced the smallest percentage decrease in year-over-year operations with 2020 operations equaling 84 percent of those experienced in 2019. Other regions across the country ranged between 66 to 82 percent. A reasonable conclusion to draw from this difference is that since the pandemic impacted aviation activity in the Northwest Mountain Region less severely compared to the rest of the country, less recovery is required to return to previous levels.

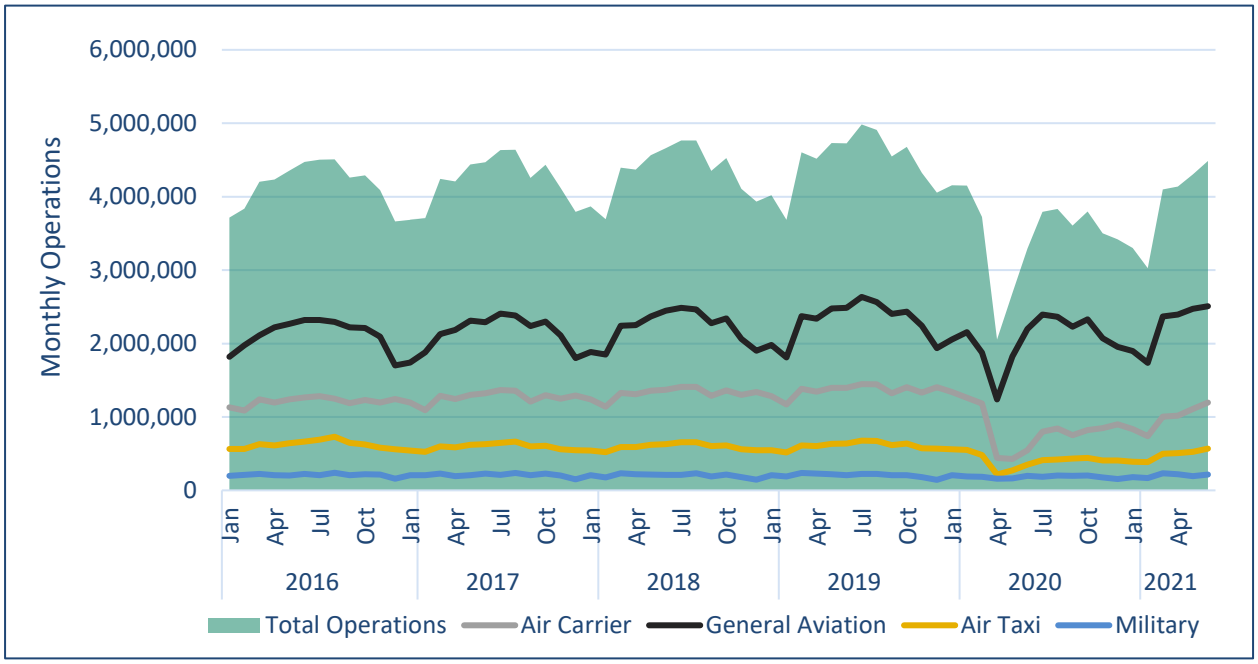
Figure 3-2: Operations by Region



Source: FAA ATADS, OpsNet

A deeper dive into the Northwest Mountain Region operations sheds some light on how the various types of flight activity (air carrier, general aviation, air taxi, and military) were impacted and have rebounded to varying degrees (**Figure 3-3**). The seasonality of flight activity is clearly seen, with steep drops in activity typically experienced during the winter months.

Figure 3-3: Aircraft Operational Breakdown - Northwest Mountain Region



Source: FAA ATADS

With respect to the pandemic, March/April 2020 saw dramatic declines in operations across all operational categories. Data indicate that while general aviation was greatly affected during the first four months of the pandemic, the degree to which that impact has continued is limited. After quickly rebounding during summer 2020, the general aviation recovery leveled off to approximately 90 percent of 2019 activity levels. The steady growth that had been experienced in the region since 2016 until the 2020 pandemic has begun to reappear with 2021 totals exceeding 2016 levels. This trend is expected to continue.

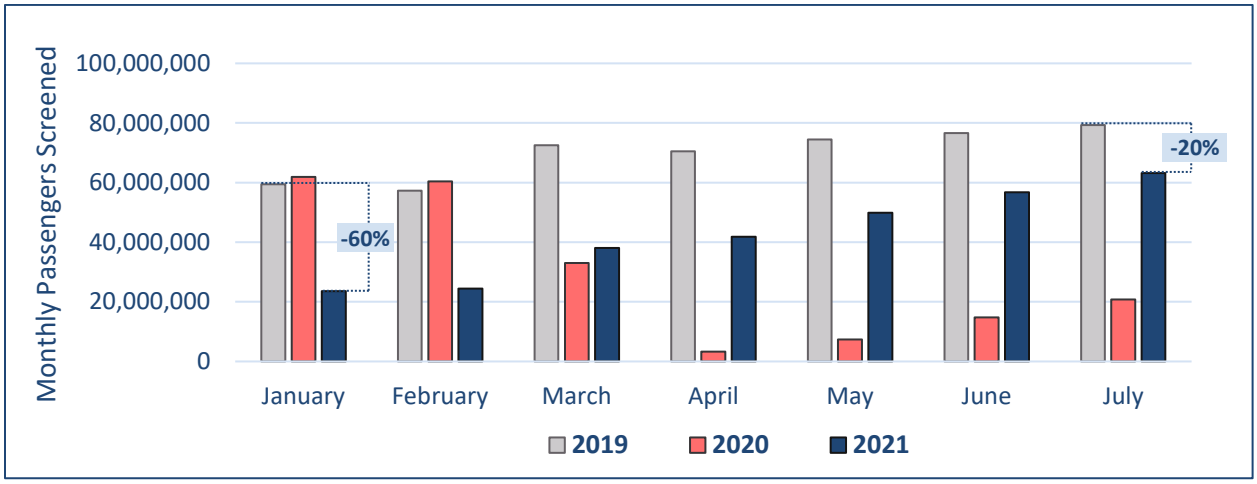
Air carrier and air taxi service saw a quick rebound in the initial months as well, although not to the same degree as general aviation. In June 2021, the total operations in the region equaled 95 percent of the operations in June 2019. Of those, there were 1,197,835 air carrier operations recorded, equaling 86 percent of the air carrier operations in June 2019.

National to Local Perspective

Commercial service recovery and citizens' willingness to fly can be measured through the number of passengers screened by TSA (**Figure 3-4**). Graphed below are the number of passengers screened by TSA over the entire country, split by month and compared side-by-side by year (2019, 2020, and 2021). For the first

month of the year in 2021, TSA screened 60 percent fewer passengers as compared to 2019. By July, TSA screened only 20 percent fewer passengers as compared to 2019. This data substantiates the air carrier operations activity levels, which were shown to have significantly recovered but not yet to the 2019 levels.

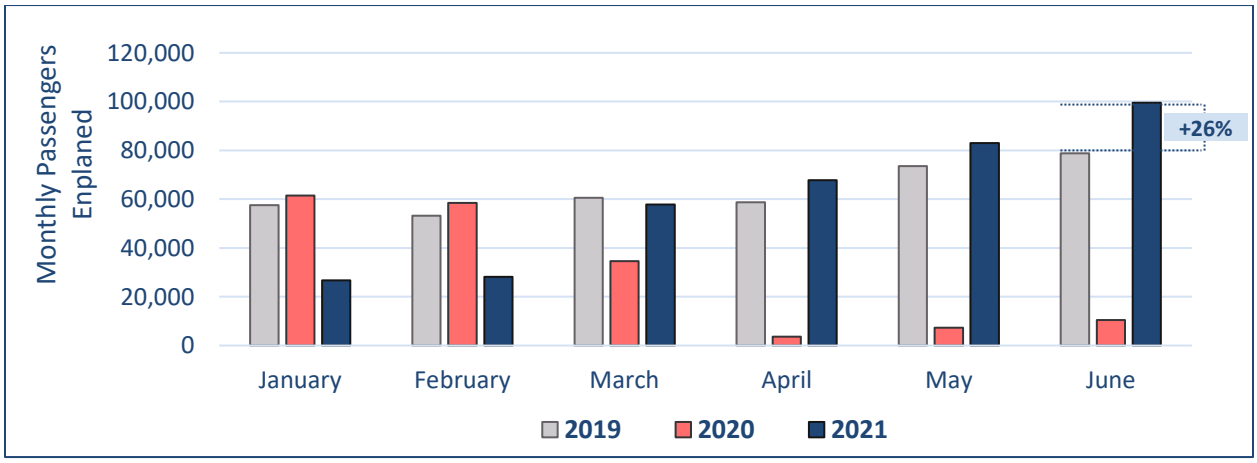
Figure 3-4: TSA Passengers Screened



Source: TSA

The number of passengers at COS has recovered more quickly than the national levels demonstrated by TSA screening. For COS, the number of enplanements (a passenger boarding a plane) in 2020 dropped to 43 percent of the 2019 enplanements. However, a month-to-month comparison shows the Airport's commercial service has quickly recovered and with the addition of Southwest Airlines, the Airport is on track to finish 2021 with enplanements only slightly below (projected at 91 percent) of its 2019 pre-pandemic enplanements (**Figure 3-5**). In fact, the airport enplaned more passengers in June 2021 than in any other month in at least the previous five years and the month-to-month comparison was up 26 percent over 2019.

Figure 3-5: COS Passengers Enplaned



Source: COS

It is evident that the nation's aviation activity continues to rebound, although still trailing the high marks set by 2019. The Northwest Mountain Region has weathered the storm better than most of the country and COS has been less impacted than many airports with local data strongly indicating the airport's recovery and growth. Taken together, these metrics should provide confidence in continued airport usage for all activity types, as well as a return to continued growth.

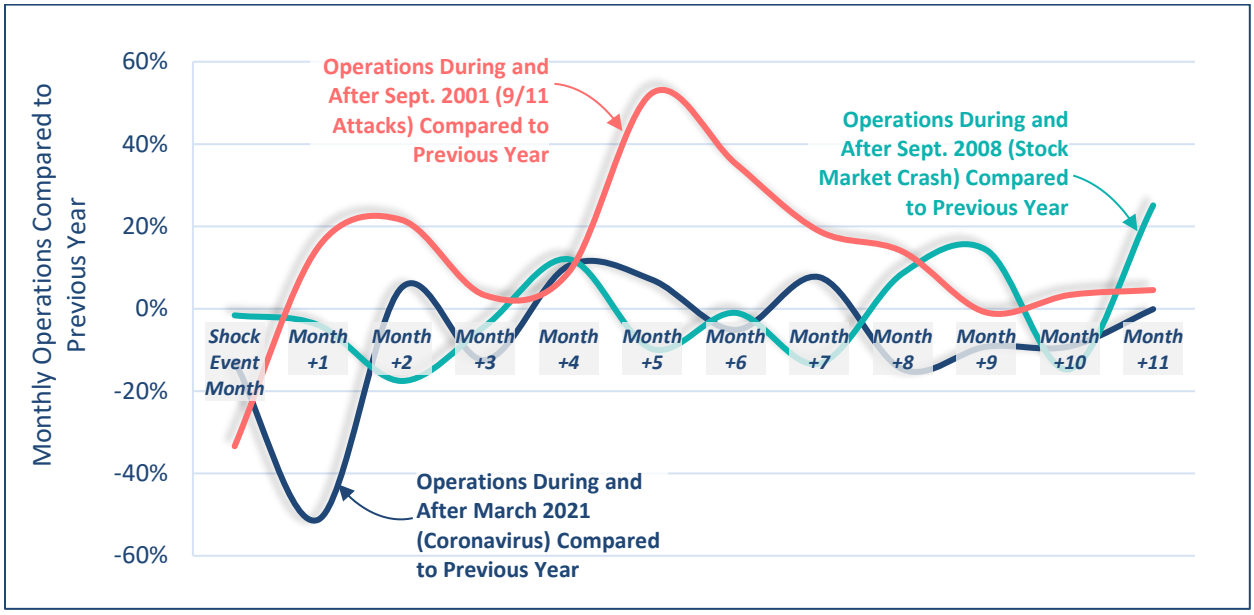
Historical Indicators

As the aviation industry continues to recover from the pandemic, history provides some examples of similar shock events that can serve as benchmarks to help anticipate the aviation industry's expected recovery. Two previous major aviation shock events experienced in the last 20 years were the terrorist attacks of September 11, 2001 (9/11) and the "Great Recession" from 2007 through 2009, with a major stock market crash occurring on September 28, 2008.

Following 9/11, commercial airline travel declined significantly as people stopped flying for fear of safety, while during and after the Great Recession, flying slowed more so due to economics. The pandemic appears to have resulted in a combination of both: fear for personal health and high levels of unemployment and uncertainty in the job market. In these previous two events, aspects of the aviation industry recovered at different speeds with commercial airline service tending to be most impacted and slowest to recover.

Figure 3-6 below presents the change in all operations (take offs and landings for general aviation and commercial service combined) at COS for the 11 months after each of the three shock events as compared to the monthly operations of the previous year. Of these three events, the pandemic appears to have impacted air traffic the most with the largest drop occurring in April 2020 (down 51 percent at COS compared to April 2019). From March through June 2020, COS experienced approximately 82 percent of the operations seen during the same period one year prior. However, from July through December 2020, the Airport experienced 100 percent of the traffic levels as compared to the previous year. While every airport is impacted differently by these type of shock events, it is important to acknowledge that COS has operationally recovered relatively quickly from the pandemic.

Figure 3-6: Shock Events



Source: FAA ATADS

General Commercial Aviation Trends

The nation's domestic network carriers have been more disciplined since 2015 in their approach to managing growth, and carriers are increasingly revenue-driven. There are also other trends in the U.S. airline industry that have impacted air service at U.S. airports.

Pilot Shortage

In 2013, the FAA increased the qualification requirements for first officers (also known as co-pilots) who fly for U.S. passenger and cargo airlines. FAA now requires first officers to hold an Airline Transport Pilot certificate, requiring 1,500 hours total time as a pilot. Previously, first officers were required to have a commercial pilot certificate, which requires a minimum of 250 hours of flight time.

Prior to the pandemic, a U.S. Government Accountability Office (GAO) report indicated airlines in the U.S. will need to hire 1,900 to 4,500 new pilots annually to meet demand. In the past year, analyses by CAE and OliverWyman indicate the pilot shortage has been exacerbated by the pandemic. In fact, a report published by CAE stated a there will be a global need for 27,000 pilots in the short-term. The impact is felt at the regional airline level, due to a decline in qualified entry-level pilots. Entry-level pilots are needed to fill positions vacated by pilots hired by mainline carriers. There are also negative perceptions as they relate to salary and benefits for pilots who fly for regional airlines.

A lack of qualified pilots is a challenge for airlines to retain their service and attract new service. The decline in travelers as a result of the COVID-19 pandemic has temporarily alleviated the shortage; however, if passenger demand for air

travel returns and the number of qualified pilots continues to decrease, the weakest performing routes may be the first to lose air service, especially if an alternative airport is within a reasonable driving distance.

Fleet Evolution

There is a national airline trend that reflects a migration from using smaller (50-seat) aircraft to larger (70-90 seat) aircraft. This trend is especially impactful on nonhub airports since small regional jets have historically been used to serve the nation's smaller airports. This is important in that nonhub airports would now have to generate sufficient demand to support the larger aircraft to maintain airline service profitability, and not all smaller airports and markets would be able to do so. As an example, three daily flights of 50-seat aircraft would serve 150 daily passengers, whereas three daily flights by 90-seat aircraft would accommodate 270 passengers. A community may not have the passenger base to justify the same number of flights with larger aircraft. In this case, an airline using larger aircraft might prefer only two daily flights (180 passengers) of 90-seat aircraft. Thus, the trend toward using larger aircraft may threaten to reduce or eliminate existing and/or new air service at nonhub airports.

Airport Infrastructure and Connectivity Constraints

Airport infrastructure, particularly access to large and medium hub airports, is critical for nonhub airports to thrive. Passengers leaving nonhub airports most often fly to a larger airport to connect to another flight to reach their final destination. Some larger or busier airports lack available gates to absorb more flights, and consequently, this can result in constraining airlines wishing to expand services from those larger airports to smaller, nonhub airports.

The Rise of Hub Alternatives for Leisure Markets

Air service from most mainline carriers has evolved into a "hub-and-spoke" model which is one in that flights from smaller airports are routed through larger connecting hub airports where passengers make connections to another flight to their eventual destination. This differs from the point-to-point model often used by low cost carriers to provide flights to leisure-oriented destinations. While hub operations are used to improve airline operating efficiencies, point-to-point operations tend to improve opportunities for destination markets.

"Open Skies" Agreements

Open Skies Agreements (OSAs) minimize governmental regulation on air transport between two countries. Such agreements can enhance international travel by lifting restrictions on the destinations that foreign airlines can access and removing barriers such as regulations and tariffs. OSAs encourage competition, allowing airlines to expand to new markets and lower the cost of doing business.

The Volatility of Oil Prices

Price unpredictability has made it difficult for airlines to maintain consistent profitability since airlines cannot guarantee the cost to provide service. The price of oil is highly susceptible to geopolitical and macroeconomic shocks. Even low oil prices are not always a good thing for airlines, as low oil prices can signal weakness in the global economy. A weakening global economy causes airlines to reduce service from their respective hubs, diminishing connectivity levels at nonhub airports that are largely reliant on having the largest number of connecting options possible.

The U.S. Economy, Global Trade Tensions, and Wall Street

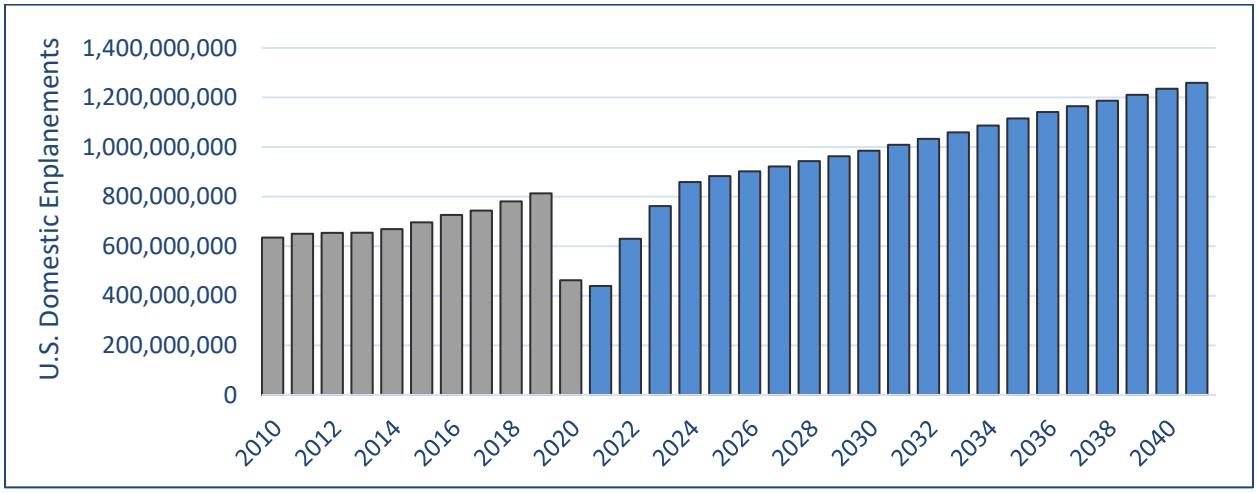
The airline industry is susceptible to economic disruptions occurring on the national and world stage. Sluggish macroeconomic indicators (such as GDP, unemployment rate, etc.), pandemics, international trade disputes, and little appetite from Wall Street investors for growth in airline service have put additional performance pressure on the airline industry. These effects trickle down to the smallest markets, and many small and nonhub airports must competitively provide air service incentives as a cost of entry for new service.

Summary of National Commercial Aviation Trends

The FAA develops forecasts of future levels of commercial passenger activity based on a combination of past commercial airline trends and national/world economic outlooks. The most recent forecasts of commercial passenger activity available is the *FAA Aerospace Forecasts, Fiscal Years 2021-2041*, which presents both near-term and long-term forecasts. Specifically, the FAA forecasts commercial passenger activity to decrease 5.0 percent from 2020 through 2021 and then grow annually an average of 8.7 percent from 2021 through 2031. This reflects the anticipated upward trend in domestic passenger traffic following the pandemic.

Additionally, the FAA projects domestic air carrier load factors to increase from a low of 68.7 percent in 2020 to 86.1 percent by 2031 and to 86.6 percent by 2041. The FAA also projects that total domestic passenger enplanements on large U.S. carriers and regional/commuter carriers combined will increase from approximately 439 million in 2020 to approximately 1.26 billion in 2041, representing an average annual growth rate of approximately 5.4 percent. The steep recovery in the short-term impacts the average annual growth rate over the entire 20-year period. For comparison, prior to the pandemic drop, the forecast average annual growth rate was 1.6 percent. This was from 2019 (816 million enplanements) to 2039 (1.12 billion). Historic and projected U.S. total domestic passenger enplanement data is depicted below in **Figure 3-7.**

Figure 3-7: Total U.S. Enplanements 2010-2041



Source: FAA Aerospace Forecasts, *Fiscal Years 2021-2041*
Note: Historical years are in gray

For 2020 to 2041, the FAA also forecasts that for domestic U.S. mainline carriers the average passenger trip length is expected to increase from 1,016 to 1,063 miles and average seats per aircraft mile will increase from 167 to 177 seats, indicating more efficient and profitable operations. Over that same period, the FAA projects regional/commuter carriers' average domestic passenger trip length to slightly increase from 502 to 508 miles. The number of seats per aircraft is also growing in the regional jet market, where it is expected that 50-seat regional jets will continue to be phased out of the market and replaced by 70-90 seat regional jet aircraft. This fleet mix transition will result to the average seats per aircraft mile increasing from 65 to 69 and the average domestic load factor increasing from 67 to 81 percent. Regional/commuter aircraft operations are expected to increase at an average annual rate of 1.1 percent through 2041.

Finally, the FAA projects that the international air cargo industry will experience significant growth within the forecast period. Between 2020 and 2041, international all-cargo carriers are expected to experience 3.8 percent average annual growth in revenue-ton miles. Although positive, domestic air cargo that is transported on dedicated cargo aircraft and in passenger aircraft is expected to grow at a much more modest rate of 1.6 percent annually over that same period.

General Aviation Industry Trends

General Aviation Defined

At the national level, fluctuating trends related to general aviation usage and economic uncertainty resulting from national and international business cycles will have impacts on demand levels. This section provides an overview of those current general aviation trends, as well as some of the various factors that have influenced those trends throughout the U.S. These are important considerations in the development of projections of aviation demand for COS since general aviation accounts for a significant percentage of airport activity.

General aviation aircraft are classified as all aircraft not flown by commercial airlines or the military. This includes an incredibly diverse array of flying that can range from a personal trip in a small single engine aircraft to an emergency medical evacuation to business-related travel to flight instruction that trains new pilots to helicopter traffic reports that keep drivers informed of rush-hour delays. Simply stated, general aviation encapsulates all those individual, unscheduled aviation activities that enrich, enhance, preserve, and protect the lives of citizens.

As defined by the FAA, general aviation activities are divided into six use categories:

- **Personal** – About a third of all private flying in the United States is for personal reasons, which may include practicing flying skills, personal or family travel, personal enjoyment, or personal business.
- **Instructional** – This category includes all private flight instruction and training ranging from private pilot to airline pilot.
- **Corporate** - About 12 percent of the total private flying in the U.S. is done in aircraft owned by a business and piloted by a professional pilot. Most of these flights are in turbine/jet aircraft and cover long distances, with some flying to intercontinental and international destinations. Businesses typically elect to fly these trips to save time and expand their geographic markets.
- **Business** – It is estimated that almost 11 percent of the total private flying in the U.S. is done by businesspersons flying themselves to meetings or other events, primarily in piston or turboprop aircraft. Most of the pilots own or work for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or would be infeasible.
- **Air Charter** – When scheduled air service either is not available or inconvenient, businesses and individuals can charter aircraft from air charter providers. These flights save time and make it possible to fly directly to places that cannot be reached by scheduled passenger service airlines. These operators use general aviation facilities and are not considered air taxi operators, which are a commercial activity and discussed in more detail later in this chapter.
- **Other** – All other general aviation activities are classified as being "other." Given its diverse nature, this includes aircraft performing a broad range of functions related to, but not limited to, disaster relief, search and rescue, police operations, news reporting, border patrol, forest fire fighting, aerial photography and surveying, crop dusting, and tourism activities.

Business Use of General Aviation

Business and corporate aviation are the fastest growing facets of general aviation, contributing over $128 billion to U.S. economic output annually and employing more than one million people. The difference between the business and corporate aviation is that corporate aircraft are flown by professional pilots carrying passengers for hire, whereas business aircraft are flown by pilots flying

the aircraft on company business. Companies and individuals use aircraft as a tool to improve the efficiency and productivity of their business and personnel. Use of general aircraft afford businesses and individuals direct control of their travel itineraries, destinations and significantly reduce travel times and inconveniences often associated with scheduled airline service.

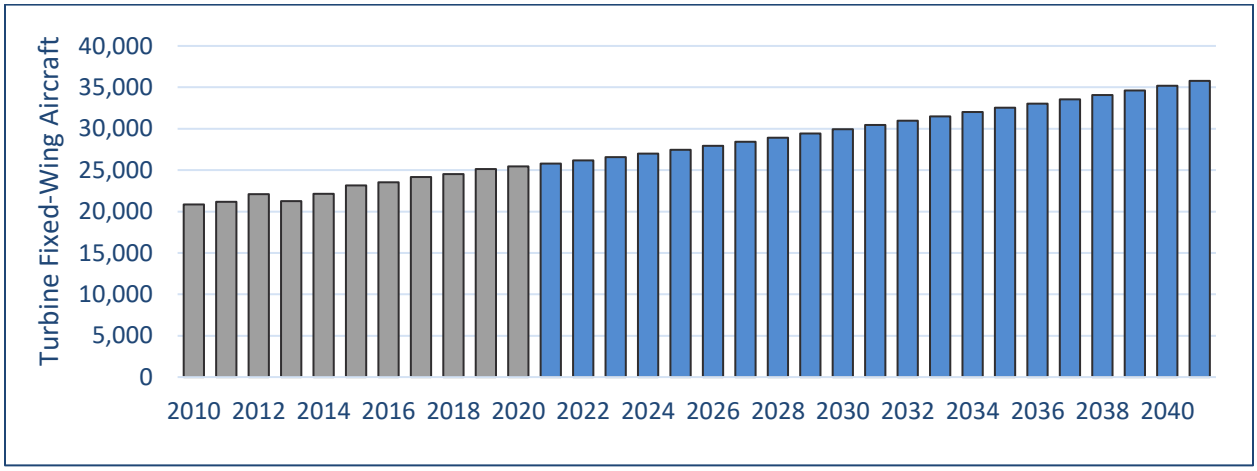
It is important to note that corporate general aviation is not the exclusive concern of Fortune 500 companies. In fact, according to the National Business Aviation Association's (NBAA) Business Aviation Fact Book 2019, only three percent of the approximately 15,000 business aircraft registered in the U.S. are flown by these companies. The remaining 97 percent are operated by a broad cross-section of organizations, including government, universities, charitable organizations, and businesses of all sizes.

In terms of the growth and development of business aviation, Honeywell's 28th Annual Business Aviation Outlook, 2019 highlighted the following:

- Up to 7,700 deliveries of new business jets valued at over $251 billion are expected through 2028
- Operators plan to replace 20 percent of their fleets with new jets within the next 5 years
- Large cabin jets account for more than 62 percent of new purchases
- 61 percent of worldwide sales originate in North America

Use of general aviation aircraft by business and corporate operators ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. Business aircraft usage by smaller companies has also escalated dramatically as various chartering, leasing, fractional ownership, interchange agreements, partnerships, and management contracts have emerged. The growth in this facet of the industry is reflected in **Figure 3-8** below that presents the FAA's historical and projected number of general aviation turbine aircraft.

Figure 3-8: Active General Aviation Turbine Aircraft 2010-2041



Source: FAA Aerospace Forecast 2021-2041
Note: Historical years are in gray

Of special note with respect to corporate and business aviation is the immense popularity of fractional ownership operations. Since their inception in 1986, fractional ownership programs offered business aircraft users increased flexibility in the ownership and operation of aircraft, as well as providing a financially viable alternative to flying commercially. Such programs use alternative aircraft acquisition concepts over traditional methods, including shared or joint aircraft ownership, and provide for the management of the aircraft by an aircraft management company. The aircraft owners participating in such a program agree not only to share their aircraft with others having a common interest in that aircraft, but also to lease their aircraft to other owners in the program. The aircraft owners use a common management company to provide aviation management services including maintenance of the aircraft, pilots, scheduling and administration of the leasing of the aircraft among the owners. Even during times of unsteady economic conditions, fractional operator businesses have consistently grown as existing and new customers increase or initiate their fractional aircraft usage.

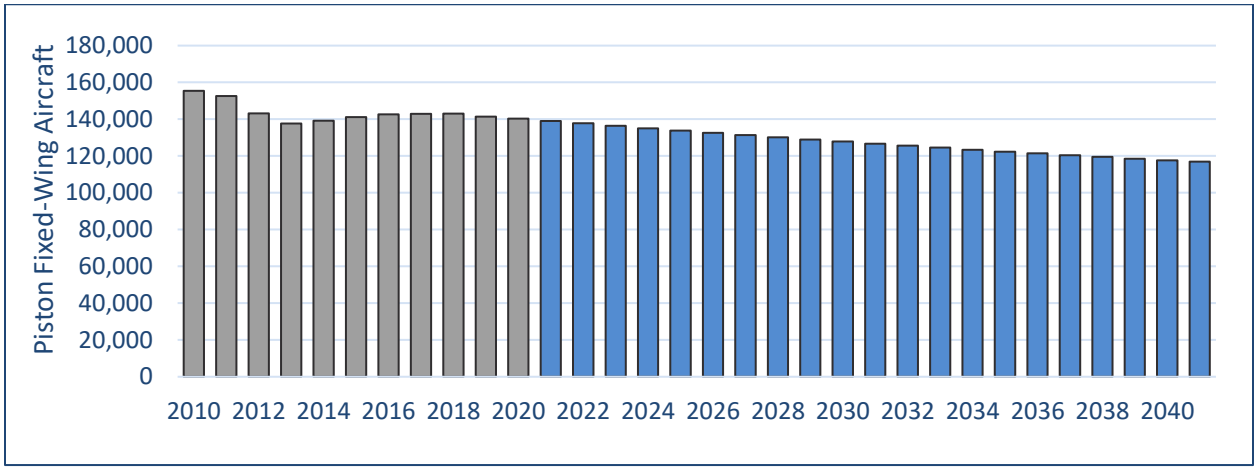
One of the most important trends identified by the FAA in their forecasts is the strong growth anticipated in active general aviation jet aircraft. In terms of growth in the number of turbine aircraft (i.e., turboprop and jet), 2013 saw the overall production of jet aircraft decline slightly due to the economic recession and the resultant pressures on companies to reduce costs. However, since that time, the production of jet aircraft has experienced substantial growth, increasing at over 2.0 percent annually on average from approximately 20,853 aircraft to 25,510 between 2010 and 2018. The active general aviation turboprop and jet aircraft fleet is anticipated to continue to increase by nearly 56 percent over the projection period to more than 35,000 aircraft by 2041.

General Aviation Piston Operators

Single and multi-engine piston aircraft experienced a decline in the number of aircraft between 2010 and 2020. Although still by far the largest portion of aircraft in the active general aviation fleet, the number of single engine aircraft fell from 139,519 in 2010 to an estimated 127,290 in 2020, a 0.9 percent average annual decline. During that same period, multi-engine piston aircraft experienced a steeper decline, falling from 15,900 aircraft to 12,395, a 2.5 percent annual decrease. In total, active piston fixed-wing aircraft decreased at 0.9 percent annually. Much of this decline is attributed to the retirement of older aircraft in combination with the relatively high costs of newer aircraft and increasing costs for fuel and maintenance services.

In its annual Aerospace Forecast, the FAA expects the number of active piston general aviation aircraft to continue to decline at a rate similar to that of the past 10 years. Specifically, the decrease in the number of piston aircraft is expected to average 0.9 percent per year over the next two decades. The resultant forecast shows total piston aircraft (combined single- and multi-engine) falling from 140,315 in 2020 to 116,905 in 2041. This is reflected in **Figure 3-9** below.

Figure 3-9: Active General Aviation Piston Aircraft 2010-2041



Source: FAA Aerospace Forecast 2021-2041
Note: Historical years are in gray

Other Forecasted Metrics

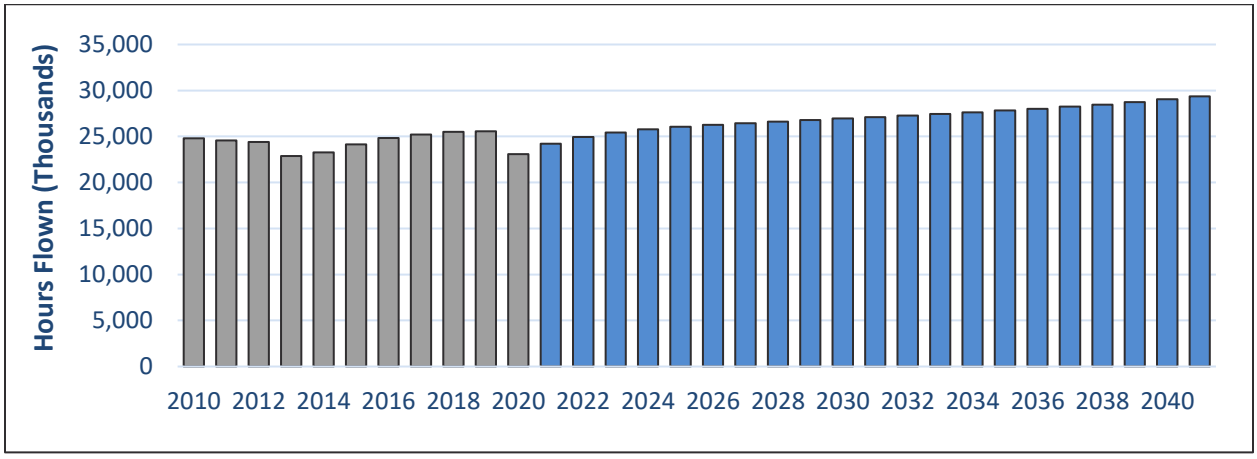
The FAA also tracks and projects an important metric known as Active General Aviation and Air Taxi Hours Flown, which captures several activity-related data including aircraft utilization, frequency of use, and duration of use. From 2010 to 2020, hours flown in general aviation piston aircraft experienced a slight decline (0.4 percent annual average) that is expected to continue at an increasing rate over the 20-year planning period (0.7 percent annual average). Conversely, turboprop and jet aircraft hours flown are expected to continue to grow at relatively high rate of 2.6 percent on average annually from 2021 to 2041.

Figure 3-10 below depicts historical general aviation and air taxi hours flown from 2010 through 2020 as well as projected hours flown through 2041. Total hours flown by general aviation and air-taxi aircraft are estimated to reach 29.4 million

by 2041, compared to an estimated 23.1 million in 2020. As shown in the graph, a decline was experienced from 2011 to 2013 spurred by the economic recession, much of which was realized by piston aircraft owners. However, since that time, hours flown totals have recovered and the FAA currently projects a steady increase of 1.0 percent on average through 2041. When comparing this to the FAA projected average annual growth rate of the general aviation active fleet (0.1 percent average annual growth rate), the difference represents an anticipated increase in aircraft utilization.

Light sport aircraft represents a relatively new category in FAA aircraft classifications. These small, lightweight aircraft are forecasted to see an increase of 4.0 percent a year in hours flown, primarily driven by growth in the fleet. Hours flown for experimental aircraft are also forecasted to increase, growing at an average annual rate of 1.4 percent over the next two decades.

Figure 3-10: U.S. General Aviation and Air Taxi Hours Flown 2010-2041



Source: FAA Aerospace Forecast 2021-2041
Note: Historical years are in gray

Summary of National General Aviation Trends

The following excerpt from the *FAA Aerospace Forecast 2021-2041* summarizes the overall general aviation market:

> *The long-term outlook for general aviation thus is more promising than before, as growth at the high-end offsets continuing retirements at the traditional low end of the sector. The active general aviation fleet is forecast to increase slightly by 0.1 percent between 2021 and 2041, after recording a decline of 2.8 percent in 2020 from the year before (active fleet shrinks 1 percent by 2041 from its 2019 level). Turbine aircraft, including rotorcraft is estimated to not experience a decline between 2019 and 2020, while the total of piston fleet is estimated to have decreased by 1.1 percent in 2020 from the previous year. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest*

segment of the fleet – fixed wing piston aircraft will continue to shrink over the forecast period. Against the marginally declining active general aviation fleet between 2019 and 2041, the number of general aviation hours flown is projected to increase by a total of 14.8 percent from 2019 to 2041 (an average of 0.6 percent per year), as growth in turbine, rotorcraft, and experimental hours more than offset a decline in fixed wing piston hours.

Incentivized by time savings efficiencies and benefits, demand for business aviation is anticipated to far exceed that of private or recreational aviation, where the rising costs associated with aircraft operations and pilot proficiency have suppressed demand. This simply means that business aviation in the form of turboprops and jets will grow faster than that of piston aircraft, with an average annual growth forecast of 1.7 percent. That projected robust growth in turbine aircraft along with growth in light sport and experimental aircraft will offset the continuing decline of piston aircraft during the 20-year period. This will result in a slight overall increase of total general aviation aircraft of 0.1 percent on average per year through 2041.

Historical and Current COS Aviation Activity

Historical enplanement, cargo, operations, and based aircraft data for COS provide the baseline from which future activity at the Airport can be projected. While historical trends are not always reflective of future periods, historical data can provide insight into how local, regional, and national demographic and aviation-related trends may be tied to a given airport. The following sections include historical overviews of COS's enplaned passengers (passengers boarding commercial flights departing COS), cargo (landed weights), aircraft operations (generally defined as either an aircraft landing or departure; thus, a takeoff and a landing would count as two operations), and based aircraft (generally defined as an aircraft that is permanently stored at an airport).

As a commercial service airport, COS collects and maintains detailed enplanement records for carriers using the Airport. These records have been utilized for reviewing historical enplanement activity at the Airport. For purposes of forecasting and determining related facility requirements, it was assumed that deplanement activity (passengers arriving on flights to COS) is equivalent to enplaned passengers. This method of passenger forecasting is consistent with FAA guidance and common practices.

Similar to passenger activity, COS management regularly records air cargo activity based on the "landed weight" of cargo aircraft, which includes the weight of the aircraft as well as its fuel and cargo. "Cargo service" airports are classified as such by being served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds, in addition to any other air transportation services that may be available at the airport. With over 100 million pounds of landed weight on a regular basis, COS is categorized by the FAA as a cargo service airport as well as a commercial service airport.

Since COS has a dedicated staff for operations, planning, and statistics, it has a formal mechanism for counting, recording, and storing airport operations data on a regular basis. That information is ultimately posted on the Airport website and provided to the FAA for storage in a centralized federal database for use by the FAA in the development of a Terminal Area Forecast (TAF) for the Airport. While Airport records are the primary source for historical activity, other sources can be utilized to establish and verify the historical activity records for COS including the following:

- FAA Terminal Area Forecast (TAF) data for COS (Issued May 2021)
- COS FAA 5010 Data (Effective date August 2021)
- FAA Air Traffic Activity Data System (ATADS)
- FAA Traffic Flow Management System Counts (TFMSC)

COS Commercial Airline Service Passenger Trends

In March 2021 Southwest Airlines (SWA) initiated new service for Colorado Springs with initial offerings being comprised of 13 daily non-stop flights to the focus cities of Chicago, Dallas, Denver, Las Vegas, and Phoenix. The addition of SWA has also been accompanied by increased enplanements from the existing air carriers at COS. Given the circumstances surrounding the pandemic, SWA has performed strongly with relatively robust enplanements and load factors on 143 passenger Boeing 737-700 and 175 passenger Boeing 737-800 aircraft.

Passenger activity at COS declined at an average annual rate of 5.5 percent between 2001 and 2020, much of which was experienced from 2019 to 2020 due to the pandemic. From 2001 to 2019, the annual average rate of decline was only 1.3 percent. More specifically, traffic at the airport declined from 2001 to 2015, and then began increasing in 2016. From January 2021 through June 2021, the airport experienced a significant increase, enplaning nearly the same number of passengers during that period as all of 2020 (see **Table 3-4**). It should also be recognized that prior to 2008, COS consistently enplaned over 1 million annual passengers, and since that time, the economic foundations of the region have grown significantly. This improving economic base continues to support and enhance the demand for commercial passenger service, as evidenced by the addition of SWA and its growing number of annual enplanements.

Table 3-4: COS Annual Enplanements 2001-2021

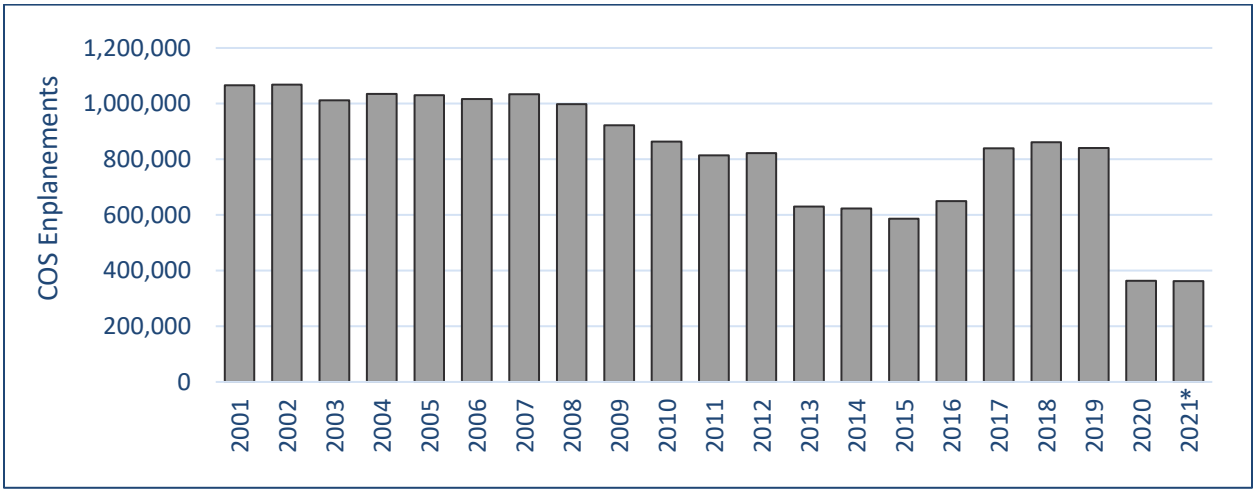
Year	Total Enplanements	Annual % Change
2001	1,065,854	-
2002	1,068,157	0.2%
2003	1,011,643	-5.3%
2004	1,034,747	2.3%
2005	1,030,833	-0.4%
2006	1,017,016	-1.3%
2007	1,033,586	1.6%
2008	998,347	-3.4%
2009	921,681	-7.7%
2010	863,407	-6.3%
2011	814,336	-5.7%
2012	822,008	0.9%
2013	629,711	-23.4%
2014	622,982	-1.1%
2015	586,783	-5.8%
2016	649,190	10.6%
2017	839,438	29.3%
2018	861,625	2.6%
2019	841,059	-2.4%
2020	363,843	-56.7%
2021 (Jan - June)	362,789	
Average Annual Growth Rates		
2001 – 2010	-2.3%	-
2016 – 2020	-13.5%	-
2001 – 2020	-5.5%	-

Source: Airport records

There have been several fluctuations in passenger activity at COS over the last 20 years spurred by the entrance and exit of Alaska Airlines and Allegiant Air, various levels of fluctuating service provided by Frontier Airlines, changes in the patterns and level of regional airline activity, industry wide changes, and multiple events within the national economy.

At its peak, COS was served by 10 different scheduled commercial air carriers. After eight years of consistent activity and limited growth from 2001 to 2008, airline mergers and consolidation led to an eight-year period of overall decline in enplanements. From 2008 to 2015, enplanements declined by over 40 percent and from 2019 to 2020 airport enplanements dropped by 57 percent (see **Figure 3-11**).

Figure 3-11: COS Historical Annual Enplanements 2001-2021



*2021 only includes data for January - June.
Source: Airport records

Additionally, when historical enplanements are analyzed by carrier, a shift in the carriers serving COS over the last 20 years can be recognized. The scheduled commercial passenger airlines serving COS and their annual enplanements are presented in **Table 3-5**.

From 2015 through 2019, COS experienced a recovery in its enplanements with the re-entrance of Frontier Airlines into the market in April 2016. By 2017, enplanements increased 29.3 percent over a similar period in 2016.

Today, the Airport is served by five different scheduled commercial air carriers: American, Delta, Frontier, Southwest, and United. Generally, small regional carriers have come and gone while large airlines have retained service. As a result, mainline carriers have absorbed much of the demand for passenger service in the region. Although American and United Airlines have long held dominant roles at COS (accounting for over 65 percent of enplanements in 2019), Southwest accounted for the most enplanements of any individual airline in 2021. Delta Air Lines has had declining enplanements throughout most of the past 20 years at COS.

Although airlines at COS have had wide and varied levels of enplanements, the expected growth in population and the strength of regional economic fundamentals throughout the market area should ultimately drive air carriers to increase their levels of passenger service.

Table 3-5: Total Annual Enplanements by Airline 2001-2021

Year	Alaska	Allegiant	American	America West	Continental Express	Delta	Express Jet	Frontier	Great Plains	Mesa	Midwest	Northwest	Southwest	US Airways	United	Vanguard	Charters	Total
2001			306,505	100,481	60,890	223,108			2,465	6,833		68,021			284,446	1,518	11,587	1,065,854
2002		18,152	275,207	97,701	71,957	198,886			13,052	5,085		66,214			283,933	26,635	11,335	1,068,157
2003		35,825	207,125	107,470	69,366	187,741			2,772	5,179		78,327			317,321		517	1,011,643
2004		37,440	173,322	107,428	69,767	222,155				4,643		86,261			332,448		1,283	1,034,747
2005		30,697	218,984	119,326	70,481	166,993				4,333		84,471			334,426		1,122	1,030,833
2006		35,224	234,930		79,723	139,485				2,886		77,794		94,078	351,779		1,117	1,017,016
2007		33,281	236,423		76,534	137,849	44,345				11,719	79,368		91,746	321,194		1,127	1,033,586
2008		33,543	213,341		71,763	105,057	48,050	62,316			4,793	72,884		82,577	302,857		1,166	998,347
2009		32,673	208,535		71,827	87,547		103,964				48,034		65,448	302,857		796	921,681
2010		38,258	190,462		70,194	127,924		110,371						517	325,112		569	863,407
2011		41,855	178,324			107,864		104,961							379,454		1,878	814,336
2012		38,834	177,505			96,392		154,743							352,371		2,163	822,008
2013	2,908	25,962	174,186			84,262									340,621		1,772	629,711
2014	21,121	29,771	180,342			82,410									306,916		2,422	622,982
2015	20,789	34,220	168,710			76,575									286,489			586,783
2016	21,953	29,221	167,565			77,488		66,516							286,447			649,190
2017	18,849	22,527	201,625			78,068		232,302							286,067			839,438
2018		3,796	240,036			72,253		259,946							285,594			861,625
2019			232,580			76,463		214,659							317,357			841,059
2020			141,892			35,796		68,954							117,203			363,845
2021 (Jan. – June)			88,269			18,366		44,671					111,561		99,922			362,789

Source: Airport records

Origin-Destination Passenger Base

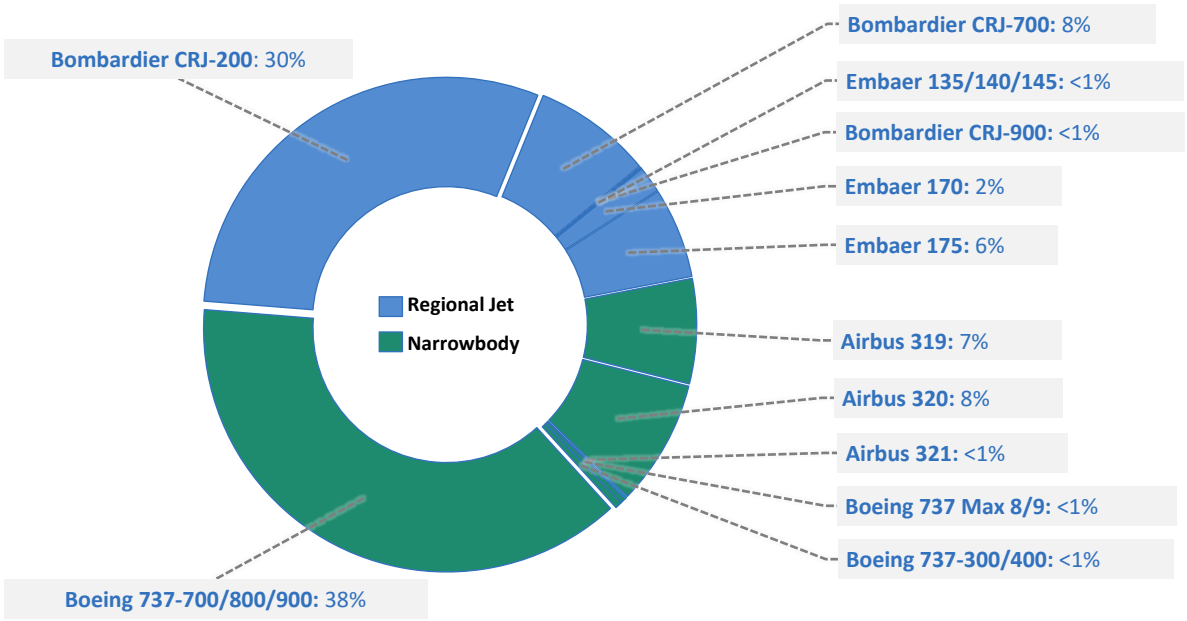
COS is primarily an origin-destination (O&D) airport, meaning that most enplaned passengers originate their air travel at COS and most deplaned passengers terminate the air travel at COS. Over 90 percent of the Airport's enplaned passengers originate in Colorado Springs, with less than 10 percent of passengers connecting onto other aircraft at COS.

Based on U.S. Department of Transportation statistics, the most common originating airports for passengers traveling to COS in the first quarter of 2021 included Denver, Dallas-Ft. Worth, Houston, Las Vegas, Chicago, Phoenix, and Salt Lake City. As with most hub-and-spoke systems employed by the major air carriers, many passengers start their air travel at a spoke airport like COS and connect onto another aircraft at a hub airport in order to get to their final destination. That process is reversed for passengers arriving at COS.

Commercial Passenger Fleet Mix

The passenger airline fleet serving COS is made up primarily of narrowbody (an airliner arranged along a single aisle, typically permitting up to six seats abreast seating in the cabin) and regional jet aircraft. A breakdown of passenger aircraft serving COS in the first half of 2021 is provided in **Figure 3-12**. By number of operations, the narrowbody aircraft (54 percent) served slightly more flights than the regional jets (46 percent).

Figure 3-12: Passenger Carrier Fleet 2021 (January – June)

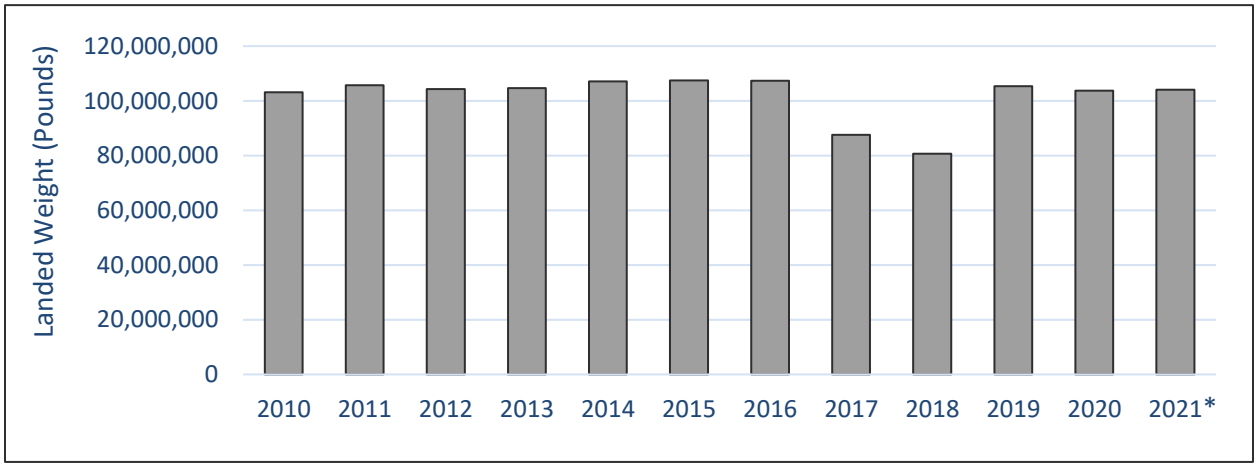


Source: FAA TFMSC

Cargo Activity

COS projects that it will accommodate approximately 104 million pounds of landed weight in air cargo in 2021 (based on actual totals from January through July of 2021 with the remainder of the year estimated). This total is comparable to the previous two years and up substantially from 80.6 million in 2018, which itself was the lowest amount in 10 years (see **Figure 3-13**). Despite the economic recession of the late 2000s and subsequent recovery, the overall past 10 years of cargo activity at COS has remained essentially flat. FedEx serves COS with multiple cargo flights per day, accounting for 95 percent of the Airport's projected landed cargo weight in 2021. FedEx operates a diverse fleet of aircraft that includes the narrowbody Boeing 757 (majority), as well as widebody Boeing 767 and 777, and the DC-10 and MD-11. A small percentage of landed air cargo weight is carried by Key Lime Air (using Fairchild Swearingen Metro aircraft) and only rarely by Atlas Air or UPS.

Figure 3-13: Historical Landed Weight



*2021 includes actual data for January – June and projections for July - December.
Source: Airport records

Aircraft Operations

Colorado Springs Airport accommodates a wide range of aircraft types and users at varying operational levels. Annual aircraft operations represent the number of aircraft takeoffs and landings occurring at an airport during a calendar year. The historical operations data for the Airport includes operations conducted both by based aircraft and itinerant aircraft (i.e., those aircraft arriving from or departing to airports outside the local area). These operations can also be classified into air carrier, air taxi, general aviation, and military categories, as detailed below:

- **Air Carrier:** Air carrier operations are those performed by passenger and all-cargo airlines serving the Airport. Included are scheduled flights, charter flights (including those commercial aircraft destined for the Department of Defense's Arrival/Departure Airfield Control Group [A/DACG] facility), diverted flights, and ferry operations (empty flights). The FAA defines an air carrier aircraft, for traffic counting purposes, as being one capable of carrying more than 60 passengers.

Over the past 20 years, air carrier operations at COS have declined on average 3.5 percent annually and are currently almost half of what they were in 2001. However, with the exception of 2020, operations in this category at COS have recently stabilized and experienced some degree of recovery since 2014. It is anticipated that with the addition of Southwest the annual air carrier operations will surpass totals from the previous five years.

- **Air Taxi:** The air taxi and commuter category consist of unscheduled operations of "for hire" air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines (e.g., SkyWest) operating aircraft with fewer than 60 seats.

  During the 2000s, air taxi operations ranged between 20,000 and 30,000 per year. As part of the decline in commercial service operations at COS, these operations have likewise experienced a decline, currently ranging between 10,000 and 20,000 annually. However, an important contributing factor to this decline is the current trend being experienced in the regional and commuter airline industry of airlines transitioning from 50-60 passenger seat aircraft to 70+ passenger seat aircraft in an effort to enhance efficiency and profitability. This transition to larger aircraft effectively shifts larger commuter aircraft into the air carrier category, which can explain some of the decline experienced recently in this category at COS.

- **General Aviation:** As discussed earlier, general aviation operations encompass all civil aircraft operations not classified as air carrier or air taxi and commuter operations. general aviation operations have been the most dominant category of aircraft operations at COS over the past 20 years. Similar to the air carrier category, general aviation operations today are roughly half of what they were in 2001. From 2015 through 2020, general aviation operations experienced robust growth of 5.9 percent annually. At COS, as well as many airports across the country, general aviation activity experienced a spike in 2020 operations.

- **Military:** Military flights at COS include missions and training operations to/from PSFB as well as exercises that use the facilities at COS that may not be based at PSFB. PSFB is home to the North American Aerospace Defense Command (NORAD), 21st Space Wing, 302nd Airlift Wing and centers of military operations. Military aircraft activity levels are dictated by national defense objectives and have been a consistent presence at COS although annual operations vary.

The basis for COS's historical operational counts are the records maintained by Airport management and the Air Traffic Control Tower (note that tower data is considered to be the best airport operational data currently available since it is based on actual aircraft operations counted by staff). Using data provided by the Airport, **Table 3-6** and **Figure 3-14** present the historical aircraft operations for COS broken down into the operational categories described above.

Table 3-6: Historical Aircraft Operations 2001-2021

Year	Air Carrier	% Air Carrier	Air Taxi	% Air Taxi	General Aviation	% General Aviation	Military	% Military	Total	Annual % Change
2001	25,783	13%	17,423	8%	140,954	68%	22,061	11%	206,221	
2002	22,932	11%	26,381	12%	144,024	66%	24,829	11%	218,166	5.8%
2003	19,571	10%	28,609	14%	105,525	53%	46,831	23%	200,536	-8.1%
2004	18,467	11%	30,684	18%	92,090	53%	33,668	19%	174,909	-12.8%
2005	20,618	12%	27,466	17%	88,295	53%	29,532	18%	165,911	-5.1%
2006	20,162	14%	23,475	17%	74,729	53%	22,592	16%	140,958	-15.0%
2007	20,338	13%	21,497	14%	88,330	57%	25,523	16%	155,688	10.4%
2008	22,742	16%	20,291	14%	73,286	50%	29,014	20%	145,333	-6.7%
2009	20,017	14%	18,318	13%	68,250	47%	38,427	26%	145,012	-0.2%
2010	19,116	14%	17,833	13%	59,124	42%	43,974	31%	140,047	-3.4%
2011	18,831	15%	16,076	13%	55,750	44%	36,107	28%	126,764	-9.5%
2012	17,952	13%	15,013	11%	58,218	43%	42,887	32%	134,070	5.8%
2013	14,521	11%	13,712	11%	60,331	47%	39,092	31%	127,656	-4.8%
2014	13,535	10%	13,830	11%	57,530	44%	45,498	35%	130,393	2.1%
2015	13,921	11%	9,870	8%	57,530	45%	45,498	36%	126,819	-2.7%
2016	12,912	10%	12,287	9%	61,307	47%	43,848	34%	130,354	2.8%
2017	13,628	11%	12,198	10%	59,980	48%	39,576	32%	125,382	-3.8%
2018	13,263	10%	13,418	11%	63,913	50%	37,072	29%	127,666	1.8%
2019	13,740	10%	15,554	11%	72,857	54%	33,280	25%	135,431	6.1%
2020	8,123	7%	10,144	8%	76,510	63%	27,030	22%	121,807	-10.1%
2021 (Jan. – June)	7,971	12%	6,606	10%	40,209	60%	12,522	19%	67,308	
Average Annual Growth Rate										
2001 – 2010	-3.3%		0.3%		-9.2%		8.0%		-4.2%	
2011 – 2020	-8.9%		-5.0%		3.6%		-3.2%		-0.4%	
2001 – 2020	-5.9%		-2.8%		-3.2%		1.1%		-2.7%	

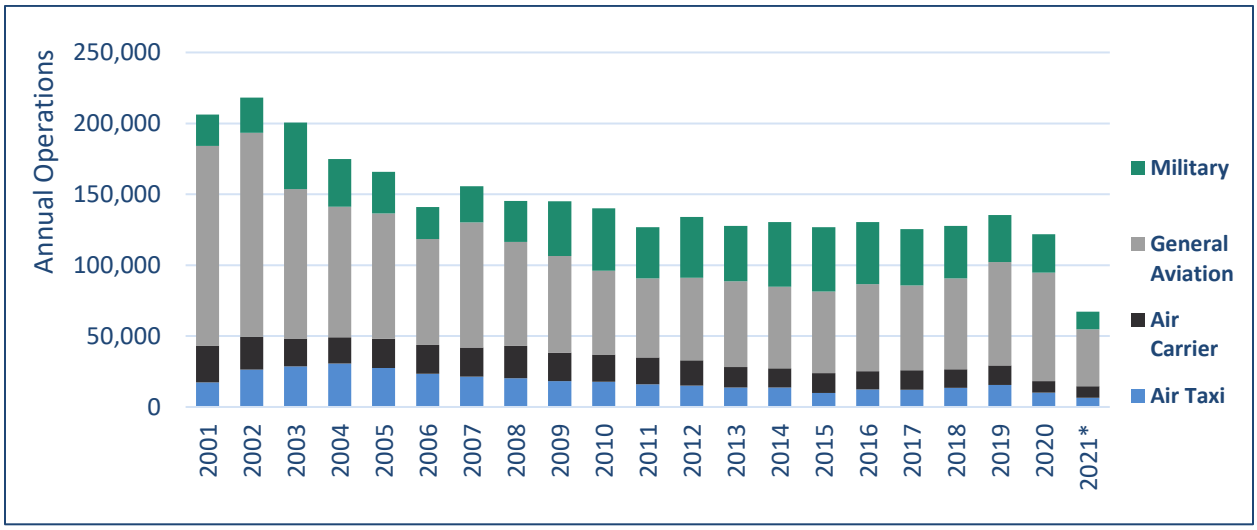
Source: Airport records

Note that the share of each aircraft category as a percent of the total number of operations is also shown in the table above. This is an important consideration in forecasting future operations because the historical trends and future projections on the share of each category will help determine the number of forecasted operations in each category.

Over the past 20 years, the share of air carrier operations at COS have generally declined but stabilized at the 10 to 11 percent level over the past seven years (with the exception of 2020). Since 2015, the share of air taxi operations at COS has slowly grown from 8 percent to approximately 11 percent of total operations. Similarly, the share of general aviation operations at COS has steadily grown from 45 to 60 percent of total operations over the past six years. It is also important to note that while military operations remain a significant contributor to COS activity, they have been declining as a share of total operations since 2015.

Although the relative share of operations within each category has changed over time, they do follow patterns that can be extended into future years or allow for variations given the anticipated profile of activity at COS. These continuing market share trends of COS operations have been applied to future operational projections. Changes in future market share have been based on anticipated changes in the airline industry, classifications of air taxi/commuter aircraft, growing interest of general aviation at COS, and possible wing/unit growth of PSFB.

Figure 3-14: Annual Operations by Category 2001-2021

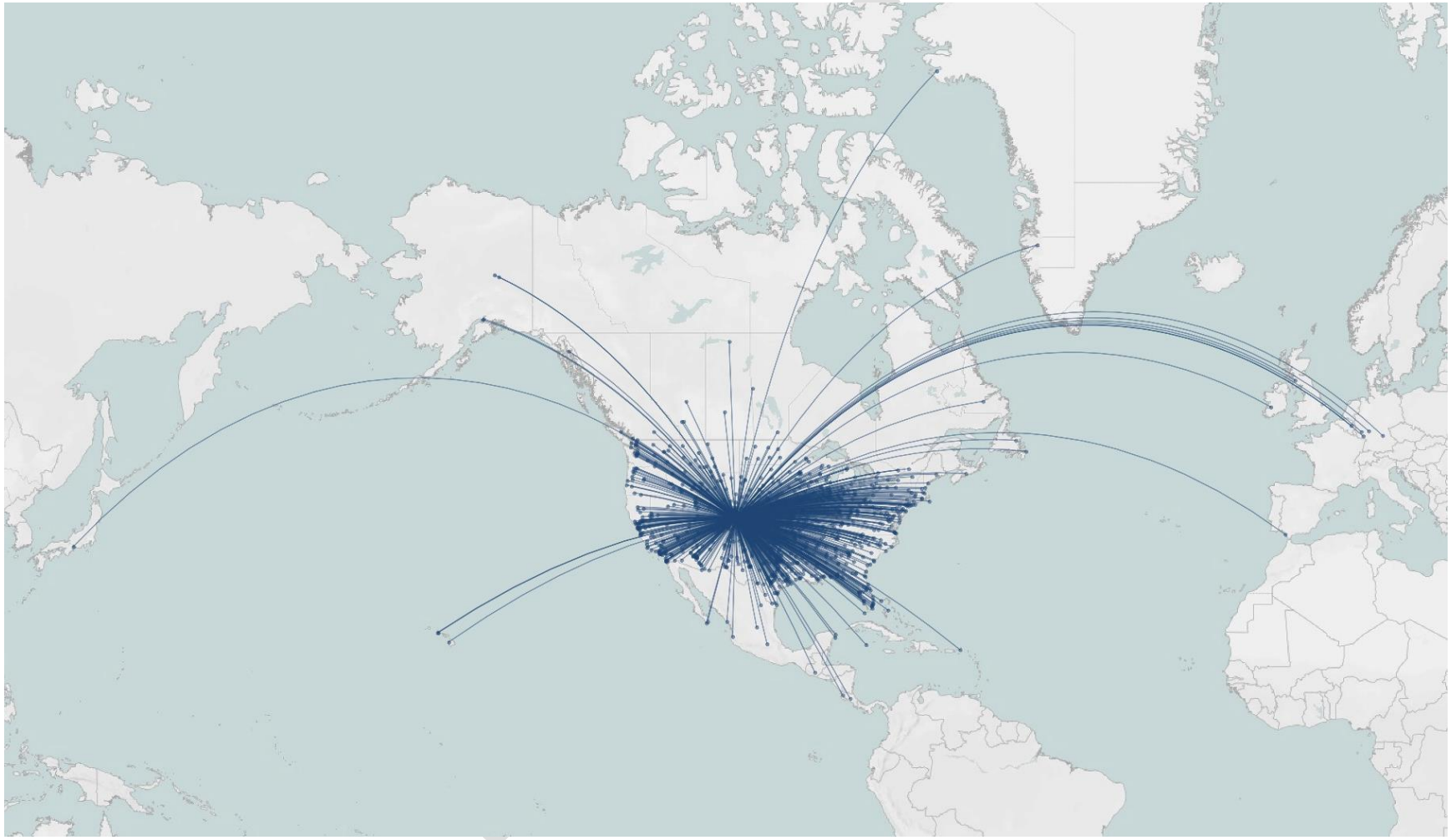


*2021 only includes data for January - June.
Source: Airport records

Flight Origins and Destinations

Data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to assess origin and destination airports for flights in and out of COS. This data represents only a portion of the total operations at the Airport, but nonetheless provides insight into the national and global reach of the Airport's general aviation activity. In 2019, the TFMSC data listed about 42,000 flights whereas the operation total from the tower was around 135,000. For that subset of flight activity at the Airport, there were 999 unique airports listed as the destination for flights departing COS, and 1,050 unique airports listed as the origin for arriving flights. These destination airports are mapped in **Figure 3-15**. As shown, COS has a global presence with flights reaching as far as Japan, Central America, Canada, Greenland, and Western Europe.

Figure 3-15: COS Flight Destination Map 2019



Source: FAA TFMSC database, Jviation, a Woolpert Company

Based Aircraft

As reflected in the FAA Terminal Area Forecast (TAF) database, the number of based aircraft at COS has fluctuated, but generally increased over the past 20 years (see **Table 3-7**). (Note that since COS is considered a primary airport, it does not follow the requirements of the National Based Aircraft Inventory Program.)

Table 3-7: Historical Based Aircraft 2001-2021

Year	Based Aircraft	Year	Based Aircraft
2001	239	2012	284
2002	172	2013	230
2003	169	2014	230
2004	261	2015	194
2005	261	2016	250
2006	292	2017	242
2007	292	2018	247
2008	292	2019	252
2009	292	2020	257
2010	246	2021	263
2011	246		
Average Annual Growth Rates			
2001 – 2010			-0.3%
2016 – 2020			-0.7%
2001 – 2020			0.4%

Source: FAA TAF

The current breakdown of based aircraft at COS (shown in **Table 3-8**) is provided in the Airport's Master Record (FAA Form 5010) and deviates from the FAA TAF shown above. From 2019 to 2021, 24 based aircraft left COS, 12 of which were military. (Note that there are any number of reasons why a civilian aircraft may change its basing location and military aircraft reallocations to different bases are commonplace.) The Airport anticipates a return of some of the departed based aircraft in the near-term.

Table 3-8: Breakdown of COS Based Aircraft (Airport 5010 Master Record)

Type	Based Aircraft
Single Engine	148
Multi-Engine	40
Jet/Turboprop	32
Helicopter	5
Gliders/Other	1
Military	25
Total	**251**

Source: COS Airport Master Record (Form 5010)

Forecast Methodologies

Projections of aviation activity are typically generated by employing historical data, incorporating assumptions, and considering likely future conditions and trends. In truth, forecasting of any type is as much an "art" as a "science", and no matter how sophisticated, it represents a scientific estimation rooted in the prevailing conditions at the time they are created. Therefore, forecasts must be updated periodically and revised as necessary to reflect new conditions and developments.

During a master planning effort, aviation activity forecasts are typically established by using a variety of assumptions that result in a wide range of outcomes. This is intentionally done in order to provide a broad view of future airport utilization potentials. Once that broad view has been established, then a careful examination of those assumptions can be undertaken to determine which could be most reasonably applied given that airport's current situation.

For COS, several forecasts were developed based on a variety of different analytical techniques including direct correlation projections, regression analyses, a market share analysis, and various trendline analyses. Consistent with industry standards, these methodologies incorporate national trends and consider the FAA's Terminal Area Forecast to create projections for COS aviation activity categories including **passenger enplanements, air cargo, aircraft operations,** and **based aircraft**. Not all methodologies are applicable to each category and may be duplicative with other methodologies. From the methodologies used for each category of activity, *a select group of projections was chosen to represent low, medium, and high growth scenarios*. A description of each methodology and the category of activity it applies to are discussed below.

- **FAA Terminal Area Forecast (TAF) (2021-2041):** The TAF is the official FAA forecast of aviation activity for U.S. Airports, both in aggregate and individually. It addresses historical and forecasted airport operations, based aircraft, enplanements, and air cargo miles and tonnage. This methodology applies to all categories of activity.

- **Colorado Airport System Plan (CASP) Forecasts 2018-2038 (Operations and Based Aircraft AAGR):** The 2020 CASP included enplanement, operational and based aircraft forecasts for airports throughout Colorado. These are based on local and regional data from socioeconomic and aeronautical sources. This methodology applies to operations and based aircraft categories of activity.

- **FAA Historical Scheduled Domestic Passenger Traffic 2010-2021 (FAA Aerospace Forecasts FY 2021-2041):** FAA Aerospace Forecasts for the U.S. are published annually and are developed using statistical models to explain and incorporate emerging trends of the different aviation sectors. This

forecast is based on historical enplaned passenger traffic growth or decline percentages. This methodology applies to enplanement projections.

- **FAA Forecast Scheduled Domestic Passenger Traffic 2021-2041 (FAA Aerospace Forecasts FY 2021-2041):** FAA Aerospace Forecasts are published annually and developed using statistical models to explain and incorporate emerging trends within the different aviation sectors. This methodology is based on projected domestic passenger traffic growth or decline percentages and applies to enplanement projections.

- **FAA Active General Aviation and Air Taxi Total Hours Flown (FAA Aerospace Forecasts FY 2021-2041):** This forecast considers all general aviation and air taxi hours, which include both piston and turbine aircraft. (Note that air taxi includes general aviation air charter operations and applies to operations and based aircraft projections.)

- **FAA Active General Aviation and Air Taxi Turbine Hours Flown (FAA Aerospace Forecasts FY 2021-2041):** This forecast includes all general aviation and air taxi hours flown for turbine aircraft only. (Note that air taxi includes general aviation air charter operations and applies to operations and based aircraft projections.)

- **FAA Forecast of Jet Fuel Prices 2021-2041 (FAA Aerospace Forecast FY 2021-2041):** This forecast is based on projected growth or decline rates of Jet Fuel (Jet-A) pricing during the 20-year forecast period within the United States. This methodology applies to all categories of activity.

- **Jet-A Fuel Flowage Forecast (FAA Aerospace Forecast FY 2021-2041):** This forecast is based only on Jet-A fuel estimated to be pumped nationally during the forecast period. Jet-A is the fuel utilized by turbine aircraft, including all commercial passenger air carriers at COS. This methodology applies to all categories of activity.

- **Total Combined Fuel Flowage Forecast (FAA Aerospace Forecast FY 2021-2041):** This forecast is based on combined totals of Jet-A and 100LL fuel estimated to be pumped nationally during the forecast period. Jet-A is the fuel utilized by turbine aircraft while 100LL is the fuel utilized by piston-powered aircraft. This methodology applies to all categories of activity.

- **Active General Aviation Aircraft (FAA Aerospace Forecast FY 2021-2041):** This forecast is based on all estimated levels of active general aviation aircraft operating in the United States during the forecast period. This methodology applies to based aircraft projections.

- **FAA Forecast Active Turbine Aircraft (FAA Aerospace Forecast FY 2021-2041):** This forecast is based on estimated levels of active turbine general aviation aircraft operating in the United States during the forecast period. This methodology applies to all categories of activity.

- **Market Area Historical Population Growth 2001-2020:** This forecast is based on growth rates from Colorado DOLA historical population data for the airport market area which includes both El Paso and Teller Counties. This methodology applies to all categories of activity.

- **Market Area Forecasted Population Growth 2021-2041:** This forecast is based on growth rate founded on forecasted Colorado DOLA population data for the airport market area. This methodology applies to all categories of activity.

- **Market Area Historical Employment 2001-2020:** This forecast is based on growth rates from Colorado DOLA historical employment data for the airport market area. This methodology applies to all categories of activity.

- **Market Area Forecasted Employment 2021-2041:** This forecast is based on growth rates from Colorado DOLA forecasted employment data for the airport market area. This methodology applies to all categories of activity.

- **Load Factor Analysis:** This methodology incorporates historical trends of commercial service load factors and looks at projections of future load factors. This methodology may be applied to commercial service enplanements.

- **Trend Analysis:** This forecast methodology assumes that the historical trend of activity in each category will continue. This methodology may be applied to all activity categories based on the reasonableness of the projection given expected national industry trends and an understanding of local influencing factors.

Projections of Passenger Enplanements

Projection Assumptions

In developing the projections of enplaned passengers at COS the following assumptions were made:

- The quality and quantity of service will continue to improve at COS in concert with the expanded service of Southwest Airlines leading to rising passenger volumes and an increased propensity of local residents to fly.

- The addition of Southwest will stimulate other carriers in a more competitive market.

- The major U.S. airlines will maintain hub operations at their primary U.S. airports; if one or more of the major U.S. airlines were to experience a dramatic change (such as a merger), other carriers will continue to serve the demand associated with the COS market area.

- The existing role of the Airport will remain the same in the future - that is, the growth of Airport's use will be reflective on the growth of the market area.

- Frontier Airlines will have a reduced and lessening effect on market area passengers as COS gains additional low fare service and is impacted by those carriers' new fare structures.
- The Airport's level of air service and traffic will continue to be based on local demand and O&D in nature; the level of connecting service at COS will continue to be minimal. (Note that if an airline located a hub operation at COS, it would increase the level of scheduled service at the Airport.)
- Limited nonstop scheduled international flights may be introduced at COS, but will not be a significant factor in overall traffic volumes.
- The capacity of the COS airside and landside facilities will not constrain the realization of air travel potential during the forecast period.

Enplanement Projections

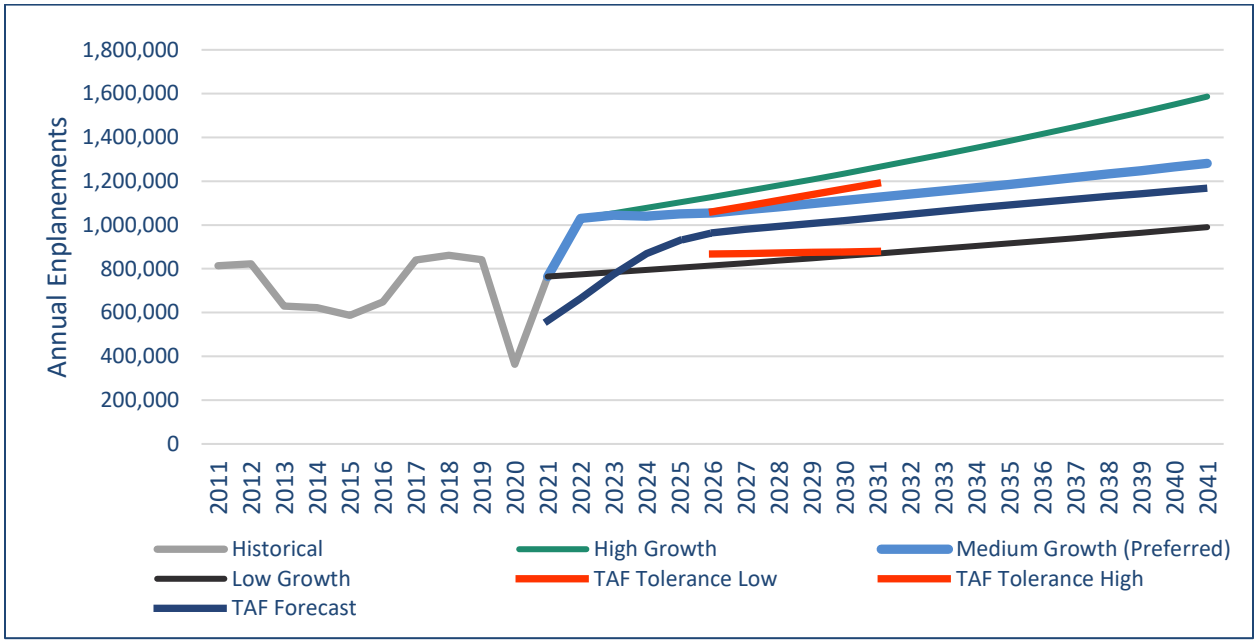
The various methodologies discussed in the previous section were applied to the estimated 2021 base year enplanement levels to produce a broad range of 20-year projections. Methodologies were then reviewed for reasonableness and likelihood. The FAA requires that study-related forecasts present their consistency with the existing TAF or demonstrate the rationale for any significant deviation. Specifically, the FAA considers a forecast to be consistent with its TAF for forecasts differing by less than 10 percent within five years of the base forecast year, and 15 percent within 10 years of the base year. The TAF projection, as well as the high and low variance ranges, are reflected in the projection graphs and represented by dashed lines.

A projection for enplanements in 2021 and 2022 was created by internal airport staff. For 2021, the projection was built on the recorded enplanements from the first half of the year and commercial flight schedules for the second half. This resulted in a projected total of 764,627 enplanements for 2021. The 2022 enplanement projection was based on 2021 data and other historical trends, load factors, and commercial service schedules. The projected enplanements for 2022 are 1,029,918. This projection assumes continued growth and increased load factors, including those by Southwest Airlines.

Scenario Based Forecasting

In an effort to narrow the range of forecasting options noted above, three forecast scenarios were selected as being representative of the reasonable range of enplanement forecasts available for COS; they are shown in **Figure 3-16.** Note that the COS forecast is portrayed as a "range" in order to better account for the variabilities that are inherent in any forecasting effort.

Figure 3-16: Scenario Based Enplanement Forecast 2021-2041



Source: Jviation

The three forecasts shown above and described below were selected to represent high-, medium-, and low-growth enplanement forecast scenarios.

1. **High-Growth Scenario** – This scenario utilizes the Airport's internal 2021 and 2022 projections. After 2022, this scenario grows based on the FAA forecast of total scheduled domestic passenger traffic (FAA Aerospace Forecast FY 2021-2041), which represents a 2.3 percent average annual growth rate throughout the 20-year planning period. This forecast is a key indicator of the FAA's positive national outlook on the growth of passenger activity recovery. Since this projection is focused on passenger levels, it is reasonable to include anticipated national passenger projections as one of the scenarios representing COS's potential future passenger growth.

   The high growth scenario projects a total of 1,586,497 enplanements by the year 2041. To achieve these levels, new routes and/or expanded service by existing mainline carriers would be required, and/or a new carrier would have to enter the market. This projection is higher than the upper threshold of the FAA TAF at the five and ten-year marks.

2. **Medium-Growth Scenario** – This scenario also starts with the Airport's 2021 and 2022 enplanement projections. From 2023 through 2026, small incremental load factor increases are assumed (1.0 percent in the first year, and 0.5 percent for each subsequent year). Following this period, projections increase from 2027 through 2041 based on the forecasted population growth in the COS market area, as detailed by the Colorado DOLA. The market area forecasted population methodology represents a 1.3 percent average annual growth rate, resulting in a projected 1,281,280 enplanements by 2041. This

scenario is slightly more conservative than the high-growth scenario but would also likely require expanded service at COS that would result from growth in the local population base and/or its propensity to fly. Based on the focus of growth within the region and the integration of population as a common forecasting variable, it is reasonable to include this as one of the scenarios representing COS's potential future growth. The medium growth projection is consistent with the short and medium term projections found in the FAA TAF.

3. **Low-Growth Scenario** – This scenario utilizes the 2021 enplanement forecast but does not assume the Airport's optimistic 2022 projection. In the low-growth scenario, enplanements grow for the entire period at the projected 1.3 percent annual average growth rate of the population growth. This scenario is notably more conservative than the others, resulting in 990,007 enplanements by 2041. This scenario could be representative of a number of real-world scenarios that may occur, such as a resurgence of COVID virus variants, increased passenger hesitancy to fly, or reduction in service by a carrier. This projection falls below the FAA TAF thresholds.

Preferred Enplanement Forecast

The Medium-Growth Scenario (Market Area Forecasted Population Growth) was selected as the preferred forecast since it considers anticipated population growth generated by the Colorado DOLA containing a reasonable basis of local and regional input. Population within the region has a strong correlation to the demand for air carrier service at COS. As population within the area increases, so too will the need for reliable, effective air passenger service.

While some area residents may be willing to travel to Denver International Airport (DEN) for additional flight options or more competitive fares, growth in the market area could reasonably attract additional service at COS that would counteract come of the attraction of DEN. Additionally, the Denver metroplex expands and the I-25 corridor becomes more congested, traveling to DEN will become less attractive and flight options to/from COS more appealing. The preferred passenger enplanement forecast for short, medium, and long-term intervals within the 20-planning horizon is compared to the 2020 FAA TAF for COS in **Table 3-9**.

Table 3-9: Preferred Enplanement Forecast

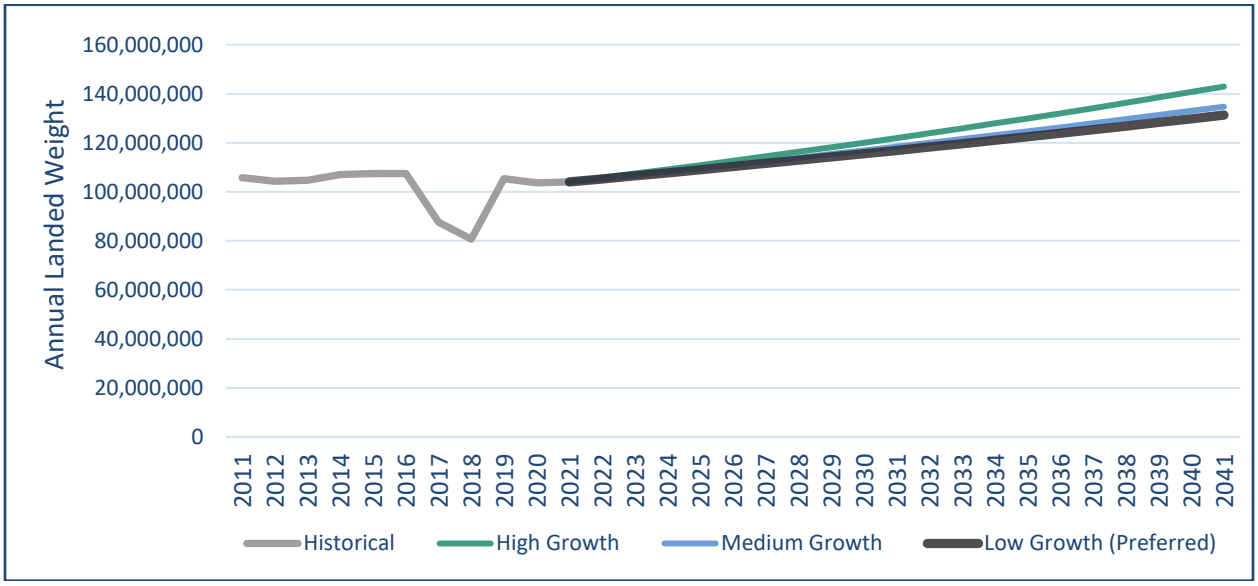
Year	Preferred Forecast	2020 FAA TAF	Variance
2021	764,627	562,789	35.9%
2026	1,055,606	964,015	9.5%
2031	1,126,028	1,034,958	8.8%
2036	1,201,148	1,104,349	8.8%
2041	1,281,280	1,168,161	9.7%
Average Annual Growth Rate			
2021 - 2041	2.6%	3.7%	

Source: Jviation, a Woolpert Company, and FAA TAF

Projections of Air Cargo Volume

A similar broad range of methodologies were applied to air cargo landed weight to forecast 20-year levels at COS. **Figure 3-17** presents the high, medium, and low growth scenarios resulting from the application of those methodologies. The FAA does not forecast individual airport air cargo activity or volume, so there are no TAF projections nor recommended tolerances to consider. As shown, there is less variance between the cargo scenarios as compared to the enplanement scenarios.

Figure 3-17: Scenario-Based Air Cargo Forecast 2021-2041



Source: Jviation, A Woolpert Company

The three growth scenarios selected for air cargo landed weight are described below:

1. **High-Growth Scenario** – The high-growth scenario begins at the projected 2021 baseline landed weight and then grows through 2041 at the FAA average annual forecast domestic air cargo carrier revenue ton-miles growth rate of 1.6 percent. National trends of air cargo paint a general picture of the industry and are thus applicable to COS. Air cargo volume in this scenario is projected to grow slightly more than the other scenarios, resulting in a projected 143 million landed pounds by 2041. Increased use of COS for air cargo flights would be required to reach this volume, which is about 35 percent more than current day levels. This forecast is indicative of a significant expansion of the COS air cargo market area, with possible air cargo hub activity and/or a new entrant.

2. **Medium-Growth Scenario** – This scenario is based on the projected population growth in the market area at a 1.3 percent average annual growth rate throughout the 20-year planning period. This growth scenario projects a total of nearly 135 million pounds of landed air cargo weight by the year 2041.

3. **Low-Growth Scenario** – This scenario is based on the forecasted employment growth in the COS market area, as projected by the Colorado DOLA. The market area forecasted employment methodology represents a 1.2 percent average annual growth rate. This forecast applies the expected growth in market area employment to the baseline COS cargo landed weight to project an expected level of over 131 million pounds by 2041. This scenario may require expanded service at COS that would come with a growth in the local population and employment base. Based on the focus of growth within the region and the integration of employment as a common forecasting variable, it is reasonable to include this as one of the scenarios representing COS's potential future growth.

Preferred Air Cargo Forecast

The Medium-Growth Scenario (Market Area Forecasted Population Growth) was selected as the preferred forecast since it considers anticipated growth generated by market area population and the general growth of the region. Population within the region likely has a strong correlation to the demand for air cargo service at COS. As the area expands and demand for goods grows, so too will the need for reliable, convenient, and effective air cargo service. The preferred air cargo forecast for short-, medium-, and long-term intervals within the 20-planning horizon is shown in **Table 3-10**.

Table 3-10: Preferred Air Cargo Forecast

Year	Preferred Forecast
2021	104,047,500
2026	110,988,729
2031	118,393,021
2036	126,291,270
2041	134,716,427
Average Annual Growth Rate	
2021 - 2041	1.3%

Source: Jviation, a Woolpert Company

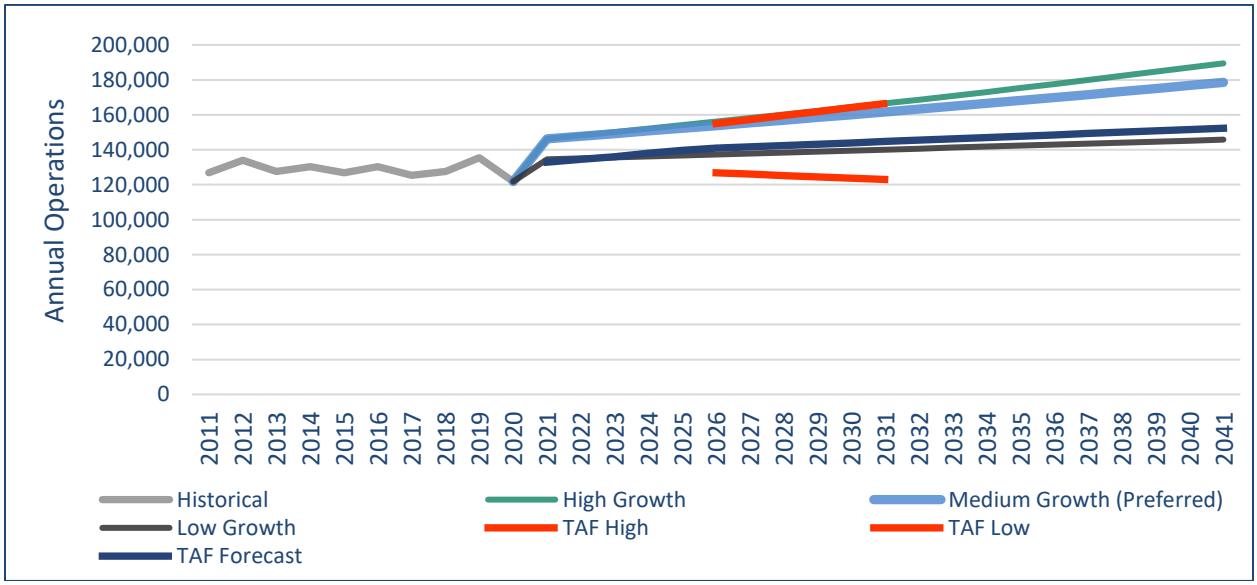
Projections of Aircraft Operations

Generally, the most important activity forecast for airfield planning is the level and type of aircraft demand generated at the airport, which is measured by aircraft operations. An aircraft operation is defined as either a takeoff or a landing of an aircraft, and ultimately serves as the basis for selecting the critical aircraft, discussed later in the chapter. Due to the impacts on airport operations resulting from the pandemic, a customized methodology was employed to establish the

baseline number of aircraft operations at COS for 2021. To help ensure this baseline was consistent with historical patterns while also not disregarding the potential impacts of the pandemic, a correlation of the actual COS operational counts (from January through June of 2021) was drawn with those over similar months over the previous five years. This resulted in a determination that January through June represented an average of 46 percent of the total annual operations experienced at COS. Based on this, the 2021 baseline aircraft operational level for COS was established as 146,322 operations. Note that this total is consistent with previous years while also accounting for the increase in general aviation operations experienced due to the pandemic.

Based on the forecast methodologies presented in a previous section, three aircraft operational forecast scenarios for COS were identified and forecasts were generated. These are shown in **Figure 3-18** and represent the range of forecasting options.

Figure 3-18: Scenario-Based Aircraft Operations Forecast 2021-2041



Source: Jviation, A Woolpert Company

The three growth scenarios selected for total aircraft operations at COS are described below:

1. **<u>High-Growth Scenario</u>** – This scenario is based on the forecasted population growth for the market area over the 20-year planning period and represents a 1.3 percent average annual growth rate. The forecast assumes aircraft activity will increase at a rate consistent with the number of residents in the area. Growth to this degree would likely be consistent with airline expansion, business jet growth, and increased mission activity from Peterson Space Force Base. This growth scenario projects a total of approximately 189,000 total aircraft operations by the year 2041, which exceeds the TAF thresholds.

2. **Medium-Growth Scenario** – This scenario is based on the FAA's forecast of total hours flown by all aircraft in the country and represents a 1.0 percent average annual growth rate. It is symbolic of the expected growth of all categories of aviation and incorporates the utilization of aircraft by their owners. Application of this scenario's growth rate to the current COS operation levels results in approximately 175,000 annual aircraft operations by 2041. This scenario may require some level of expanded service, as well as increased based aircraft and military activity, but to a lesser degree than the high-growth scenario. This forecast is consistent with the projections found in the FAA TAF.

3. **Low-Growth Scenario** – Historic aviation levels are often a strong predictor for future activity. This scenario starts with a lower baseline level of operations of 134,616 aircraft operations for 2021 which is equal to the first six months accounting for 50 percent of the annual total rather than the 46 percent derived based on the five-year historical average. (This modification reflects the potential that the second half of 2021 will result in less aggressive activity levels than those included in the previous scenarios). The operations then increase based on the rate (0.4 percent annually) that aircraft operations increased at the Airport from 2011 through 2020. Total COS aircraft operations projected under this scenario result in approximately 146,000 by 2041. This scenario is within the thresholds for the short- and medium-term found in the TAF.

Preferred Aircraft Operations Forecast

The Medium-Growth Scenario (Hours Flown) was selected as the preferred forecast since hours flown is one of the best correlations of operational activity levels. While some categories of activity at COS may decline during the 20-year planning period, others will increase and counteract any declining segments (as seen in 2020 with fewer military operations offset by higher general aviation operational counts). Operations will also increase from expanded transient activity, increased usage of local based aircraft, as well as the addition of more based aircraft at the Airport.

A comparison of the preferred aircraft operations forecast for short, medium, and long term intervals with the 2020 FAA TAF has been provided in **Table 3-11**. As with the enplanement projections, the FAA requires that operational forecasts present their consistency with the existing TAF or demonstrate the rationale of any significant deviation. As shown below, the preferred aircraft operations forecast lies within the TAF thresholds and therefore no additional rationale is required to be provided to the FAA.

Table 3-11: Preferred Operations Forecast

Year	Preferred Forecast	2020 FAA TAF	Variance
2021	146,322	132,911	10.1%
2026	153,787	140,905	9.1%
2031	161,631	144,701	11.7%
2036	169,875	148,532	14.4%
2041	178,541	152,311	17.2%
Average Annual Growth Rate			
2021 - 2041	1.0%	0.7%	

Source: Jviation

Breakdown of Aircraft Operations by Category

Breaking down future aircraft operations by category (e.g., air carrier, air taxi, general aviation, and military) provides additional definition to the forecasted levels of operations. By applying historical market share percentages as well as possible changes in the classification of aircraft and focus of aviation by particular COS user groups, estimated operations by category were established and are shown in **Table 3-12.**

Table 3-12: Operations Forecast by Category

Year	Air Carrier	% Air Carrier	Air Taxi	% Air Taxi	General Aviation	% General Aviation	Military	% Military	Total
2021	13,169	9%	14,632	10%	86,330	59%	32,191	22%	146,322
2026	16,917	11%	13,841	9%	86,121	56%	36,909	24%	153,787
2031	19,396	12%	12,930	8%	88,897	55%	40,408	25%	161,631
2036	22,084	13%	11,891	7%	91,733	54%	44,168	26%	169,875
2041	24,996	14%	10,712	6%	94,627	53%	48,206	27%	178,541
Average Annual Growth Rate									
2021 - 2041	3.3%	-	-1.5%	-	0.5%	-	2.0%	-	1.0%

Source: Jviation, a Woolpert Company

Air Carrier

As the region continues to grow and the demand for air service increases, the number of air carrier operations will likely expand accordingly (the addition of Southwest Airlines has already resulted in new air carrier operations). COS has had longstanding commercial passenger service and the region has demonstrated that demand for reliable scheduled service is significant enough to support multiple air carriers. As air carriers in general focus on becoming more efficient and profitable, larger aircraft will become a more prevalent element of the airlines' aircraft fleets. Aircraft such as the Boeing 737, Airbus A319 and A320, and larger regional jets (60+ seats) are anticipated to increase in frequency throughout the 20-year period. It is also estimated that air carrier aircraft will increase their share of total aircraft operations at COS from 9 percent to 14 percent.

Air Taxi

Air taxi and commuter operations consist of unscheduled operations of "for hire" air taxis and the scheduled operations of commuter airlines, including regional affiliate airlines operating aircraft with fewer than 60 seats. Regional and commuter airlines continue to transition from 50-60 passenger seat aircraft to 70+ passenger seat aircraft, which effectively shifts larger commuter aircraft from the air taxi category to the air carrier category. This transition is evident in the forecasted declining percentage of air taxi operations within the COS fleet mix. While there may continue to be a significant number of operations in this category throughout the planning period, their percent share of total operations at COS will likely decline significantly. However, much of this decline will result from the categorization of aircraft and not an actual reduction in passenger demand. Airlines will simply be using larger aircraft in years ahead.

General Aviation

General aviation is the largest and most varied category of operations at COS. That trend is expected to continue, although with a different focus. As national trends continue of increasing business jet operations and declining smaller private/recreational aircraft operations, the general aviation landscape at COS will likely change accordingly. The share of general aviation operations at COS increased dramatically from 54 percent in 2019 to 63 percent in 2020. It is anticipated that this increased share will slowly regress to pre-pandemic levels, but nevertheless remain more than half of all COS operations throughout the planning period.

Military

The role of the military at COS is difficult to predict given the uncertainty of mission priorities and Department of Defense objectives. With PSFB being home to the 21st Space Wing (among other groups) and the 302nd Airlift Wing (Reserve), there is a strong probability that military operations at COS could expand in the future. The share of military operations at the Airport decreased in 2020, falling from 25 percent in 2019 down to 22 percent in 2020. It is expected that military operations at COS will return to pre-pandemic levels in the upcoming years. Given this likelihood and the on-going interest by PSFB to expand into areas surrounding the Airport, the share of future military operations at COS are estimated to increase to 27 percent by the year 2041.

Split of Local and Itinerant Operations

This forecast also includes a breakdown of forecasted operations into local and transient activities. Local operations are those performed by aircraft that are based at COS and operate in the local traffic pattern and/or within sight of the Airport. These operations also include simulated instrument approach flight training and departures to or arrivals from practice areas within a 20-mile distance from the Airport. Itinerant or transient operations are operations by aircraft that leave the local airspace, including those based at other airports. The

results from the preferred scenarios for local and itinerant operations at COS for the planning period (2021-2041) are presented in **Table 3-13.** Any variation in the percentage split between local and itinerant operations over time would be an indication of a change in nature of operations at an airport. Since no such fundamental changes are anticipated at COS, the percentages are projected to remain static throughout the planning period.

Table 3-13: Local and Itinerant Spilt

Year	Local	Itinerant	Total
2021	39,507	106,815	146,322
2026	41,522	112,265	153,787
2031	43,640	117,991	161,631
2036	45,866	124,009	169,875
2041	48,206	130,335	178,541
Percent Share	27%	73%	

Source: Jviation, a Woolpert Company

Operations by Runway End

By using annual flight track data collected as part of the 2019 COS Land Use Study, it is possible to estimate the number of existing and forecasted operations by runway end at COS. The results of this analysis are presented below in **Table 3-14** and reflect a full year (Oct 2018 to Sept 2019) of flight track data from the FAA to estimate the overall percentage of use for each runway at the Airport. The percentages of existing use have been applied to future years to predict the number of operations for each runway end at key points within the planning period.

Table 3-14: Operations by Runway End

Year	Runway 13	Runway 31	Runway 17L	Runway 17R	Runway 35L	Runway 35R	
	5%	4%	26%	29%	18%	18%	Total
2021	7,316	5,853	38,044	42,433	26,338	26,338	146,322
2026	7,689	6,151	39,985	44,598	27,682	27,682	153,787
2031	8,082	6,465	42,024	46,873	29,094	29,094	161,631
2036	8,494	6,795	44,168	49,264	30,578	30,578	169,875
2041	8,927	7,142	46,421	51,777	32,137	32,137	178,541

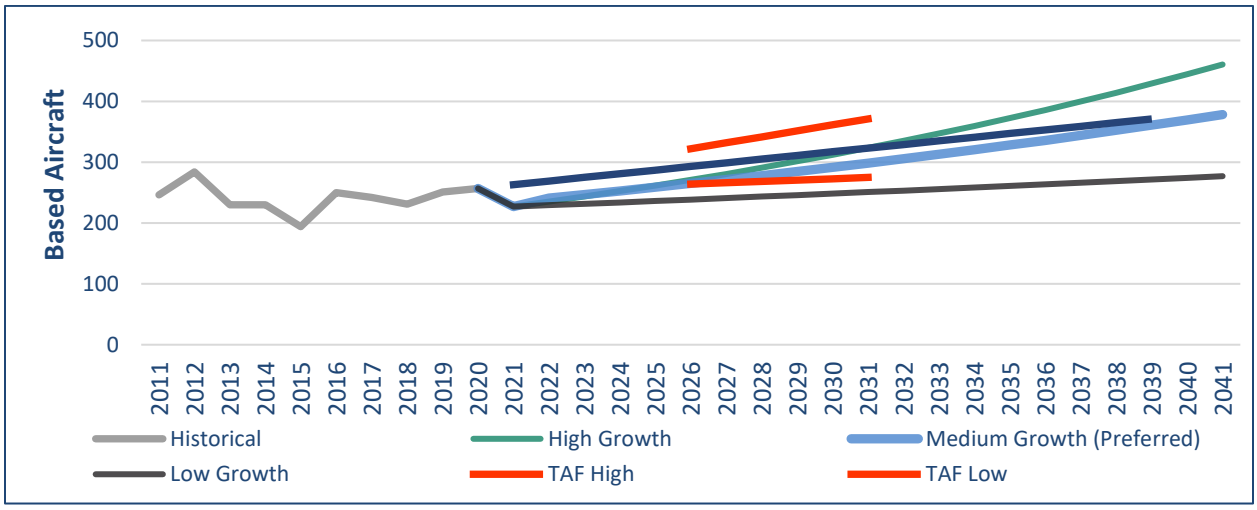
Source: Jviation, a Woolpert Company, ATAC

Based Aircraft Projections

The based aircraft forecast helps determine the future activity levels and the potential requirement for expanded or improved airport facilities. Based aircraft are defined as those that are permanently stored at an airport. Estimating the number and types of aircraft expected to be based at COS over the 20-year study period will impact the planning for future Airport facility and infrastructure requirements, particularly as they relate to general aviation activities. As the number of aircraft based at an airport increases, so too does the aircraft storage required as well as supporting infrastructure and services.

According to the Airport's Master Record (FAA Form 5010), COS currently has 227 based aircraft, which was used as the 2021 baseline for projecting future based aircraft totals. The overall number of based aircraft at COS decreased by 24 from 2019 to 2021, with 12 being military aircraft. The precise reasons for this reduction are unknown, but based on recent inquiries at the Airport, a return to pre-pandemic levels of based aircraft is anticipated. The results of the scenario range for based aircraft at COS over the planning period are presented graphically below in **Figure 3-19**.

Figure 3-19: Scenario-Based Based Aircraft Forecast 2021-2041



Source: Jviation, a Woolpert Company

The three forecasts shown above were selected to represent high-, medium-, and low-growth based aircraft forecast scenarios. These are reflected in the following:

1. **High-Growth Scenario** – This scenario is based on the FAA Forecast Jet-A Fuel Flowage growth rate (3.6 percent average annual growth rate). This growth rate represents regional socioeconomic data projections and national aviation industry expectations for Jet-A fuel sales (reflecting the growth of turbine aircraft based at COS). This is the most optimistic scenario, projecting based aircraft at the Airport to reach 460 by 2041. To accommodate this growth, the Airport would require a significant amount of capital improvements, mainly in the form of new hangars and associated infrastructure.

2. **Medium-Growth Scenario** – Following the drop in the number of based aircraft over the past year, this scenario assumes a rebound over the next year (from 227 to 241) as roughly half of the departed aircraft return during pandemic recovery. After 2022, based aircraft are then forecasted to grow at 2.4 percent average annual rate based on the FAA forecast of national terminal radar approach control facility (TRACON) operations from 2021 to 2041. Note that based aircraft and the number of aircraft operations are typically highly correlated, so as TRACON operations, it is reasonable to assume that the number of based aircraft will increase proportionally. There

is a TRACON located at COS as well as nearby DEN and in Aspen that provide very accurate data for the area market. This scenario is notably more conservative than the high-growth scenario (projecting 378 based aircraft by 2041) and is consistent with the short- and medium-term projections found in the FAA TAF.

3. **Low-Growth Scenario** – This scenario is based on the FAA's forecast of total hours flown by all aircraft in the country. It is symbolic of the expected growth of all categories of aviation and incorporates the utilization of aircraft by their owners. The FAA hours flown methodology represents a 1.0 percent average annual growth rate. In applying this growth rate to the current number of based aircraft at COS, it is projected that based aircraft will increase to 272 aircraft by 2041. This projection falls below the FAA TAF thresholds.

Preferred Based Aircraft Forecast

The Medium-Growth model (TRACON Operations) was selected as the preferred forecast for the total based aircraft fleet at COS. The total based aircraft projected for COS over the planning period were then allocated to six general aircraft categories (single-engine piston, multi-engine piston, turbine/jet, military, helicopter, and other) to develop a projection of COS's based aircraft fleet mix throughout the planning period. The existing fleet mix was developed based on the fleet mix percentages reported by the Airport Master Record in August 2021. Through the forecasting process, and based on anticipated migrations of the fleet, those percentages are anticipated to change over the long-term. Those based aircraft totals and fleet mix percentages for COS are shown in **Table 3-15.**

Table 3-15: Based Aircraft Forecast by Type

Year	2021	2026	2031	2036	2041
Single Engine	154	164	167	175	189
Percent of Total	68%	62%	56%	52%	50%
Multi-Engine	35	32	39	44	42
Percent of Total	15%	12%	13%	13%	11%
Jet/Turboprop	22	34	48	60	72
Percent of Total	10%	13%	16%	18%	19%
Helicopter	2	6	7	10	15
Percent of Total	1%	2.4%	2.4%	3%	4%
Glider/Other	2	2	2	3	4
Percent of Total	0.9%	0.6%	0.6%	1%	1%
Military	12	26	36	44	57
Percent of Total	5%	10%	12%	13%	15%
Total Aircraft	**227**	**265**	**298**	**336**	**378**

Source: Jviation, a Woolpert Company

Given the business development opportunities being presented in this business-friendly community through proactive economic initiatives, projected population and economic growth, and the anticipated resultant market area benefits, it is likely that COS will follow, if not exceed, national trends with respect to aircraft

market share and experience an influx of business aircraft and helicopters. The fleet mix projection shows an increasing role for turbines/jets at the Airport over the planning period, which is consistent with FAA projections within the general aviation market segment where the declining market share of single and multi-engine piston aircraft will be replaced by turbines/jet aircraft used for business travel. The forecast also includes an increase in military presence and activity at COS.

Peaking Characteristics

Peak period activity is important in the process of determining the facility requirements at an airport in that it helps determine the optimum sizing of terminal facilities, landside facilities, airfield capacities, and other considerations. In this analysis, three specific peak periods were used to determine what size facilities may be needed to meet forecasted demand; these included peak month, average day of the peak month, and peak hour operations and enplanements. Following are definitions of each:

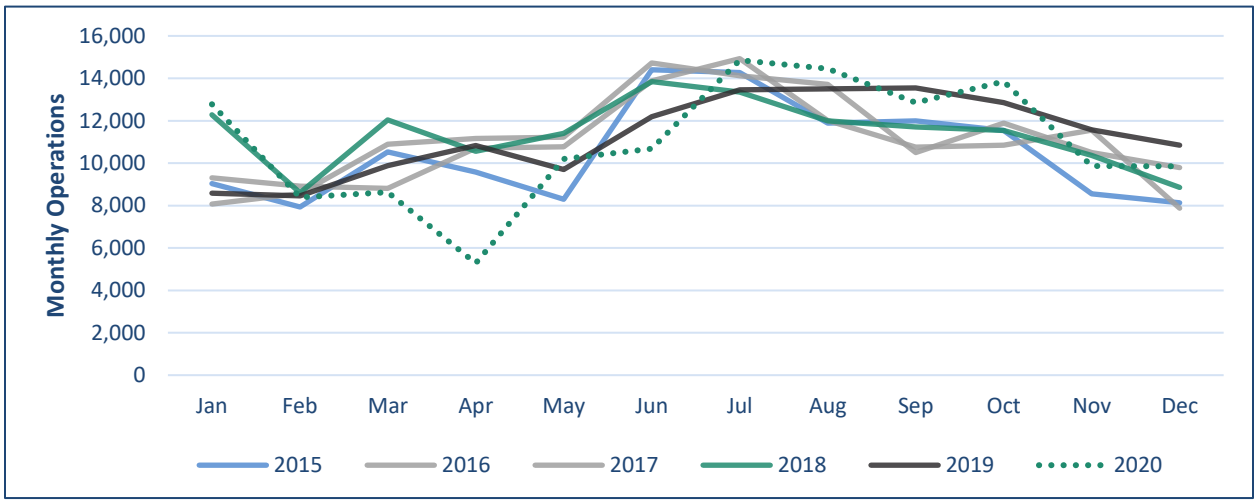
- **Peak Month:** The month during which the most aircraft operations/enplanements occur.
- **Peak Month Average Day (PMAD):** Aircraft and passenger activity that can be expected on a typical day during the peak month.
- **Peak Hour:** The hour during which most activity occurs within the average day of the peak month.

These peaking characteristics are estimated for aircraft operations and passenger activity for current levels as well the planning period years of 2026, 2031, 2036, and 2041.

Seasonality of Operations

Determining the seasonality of operations is an important part of determining the peak level of activity for an airport. **Figure 3-20** illustrates the seasonal characteristics of operations at COS over the past five years. Specifically, the figure shows that the June/July timeframe is typically the peak season of flight activity with the share of operations during those months averaging 11 percent of annual operations. Activity slightly declines during the winter months and typically represents six to seven percent of annual operations.

Figure 3-20: Seasonality of Total Operations 2015-2020



Source: Airport records

Peak Aircraft Operations

Airport traffic displays peaking characteristics by month of the year, by day of the week, and by the hour of the day. Operational traffic levels at COS are fairly spread out over the year, although summer months represent the busiest season due to increased summer vacation leisure travel and fair-weather flying conditions. Total PMAD operations are projected to increase from an estimated 485 to 640 over the course of the planning period.

Table 3-16 shows the peak period operations for each category of traffic at COS: Air Carrier/Air Taxi (combined), General Aviation, and Military. During the development of peak hour estimates, discussions with the Air Traffic Control Tower (ATCT) revealed strong operational peak periods during the morning hours followed by slower periods until the afternoon. Based on this information as well as generalized planning standards that suggests that 12 to 20 percent of daily activity be assigned to the peak hour, a 15 percent allocation was applied to PMAD level to determine peak hour levels for COS. By applying this methodology and calculating each segment of traffic, it was determined that the total peak hour PMAD operations were projected to increase from 80 to 98 from 2021 to 2041.

Table 3-16: Peak Period Operations Projections

Category / Year	Annual	Peak Month	Average Day	Peak Hour
Air Carrier & Air Taxi				
2021	27,801	3,058	102	15
2026	30,757	3,383	113	17
2031	32,326	3,556	119	18
2036	33,975	3,737	125	19
2041	35,708	3,928	131	20
General Aviation				
2021	86,330	9,496	317	47
2026	86,121	9,473	316	47
2031	88,897	9,779	326	49
2036	91,733	10,091	336	50
2041	94,627	10,409	347	52
Military				
2021	32,191	3,541	118	18
2026	36,909	4,060	135	20
2031	40,408	4,445	148	22
2036	44,168	4,858	162	24
2041	48,206	5,303	177	27
Total Operations				
2021	146,322	16,095	537	80
2026	153,787	16,917	564	85
2031	161,631	17,779	593	89
2036	169,875	18,686	623	93
2041	178,541	19,640	655	98

Source: Jviation, a Woolpert Company, Airport records, ATCT

Peak Hour Enplanements

Peak hour enplanements are determined in a similar way as operations but differ in that they are based on an understanding and application of airline schedules. Hourly flight data was collected from airline schedules for select days in 2019 and 2021. Similar to operations, airline enplanement data show June and July as being the busiest passenger travel months in the year, accommodating approximately 10 percent of all passenger enplanements occurring during each of those summer months.

Applying daily airline schedule data to PMAD enplanements results in peak hour passengers representing 20 percent of the total daily passenger activity, with most typically occurring in the morning (6 am-12 pm). Using those measures, the combined air carrier and air taxi peak hour enplanements were calculated and have been presented in **Table 3-17.** In short, peak hour enplanements are expected to grow from 510 passengers in 2021 to 748 passengers by the year 2041.

Table 3-17: Peak Period Enplanement Projections

Category / Year	Annual Enplanements	Peak Month	Peak Month Average Day	Peak Hour
Air Carrier & Air Taxi				
2021	764,627	76,463	2,549	510
2026	1,055,606	91,076	3,036	607
2031	1,126,028	97,632	3,254	651
2036	1,201,148	104,660	3,489	698
2041	1,281,280	112,195	3,740	748

Source: Jviation, a Woolpert Company, Airport records, airline schedules

Critical Aircraft Determination

The ultimate design and development of airport facilities is directly impacted by the demand for those facilities. Aircraft-related activities (in the form of based aircraft, operational levels, and types of operations) typically serve as the basis for that demand since aircraft tend to generate the most challenging and specific operational requirements. In general, airport infrastructure components are designed to accommodate the most demanding aircraft type that will utilize the infrastructure on a regular basis. The FAA refers to this aircraft type as the Critical Design Aircraft, which it defines as being the most demanding airplane, or family of airplanes, that accounts for at least 500 annual itinerant operations.

This Critical Design Aircraft designation is important since it will serve as the basis of the Airport Reference Code (ARC) and/or Runway Design Code (RDC), which are facility classification systems given to aircraft (and are discussed in detail in the next chapter). The letters associated with the ARC and RDC represent the Aircraft Approach Category (AAC) and range from A through E that represent progressively faster landing airspeeds, with "A" being the slowest. Similarly, the Airplane Design Group (ADG) of the ARC and RDC is reflected by roman numerals that represent aircraft wingspans and tail heights, with "I" being the smallest wingspan and lowest tail height (see **Figure 3-21** below for examples). The FAA utilizes this classification system to apply specific airport design criteria that are appropriate for the operational and physical characteristics of the aircraft types operating at that airport.

To project the current and future Critical Design Aircraft for COS, an itinerant aircraft operations analysis was conducted. As presented in **Table 3-18**, aircraft operations data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to evaluate historical operations at COS in order to identify an appropriate Critical Design Aircraft. The TFMSC data represents actual flights recorded and validated by the FAA through means of flight plans, instrument flight operations, and/or other radar-based tracking applications. It is the most accurate FAA flight data publicly available and identifies aircraft type, flight dates, flight origins and destinations, among other metrics. (It should be noted that in 2020, there were 1,803 records in the TMFSC data that did not contain ARC and/or ADG categories – they were labeled as "no data.")

Figure 3-21: ARC/RDC Aircraft Examples

Source: FAA

Table 3-18: COS TFMSC Counts (2015-2020)

	2015	2016	2017	2018	2019	2020
ARC/RDC						
A-I	3,197	2,636	2,765	2,953	3,229	2,971
A-II	621	504	518	506	617	669
A-III	0	2	3	5	4	4
B-I	3,068	3,238	2,574	3,076	3,289	3,115
B-II	4,836	4,724	4,900	4,965	5,245	4,637
B-III	943	70	24	33	56	35
B-IV	399	403	330	277	347	302
C-I	792	829	881	855	660	672
C-II	11,388	11,716	10,935	12,904	13,365	7,952
C-III	4,730	6,424	9,400	7,879	7,104	4,188
C-IV	3,195	2,738	2,664	2,434	2,753	1,929
C-V	16	14	37	52	39	30
C-VI	13	50	63	52	40	0
D-I	1,044	1,237	1,292	1,007	782	464
D-II	205	227	184	162	173	104
D-III	2,306	2,303	3,063	3,448	3,352	1,534
D-IV	16	38	23	45	29	18
D-V	79	45	51	52	92	18
TOTAL	**36,848**	**37,198**	**39,707**	**40,705**	**41,176**	**28,642**
Approach Category						
A	3,818	3,142	3,286	3,464	3,850	3,644
B	9,246	8,435	7,828	8,351	8,937	8,089
C	20,134	21,771	23,980	24,176	23,961	14,771
D	3,650	3,850	4,613	4,714	4,428	2,138
TOTAL	**36,848**	**37,198**	**39,707**	**40,705**	**41,176**	**28,642**
Design Group						
I	8,101	7,940	7,512	7,891	7,960	7,222
II	17,050	17,171	16,537	18,537	19,400	13,362
III	7,979	8,799	12,490	11,365	10,516	5,761
IV	3,610	3,179	3,017	2,756	3,129	2,249
V	95	59	88	104	131	48
VI	13	50	63	52	40	0
TOTAL	**36,848**	**37,198**	**39,707**	**40,705**	**41,176**	**28,642**

Source: FAA TFMSC

In reviewing the COS TFMSC data, several observations can be made:

- As expected in 2020, there was an overall decrease in larger regional jets operating at COS. The general trends of activity use by category aligned with previous years. The highest number of operations being experienced at COS is by RDC C-II aircraft, which is reflective of medium and large corporate aircraft as well as regional jets used in commercial air carrier and air taxi service. This has been historically the most predominant aircraft type using the Airport.

- Prior to the pandemic, the Airport was accommodating roughly 28,000 annual approach category C and D aircraft operations, up from approximately

24,000 in 2015. Currently, the D-III (737-800) and C-IV (757-200) designations are the most operationally demanding single ARC types that meet the FAA's 500-annual itinerant operation threshold. This trend is anticipated to continue into future years.

- As it has historically, COS will continue to occasionally accommodate more demanding aircraft than the established Critical Design Aircraft. These can include much larger aircraft such as Boeing 747 and 777 aircraft; however, while these are admittedly more demanding aircraft, they do not operate at a frequency great enough (i.e., 500 annual itinerant operations) to warrant facility design changes at the Airport. Yet when considering the most demanding aircraft type and calculating the annual itinerant operational threshold, the FAA does allow for those more demanding aircraft types to be included in lesser demanding aircraft operational totals as a means of incorporating their occasional use into the overall calculation.

Greater examination of the TFMSC data also shows that aircraft in the D approach category and IV design group, individually, consistently exceed the 500-annual itinerant level threshold. In lieu of identifying a specific critical design aircraft, the FAA also allows for the grouping of aircraft in the most demanding AAC and ADG to represent a composite critical design aircraft. With this methodology, the most demanding AAC that meets the 500-operational threshold is identified as being the representative AAC of the composite design aircraft as is the case with the most demanding ADG. As shown in the preceding table, there were 2,138 operations of Approach Category D aircraft in 2020 at COS, and more than double that in pre-pandemic 2019 (4,428). In 2020 there were 2,249 Design Group IV aircraft operations with significantly more in 2019 as well (3,129).

With respect to identifying a particular aircraft model to serve as the representative of the Airport's Critical Design Aircraft, there is not one D-IV aircraft model that operates frequently enough at COS to meet the 500-annual operation threshold. However, through examination and application of the AAC and ADG components independently, a composite critical design aircraft with an ARC/RDC designation of D-IV is well supported. A common aircraft within this ARC is the Boeing 757, Boeing 767, and MD-11 and will be used as the Airport's existing ARC and RDC.

While historical trends and recent data can provide a good perspective on the current conditions at an airport, the Critical Design Aircraft determination must also consider patterns forecasted to occur within the planning period. When operational growth rates are applied to the FAA TFMSC data for COS, the results continue to show an ARC/RDC of D-IV throughout the 20-year planning period. Operations by larger aircraft operations will continue to increase, but not to a level justifying a higher ARC/RDC.

Summary

It is anticipated that COS will experience moderate growth during the 20-year planning period that generally reflects the regional aviation industry trends and the socioeconomic development growth of the area. Most market demographic trends indicate that the Airport will outpace prevailing national and state growth trends, while other key economic indicators project continued robust growth in the area economy, and by extension, business-related general aviation. Passenger enplanements are projected to grow from approximately 765,000 to over 1,281,000 by 2041, and the Airport will also realize an increase in the number of operations with more than 178,000 operations anticipated by the end of the planning period. Aircraft operations above that level could be experienced in future years should additional aviation businesses and airlines locate to the Airport. Based aircraft are expected to increase from 227 to 378 by 2041, which includes a continued shift in the fleet mix towards business aviation aircraft. **Table 3-19** summarizes the projections for the preferred forecast contained in this chapter.

As recognized previously, to secure FAA approval for the activity projections, FAA requires a comparison of the forecasts to the annually produced TAF. Specifically, the FAA looks at an airport's recommended passenger enplanements, based aircraft, and operations forecasts be within 10 percent of their five-year TAF and within 15 percent of their 10-year TAF. A comparison between the forecasts (included in the table below) shows that the preferred projections all lie within the FAA tolerances.

Table 3-19: Summary of Preferred Aviation Activity Forecasts

	2021	2026	2031	2036	2041
Enplanements					
Peak Hour	510	607	651	698	748
Annual	**764,627**	**1,055,606**	**1,126,028**	**1,201,148**	**1,281,280**
TAF	562,789	964,015	1,034,958	1,104,349	1,168,161
TAF Variance	35.9%	9.5%	8.8%	8.8%	9.7%
Cargo					
Landed Weight (lbs.)	**104,047,500**	**110,988,729**	**118,393,021**	**126,291,270**	**134,716,427**
Operations					
Category					
Air Carrier	13,169	16,917	19,396	22,084	24,996
Air Taxi	14,632	13,841	12,930	11,891	10,712
General Aviation	86,330	86,121	88,897	91,733	94,627
Military	32,191	36,909	40,408	44,168	48,206
TOTAL	**146,322**	**153,787**	**161,631**	**169,875**	**178,541**
TAF	132,911	140,905	144,701	148,532	152,311
TAF Variance	10.1%	9.1%	11.7%	14.4%	17.2%
Local vs. Itinerant					
Local Operations	39,507	41,522	43,640	45,866	48,206
Itinerant Operations	106,815	112,265	117,991	124,009	130,335
Peak Hour	**80**	**85**	**89**	**93**	**98**
Based Aircraft					
Type					
Single Engine	154	164	167	175	189
Multi-Engine	35	32	39	44	42
Jet/Turboprop	22	34	48	60	72
Helicopter	2	6	7	10	15
Glider/Other	2	2	2	3	4
Military	12	26	36	44	57
TOTAL	**227**	**265**	**298**	**336**	**378**
TAF	263	293	323	353	383
Variance	-13.7%	-9.6%	-7.6%	-4.8%	-1.3%

Source: Jviation, a Woolpert Company