Missoula
MONTANA AIRPORT

CHAPTER TWO:
FORECASTS

2.1 Introduction

The first step in planning for future facilities is to define the level of demand that can reasonably be expected to occur over the planning period. In the airport master planning process, this involves preparing forecasts of key aviation activity indicators that define the level of airport demand. Forecasts of commercial service and general aviation are used as the basis for facility planning, financial projections and environmental analysis.

The forecasts will be applied to several phases of the Airport Master Plan. Initially, they will be used to identify individual segments of future activity. They will then be used in the evaluation of airfield capacity, and the facility requirements of the airfield and the terminal area. From these evaluations, the need for new or improved facilities within the twenty-year planning period can be determined.

Aviation activity and the demand for aviation services can be affected by a variety of unforeseeable and unpredictable influences such as competition; local, regional, national and global economies; fuel supply volatility and pricing; and the implementation of effective airport sales and marketing programs. Planning and projecting aviation activities for a twenty-year planning period with absolute certainty is unrealistic. Therefore, it is important to remember that forecasts are to serve only as guidelines. Planning and development of improvements must remain a dynamic process, flexible enough to respond to unforeseen facility needs and service demands. Reviewing the airport's activity on a regular basis to determine if changes to the guidelines are necessary is a way to stay current with changing conditions and demands.

The following forecast analysis examines recent developments, historical information, and current aviation trends for the Missoula Montana Airport (MSO) to provide an updated set of passenger and operational projections. The intent of the Master Plan is to assist the Missoula County Airport Authority in making the adjustments necessary to ensure that the facility meets projected demands in an efficient and cost-effective manner.

2.2 National Aviation Trends

The Federal Aviation Administration (FAA) publishes its national aviation forecast each year which includes forecasts for major air carriers, regional/commuters and general aviation. The forecast uses the economic performance of the United States as an indicator of future aviation industry growth. The current edition at the time of this chapter's preparation was FAA Aerospace Forecast Fiscal Years 2022-2042. The following is excerpted from the Aerospace Forecast:

The U.S. airline industry underwent considerable restructuring since the 2007-2009 recession. Air carriers adopted a strategy of "capacity discipline", fine-tuning their business models to minimize losses by lowering operating costs, eliminating unprofitable routes, and grounding older, less fuel-efficient aircraft. To increase operating revenues, carriers initiated new services that customers were willing to purchase and started charging separately for services that were historically bundled in the price of a ticket. The industry also experienced an unprecedented period of consolidation with four major mergers in five years. The results of these efforts were impressive: 2019 marked the eleventh consecutive year of profitability for the U.S. airline industry.

The outbreak of the COVID-19 pandemic in 2020, however, brought a rapid and cataclysmic end to those boom years. Airline activity and profitability tumbled almost overnight and without the financial and competitive strength built up during the boom, airlines would have faced even greater challenges. As it was, they were able to slash capacity and costs, and then, relying on their balance sheets, credit ratings and value inherent in their brands, to raise capital through borrowing and restructuring fleets allowing them to withstand the period of losses. Although several small regional carriers ceased operations in 2020, no mainline carriers did.

By the middle of 2021, conditions and the outlook had brightened considerably. With the arrival of spring, the introduction of vaccines, and the lifting of some local restrictions, leisure travel began rebounding. Favored destinations remained concentrated in outdoor recreation spots, whether beach or mountain, and some recorded traffic levels higher than in 2019. The emergence of the COVID-19 variants in the second half of the year paused the recovery but generally didn't reverse it. Two new low-cost carriers were formed and one regional carrier that ceased operations in 2020 was reborn. By the third quarter, industry profitability was nearing the breakeven point.

The business modifications necessitated by the downturn will shape the industry for years to come, long after the recovery is complete. Primarily, airlines will be smaller having retired aircraft and encouraged voluntary employee separations. Fleets, however, become younger and more fuel-efficient as retirements targeted the oldest and the least efficient aircraft. As airlines carry high levels of debt, capital spending and investment will be restrained which in turn holds back future growth. And even the unbundling of services took a small step backwards as carriers eliminated change fees for all but Basic Economy tickets.

In the medium-term, airlines will be focused on trying to foretell the recovery in demand and position themselves to meet it. To date, that demand recovery has been extremely uneven across markets and population segments, driven by COVID-19 case counts, vaccinations, governmental restrictions and the degree of pent-up demand experienced by consumers and businesses. While domestic leisure traffic has led the recovery, domestic business travel is expected to gain momentum in 2022. International activity

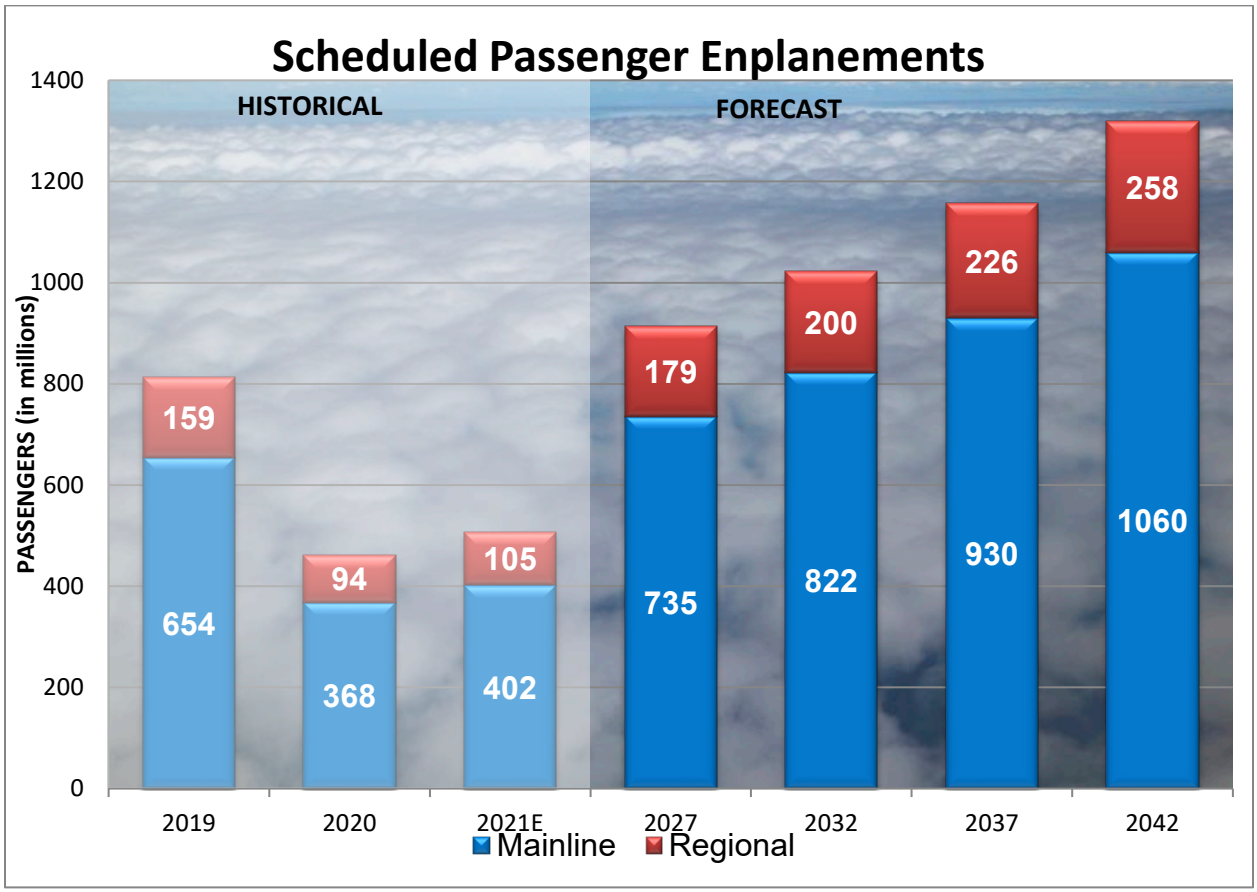
generally lags domestic as individual country experience with the pandemic is varying and shifting so widely.

Long-term, the strengths and capabilities developed over the past decade will become evident again. There is confidence that U.S. airlines have finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits. Pent-up demand is expected to drive the commercial operations back to the pre-COVID level by 2023, hence leading to the stronger growth in the commercial sector.

The unpredictable demand environment carriers faced in the previous two years improved in 2022. Driving the predictability was continued lifting of COVID-19 precautions, the working off of pent-up demand, and employees returning to offices as they became more comfortable with travelling again and employers finding ways to satisfy duty-of-care requirements. Increasingly predictable activity allowed carriers to return capacity to typical markets and reduce reliance on purely recreational destinations. Load factors and utilization rates rose and so did fares.

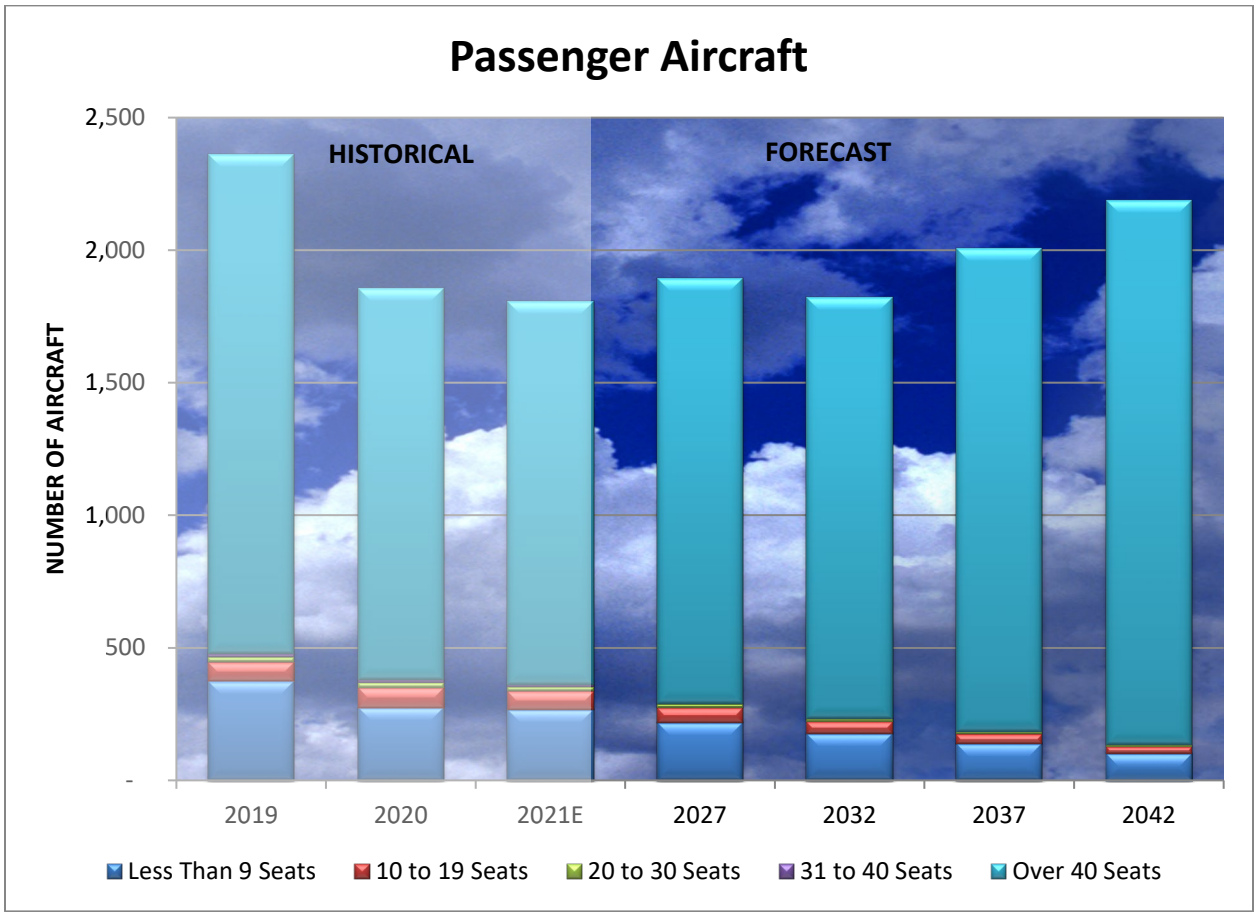
In the final recovery phase, activity approaches 2019 levels and industry conditions begin to normalize. Leisure travel has largely returned to pre-pandemic levels and business travel is steadily catching up. Carriers remain somewhat constrained by debt incurred to survive the crisis and forgo some capital investments in favor of strengthening their balance sheets. Throughout the recovery from the pandemic, several trends emerged that subsequently will, to greater or lesser extent, be reversed. Low-cost carriers targeting leisure travelers benefitted from relative strength in this segment. The sharp curtailment of business travel, on the other hand, impacted legacy carriers and those serving key business markets. And all carriers received a boost from low fuel prices that were due in part to reduced energy demand worldwide.

The 2022 FAA forecast calls for mainline U.S. carrier passenger growth over the next 20 years to average 3.7 percent per year with regional carriers growing at an average 3.8 percent per year. Regional carrier aircraft size is projected to continue to grow, with 70-90 seat regional jet aircraft entering the fleet and reductions in the 50 seat and under jet fleet. The changing aircraft fleet mix is narrowing the gap between the size and aircraft types operated by the mainline and regional carriers. **Figure 2-1** depicts passenger forecasts and **Figure 2-2** depicts fleet mix forecasts for Regional/Commuter Airlines from the 2022-2042 Aerospace Forecast.



Source: FAA Aerospace Forecast, FY 2022-2042, 2021 Estimated

Figure 2-1 U.S. Regional / Commuter Enplanements Forecasts

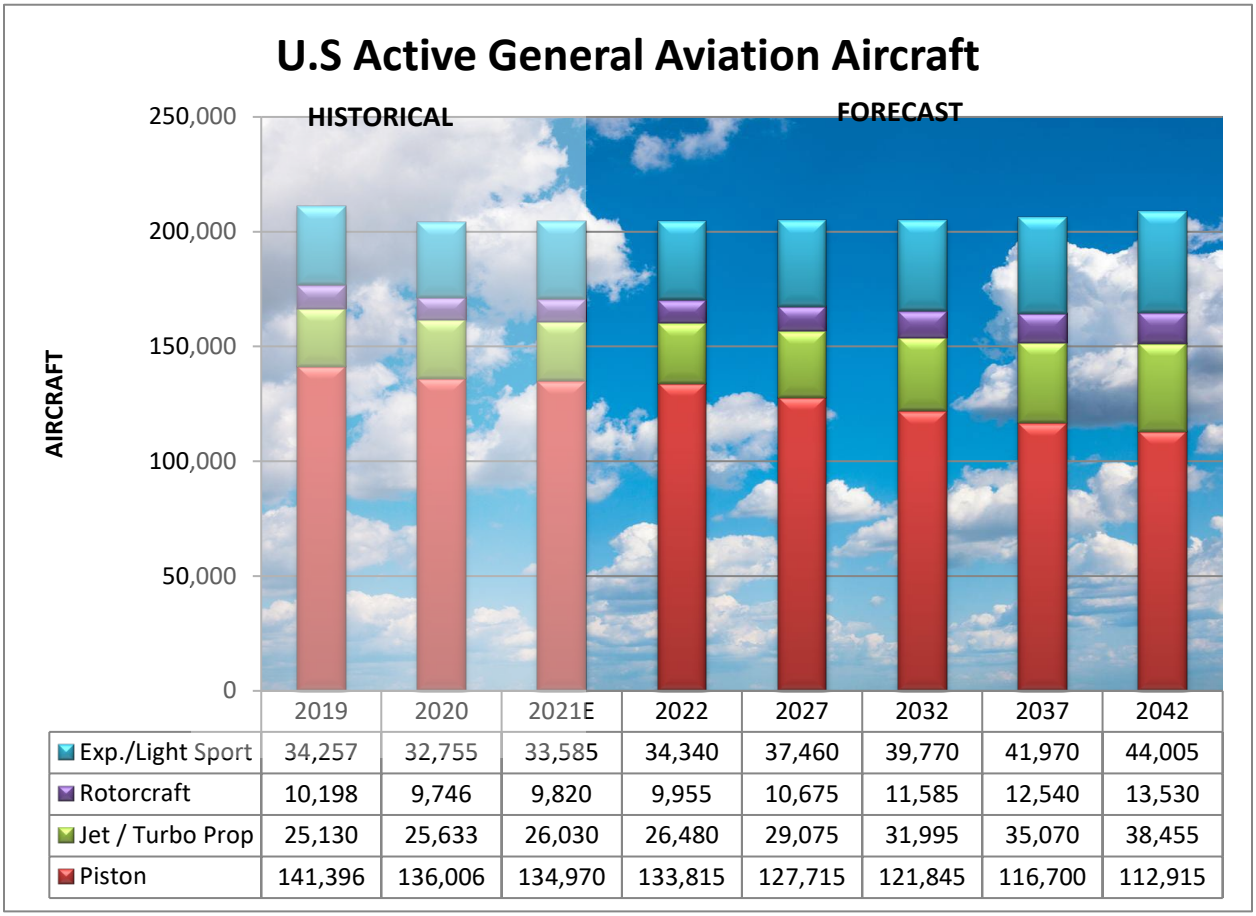


Source: FAA Aerospace Forecast, FY 2022-2042, 2021 Estimated

Figure 2-2 U.S. Regional / Commuter Aircraft Forecasts

Figure 2-3 depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts total general aviation active aircraft to remain around its current level over the next 20 years. Declines in the fixed-wing piston fleet are anticipated to be offset by increases in the turbine, experimental and light sport fleets. The more expensive and sophisticated turbine-powered fleet (including rotorcraft) is projected to grow at an average rate of 1.9 percent per year over the forecast period, with the turbojet fleet increasing 2.6 percent per year.

As indicated in the FAA forecast, the growth in U.S. Gross Domestic Product (GDP) and corporate profits are catalysts for the growth in the general aviation turbine fleet. The largest segment of the fleet, fixed wing piston aircraft, is predicted to shrink over the forecast period by 22,055 aircraft (an average annual rate of -0.8 percent). Unfavorable pilot demographics, overall increasing cost of aircraft ownership, coupled with new aircraft deliveries not keeping pace with retirements of the aging fleet are the drivers of the decline. On the other hand, the smallest category, light-sport-aircraft, (created in 2005), is forecast to grow by 3.5 percent annually, adding about 2,890 new aircraft by 2039, doubling its 2019 fleet size.

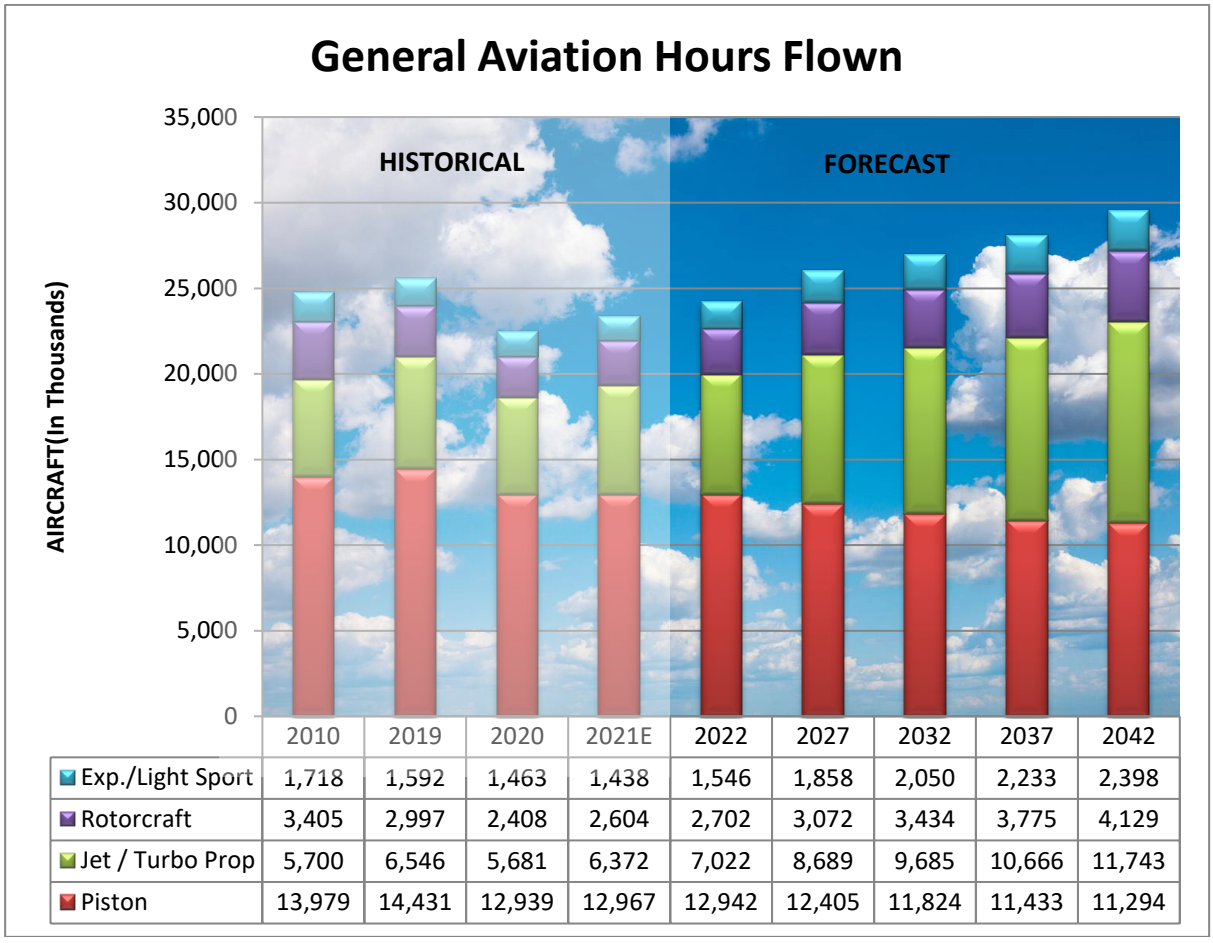


	2019	2020	2021E	2022	2027	2032	2037	2042
Exp./Light Sport	34,257	32,755	33,585	34,340	37,460	39,770	41,970	44,005
Rotorcraft	10,198	9,746	9,820	9,955	10,675	11,585	12,540	13,530
Jet / Turbo Prop	25,130	25,633	26,030	26,480	29,075	31,995	35,070	38,455
Piston	141,396	136,006	134,970	133,815	127,715	121,845	116,700	112,915

Source: FAA Aerospace Forecast, FY 2022-2042, 2021 Estimated

Figure 2-3 U.S. General Aviation Aircraft Forecasts

Although the total active general aviation fleet is projected to marginally increase, the number of general aviation hours flown is forecast to increase an average of 1.1 percent per year to 29.6 million through 2042 from 22.5 million in 2020, as the newer aircraft fly more hours each year. Fixed wing piston hours are forecast to decrease by 0.6 percent. Countering this trend, hours flown by turbine aircraft are forecast to increase 3.2 percent yearly over the forecast period. Jet aircraft are expected to account for most of the increase, with hours flown increasing at an average annual rate of 3.8 percent over the forecast period. The large increases in jet hours result mainly from the increasing size of the business jet fleet, along with estimated increases in utilization rates.



	2010	2019	2020	2021E	2022	2027	2032	2037	2042
Exp./Light Sport	1,718	1,592	1,463	1,438	1,546	1,858	2,050	2,233	2,398
Rotorcraft	3,405	2,997	2,408	2,604	2,702	3,072	3,434	3,775	4,129
Jet / Turbo Prop	5,700	6,546	5,681	6,372	7,022	8,689	9,685	10,666	11,743
Piston	13,979	14,431	12,939	12,967	12,942	12,405	11,824	11,433	11,294

Source: FAA Aerospace Forecast, FY 2022-2042, 2021 Estimated

Figure 2-4 U.S. General Aviation Hours Flown

The significance of these national trends is that they point to a general, but modest, growth within all sectors of the aviation industry and provide the basis for forecasting growth at MSO.

2.3 Airport Service Area

The airport service area is generally defined by the proximity of other airports providing similar services. For general aviation, the service area is generally more closely defined around the airport but will depend on the level of service and facilities needed by the specific user such as longer runways, air traffic control services and instrument capability. The analysis of the airport service area contained within this chapter focuses on the commercial service aspects.

The airport service area has been defined to include Missoula County and the eight adjacent counties of Mineral, Granite, Ravalli, Sanders, Lake and Powell counties in Montana, and Clearwater and Idaho Counties in Idaho. While the passenger service area may extend outside the boundaries of the defined service area, these nine counties are presumed to provide the source for the majority of locally originating passengers. There are several other large towns with competing air service facilities within an approximately 150-mile, straight-line distance from

MSO including those at Kalispell, Helena, Butte, Great Falls, and Lewiston, Idaho, while Bozeman and Spokane, Washington, are just beyond this 150-mile threshold. These competing facilities surround the Missoula service area to the east/southeast, north and west, while the nearest competing airports to the south are more than 200 miles distant in southern Idaho. Of these other regional facilities, Spokane, which is approximately 200 miles from Missoula by car, is by far the largest in terms of air service.

Local Population and Economy

Table 2-1 shows 2021 population estimates for the MSO service area. The projections reflect U.S. Census estimates for July 1, 2021.

Table 2-1 MSO Service Area Population, 2021

County	Population (2021)	% of Air Service Region
Missoula County, MT	119,533	47%
Ravalli County, MT	45,959	18%
Lake County, MT	32,033	13%
Idaho County ID	17,040	7%
Sanders County, MT	12,959	5%
Clearwater County, ID	8,895	3%
Powell County, MT	6,999	3%
Mineral County, MT	4,860	2%
Granite County, MT	6,999	3%
Service Area Population	**255,277**	

Source: US Census Bureau Population Estimates July 1, 2021

Table 2-2 shows historic census counts and population projections for the MSO Service Area through 2040. The projections were obtained from the Census & Economic Information Center (CEIC), Montana Department of Commerce for surrounding counties and from the Idaho Department of Labor for Idaho counties. Forecasts for 2040 were not available for Idaho County and Clearwater County in Idaho. Flat growth was assumed between 2030 and 2040 for these two counties based on historic and projected trends. In 2020 the U.S. Census estimated the population of the MSO service area at 245,695. Projections provided by the Montana CEIC and derived from the Idaho Department of Labor reflect a population for the Airport Service Area of about 283,826 in the year 2040. This represents a projected average annual growth rate of 0.78 percent over the planning period.

Table 2-2 MSO Service Area Population Projections

	Actual				Projected	
	1990	2000	2010	2020	2030	2040
Missoula County, MT	78,687	95,802	109,299	117,922	132,802	141,601
Ravalli County, MT	25,010	36,070	40,212	44,174	51,073	55,716
Lake County, MT	21,041	26,507	28,746	31,134	32,115	33,141
Idaho County ID	13,783	15,511	16,267	16,541	16,507	16,507
Sanders County, MT	8,669	10,227	11,413	12,400	12,693	12,967
Clearwater County, ID	8,505	8,930	8,761	8,734	8,746	8,746
Powell County, MT	6,620	7,180	7,027	6,946	7,625	8,425
Mineral County, MT	3,315	3,884	4,223	4,535	4,922	5,314
Granite County, MT	2,548	2,830	3,079	3,309	3,469	3,503
TOTAL	**168,178**	**206,941**	**229,027**	**245,695**	**269,952**	**285,920**
% Change Between Census Years		23.05%	10.67%	7.28%	9.87%	5.92%
State of Montana	**799,065**	**902,195**	**989,415**	**1,084,225**	**1,172,150**	**1,229,024**
% Change Between Census Years		12.91%	9.67%	9.58%	8.11%	4.85%
United States	**248,790,925**	**281,421,906**	**308,745,538**	**331,449,281**	**355,100,000**	**373,500,000**
% Change Between Census Years		13.12%	9.71%	7.35%	7.14%	5.18%

Sources: US Census Bureau 1990, 2000, 2010, 2020
US Projections, "Demographic Turning Points for the United States: Population Projections for 2020 to 2060"
2030, 2040 MT County & State Projections - CEIC, MT Department of Commerce
2030 ID County Projections - Idaho Department of Labor
* Note: 2040 Projections for ID Counties not Avialiable. Flat growth assumed 2030-2040 based on historic trends.

Additional detail on historical and expected population change is provided in **Table 1-3**. Over the most recent ten-year census period (2010-2020), the population in the MSO service area has grown slightly slower than that of Montana (7.28 percent vs. 9.58 percent). and just slightly more slowly than that of the United States (7.35 percent). Population projections for 2020-2030 and 2030-2040 indicate that the air service area will grow at a faster rate than both the State of Montana and the United States. At a sub-regional level, the fastest growth is forecast for Ravalli, and Missoula Counties, where increases of 15.62 percent and 12.62 percent, respectively, are expected for the 2020-2030 time period. Lake County, the third largest population center in the service area is projected to grow at a rate of 3.15 percent for this period. Increases of 9.09 percent, 6.63 percent, and 3.19 percent are anticipated for the 2030-2040 time frame. Most of the area of these three counties is within 50 miles of the airport and therefore represents strong population growth within the core of the service area. Conversely, the slowest growth is expected in Idaho County, Idaho, where negative population change is projected through 2030. The overall trend for the full-service area is expected to be positive.

Table 2-3 MSO Service Area Population Growth by County

	Change 2010-2020	Change 2020 - 2030	Change 2030 - 2040
Ravalli County, MT	9.85%	15.62%	9.09%
Missoula County, MT	7.89%	12.62%	6.63%
Powell County, MT	-1.15%	9.78%	10.49%
Mineral County, MT	7.39%	8.53%	7.96%
Granite County, MT	7.47%	4.84%	0.98%
Lake County, MT	8.31%	3.15%	3.19%
Sanders County, MT	8.65%	2.36%	2.16%
Clearwater County, ID	-0.31%	0.14%	0.00%
Idaho County ID	1.68%	-0.21%	0.00%
Service Area Overall	7.28%	9.87%	5.92%
State of Montana	9.58%	8.11%	4.85%
United States	7.35%	7.14%	5.18%

Sources: US Census Bureau 1990, 2000, 2010, 2020
US Projections, "Demographic Turning Points for the United States: Population Projetions for 2020 to 2060"
2030, 2040 MT County & State Projections - CEIC, MT Department of Commerce
2030 ID County Projections - Idaho Department of Labor

* Note: 2040 Projections for ID Counties Not Avialiable. Flat growth assumed 2030-2040 based on historic trends.

The economy of the Missoula Trade Area is dominated by service industries (including health care), government and retail. Health care in particular is one of the Missoula's fastest growing industries with St. Patrick's Hospital (western Montana's only level-II trauma center) and the Community Medical center being among the City of Missoula's largest employers behind the University of Montana. **Table 2-3** provides recent statistics on the civilian labor force and unemployment levels in the airport service area, the State of Montana and the United States. The data indicates that trends in job growth have been strong in the service area. Over the last five years, employment growth was 7.8 percent in the service area, in comparison with growth of 6.4 percent in the State of Montana and 0.8 percent in the United States. Unemployment rates also show positive trends. The average unemployment rate for the air service region (4.4 percent) is one percent higher than the State of Montana (3.4 percent) but one percent lower than the United States (5.4%). The unemployment rate for the air service region is falling at a rate faster than both the State of Montana and the United States on average.

Table 2-3: Civilian Labor Force and Unemployment Rate

	Employment 2021	Employment Change 2016 - 2021	Unemployment Rate 2021	Unemployment Rate Change 2016 - 2021
Missoula County, MT	62,920	6.7%	3.4%	-12.8%
Ravalli County, MT	20,564	10.6%	3.6%	-28.0%
Lake County, MT	13,472	8.3%	3.8%	-22.4%
Idaho County ID	6,487	8.4%	4.9%	-10.9%
Sanders County, MT	4,955	13.2%	4.8%	-40.0%
Clearwater County, ID	2,837	0.2%	6.5%	-8.5%
Powell County, MT	2,903	6.8%	2.6%	-50.0%
Mineral County, MT	1,772	13.9%	5.3%	-32.1%
Granite County, MT	1,548	1.0%	4.4%	-27.9%
Air Service Region	**117,458**	**7.8%**	**4.4%**	**-26.5%**
State of Montana	**531,202**	**6.4%**	**3.4%**	**-20.9%**
United States	**152,586,000**	**0.8%**	**5.4%**	**10.2%**

Source: Bureau of Labor Statistics

Table 2-4 shows historic per capita income of each county in the service area for 2021, 2016 and the change from 2016 to 2021. Overall, the mean per capita income for the region was $48,773, and Missoula County had the highest single per capita income at $61,881 per person in 2021. This was the only county in the service area with per capita income levels above those for the state ($56,949). No county, however, exceeded per capita income for the nation ($64,143). Other counties with relatively high incomes were Ravalli, Granite and Powell Montana – each of which had per capita incomes of $50,000-$56,000. Conversely, Clearwater and Idaho Counties, Idaho and Sanders County, Montana, had the lowest per capita incomes – each was less than $43,000 in 2021. Over the past decade, income levels in the service region overall grew at a rate (29.5 percent) that was slightly higher than that of Montana (29.2 percent) and the national per capita income growth (29.3 percent). Individually, the largest increases in income were seen in Ravalli (35.4 percent), Missoula (34.4 percent) and Lake (30.4 percent) Counties, where income growth outpaced that of both Montana and the United States. The slowest per capita income growth occurred in Mineral, MT (23.7 percent), Clearwater, ID (26.0 percent) and Granite, MT (26.6 percent).

Table 2-4: Per Capita Income

	Income 2021	Income 2016	Income Change 2016 - 2021
Missoula County, MT	61,881	46,029	34.4%
Ravalli County, MT	56,321	41,584	35.4%
Lake County, MT	46,387	35,575	30.4%
Idaho County ID	41,484	31,865	30.2%
Sanders County, MT	42,153	32,890	28.2%
Clearwater County, ID	41,834	33,190	26.0%
Powell County, MT	50,932	39,475	29.0%
Mineral County, MT	45,966	37,169	23.7%
Granite County, MT	51,995	41,080	26.6%
Air Service Region	**48,773**	**37,651**	**29.5%**
State of Montana	**56,949**	**44,063**	**29.2%**
United States	**64,143**	**49,613**	**29.3%**

Source: U.S. Bureau of Economic Analysis

2.4 Historical Enplaned Passengers

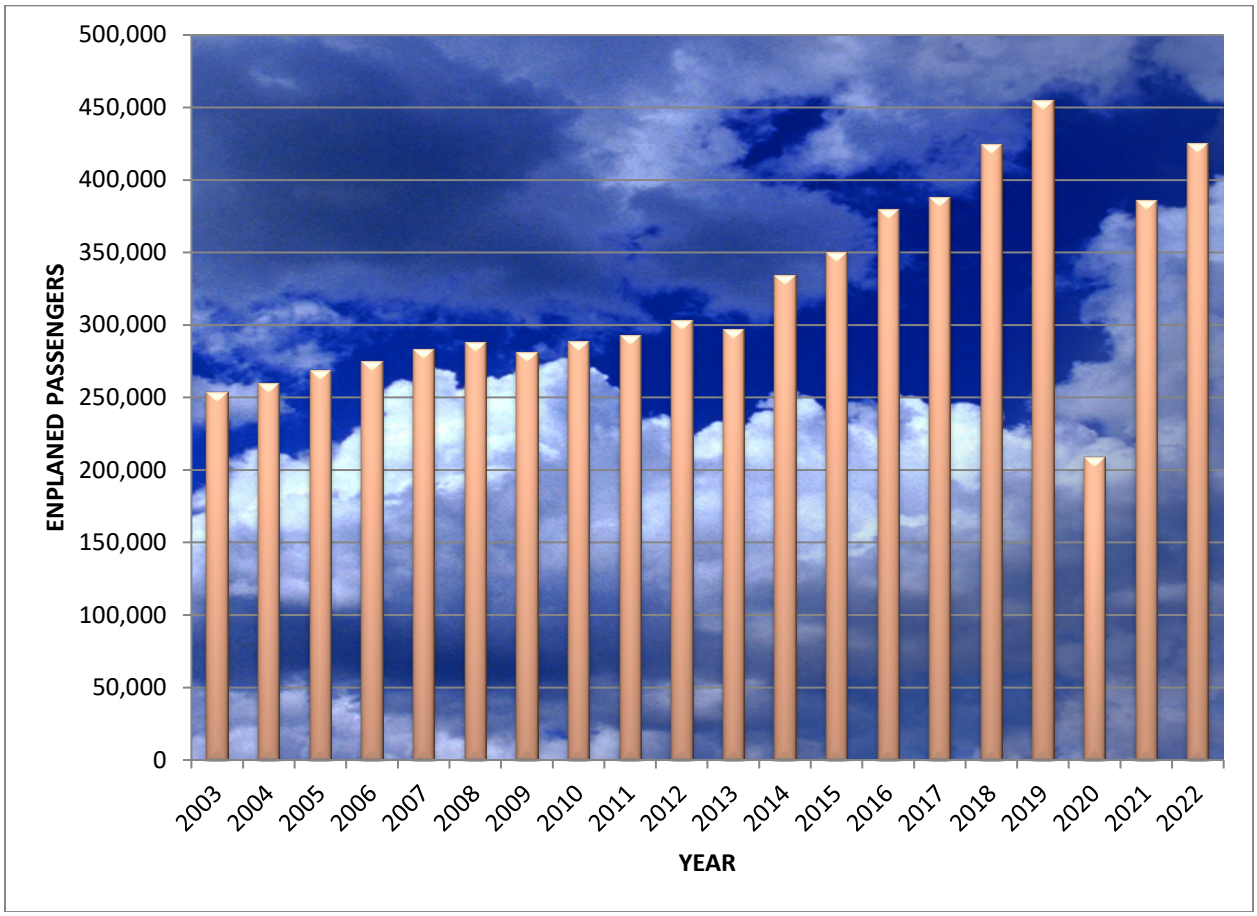
Table 2-5 and **Figure 2-5** show the historical enplaned passengers at MSO for the last twenty years, from 2003, when the airlines enplaned 253,761 passengers, through 2022, when 424,945 passengers were enplaned.

The past two decades at MSO have been characterized by consistent strong and steady growth. While most airports in the US experienced high volatility over the past decade, MSO has experienced sustained growth. Through the "Great Recession" years of 2007 through 2009, where most airports experienced sharp declines in passenger enplanements, MSO experienced steady increases in 2007 and 2008 and a modest 2.4 percent decline in 2009. 2019 was a record setting year, but the outbreak of the COVID-19 pandemic drove numbers down dramatically in 2020 as passenger air travel all but ceased nationwide for several months. By the middle of 2021, enplanements began to recover to pre-pandemic levels as leisure travel began rebounding. September, October and November of 2022 saw passenger enplanement levels surpass 2019's record setting pre-pandemic levels at MSO. Over the last twenty years, the average annual growth rate has been 5.4 percent, while over the last ten years, growth has averaged 8.4 percent. Passenger counts at MSO have increased by more than 44 percent between the 2013 and 2023.

Table 2-5 Historical Enplaned Passengers

Year	Total Enplanements	Annual % Change
2003	253,761	5.6%
2004	260,039	2.5%
2005	268,745	3.3%
2006	275,125	2.4%
2007	283,478	3.0%
2008	287,934	1.6%
2009	280,884	-2.4%
2010	288,807	2.8%
2011	292,530	1.3%
2012	303,016	3.6%
2013	296,797	-2.1%
2014	334,417	12.7%
2015	350,361	4.8%
2016	379,532	8.3%
2017	388,028	2.2%
2018	424,836	9.5%
2019	455,272	7.2%
2020	208,473	-54.2%
2021	385,818	85.1%
2022	424,945	10.1%
Avg. annual % change 2003 - 2022		5.4%
Avg. annual % change 2013 - 2022		8.4%
Avg. annual % change 2018 - 2022		11.5%

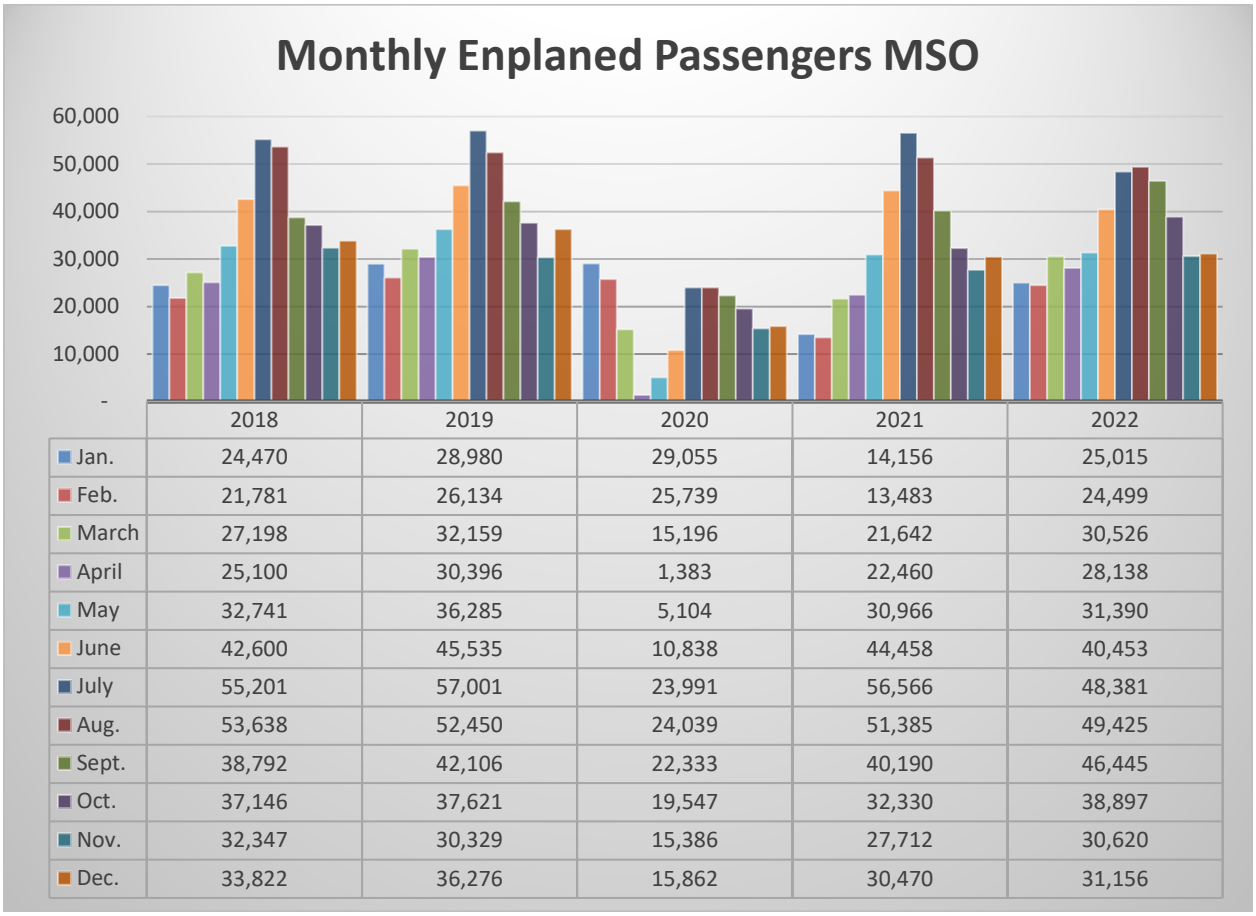
Source: Airport Records



Source: Airport Records

Figure 2-5 Historical Enplaned Passengers

Figure 2-6 shows monthly enplaned passenger counts at MSO for the last five years. Monthly passenger enplanements are a function of both demand and schedule. Passenger traffic at MSO exhibits a seasonal pattern, typically peaking during the summer months of July and August. As shown in **Table 2-6**, July and August together have historically accounted for over 25 percent of annual enplanements.



	2018	2019	2020	2021	2022
Jan.	24,470	28,980	29,055	14,156	25,015
Feb.	21,781	26,134	25,739	13,483	24,499
March	27,198	32,159	15,196	21,642	30,526
April	25,100	30,396	1,383	22,460	28,138
May	32,741	36,285	5,104	30,966	31,390
June	42,600	45,535	10,838	44,458	40,453
July	55,201	57,001	23,991	56,566	48,381
Aug.	53,638	52,450	24,039	51,385	49,425
Sept.	38,792	42,106	22,333	40,190	46,445
Oct.	37,146	37,621	19,547	32,330	38,897
Nov.	32,347	30,329	15,386	27,712	30,620
Dec.	33,822	36,276	15,862	30,470	31,156

Source: Montana Department of Transportation, MSO Records

Figure 2-6 Monthly Enplanements 2018-2022

Table 2-6 Average Monthly Distribution of Annual Enplanements 2018-2022

	Avg Mo. Distribution
Jan.	6.5%
Feb.	6.0%
March	6.8%
April	5.8%
May	7.3%
June	9.8%
July	12.9%
Aug.	12.4%
Sept.	10.2%
Oct.	8.9%
Nov.	7.3%
Dec.	6.2%

Source: Montana Department of Transportation, MSO Records

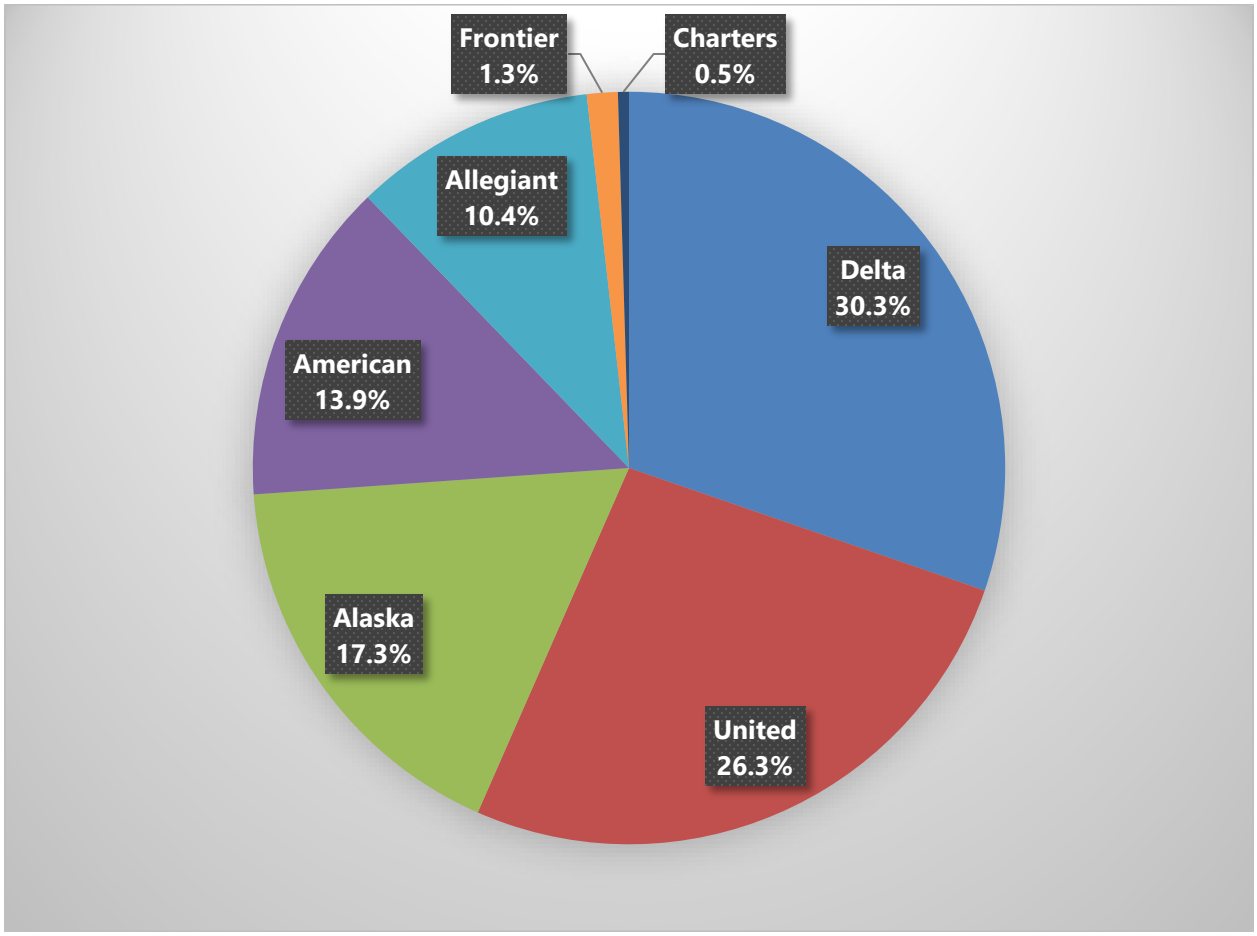
Six airlines provided scheduled service at MSO in 2022, as shown in **Table 2-7** and **Figure 2-7**, accounting for 99.5 percent of total enplanements (charters accounted for 0.5%):

- Delta accounted for 30.3 percent of total enplanements.
- United accounted for 26.3 percent of total enplanements.
- Alaska accounted for 17.3 percent of total enplanements.
- American accounted for 13.9 percent of total enplanements.
- Allegiant accounted for 10.4 percent of total enplanements.
- Frontier accounted for 1.3 percent of total enplanements.

Table 2-7 Enplanements by Airline – 2022

Airline	Enplanements	Share
Delta	128,680	30.3%
United	111,766	26.3%
Alaska	73,504	17.3%
American	59,085	13.9%
Allegiant	44,275	10.4%
Frontier	5,633	1.3%
Charters	2,002	0.5%
Total - 2022	**424,945**	**100.0%**

Source: Montana Department of Transportation



Source: Montana Department of Transportation

Figure 2-7: Enplanements by Airline

MSO serves mainly origin and destination (O&D) passengers – passengers that either originate their trip from or end their trip at the Airport. **Table 2-8** shows MSO's enplaned passenger shares by nonstop destination in 2022. Denver tops the list with 28.0 percent of passengers, followed by Salt Lake City with 18.3 percent and Seattle with 16.6 percent.

Table 2-8: Enplaned Passengers by Nonstop Destination, 2022

Rank	City	Passenger Share
1	Denver	28.0%
2	Salt Lake City	18.3%
3	Seattle	16.6%
4	Minneapolis / St. Paul	12.3%
5	Dallas	12.2%
6	Phoenix-Mesa	4.0%
7	Las Vegas	3.5%
8	Los Angeles	2.9%
9	Santa Anna (Orange County)	0.9%
10	Oakland	0.7%
11	Portland	0.3%
12	San Diego	0.2%
13	San Francisco	0.1%

Source: MSO Records
Note: Data available through November, 2022 at time of writing

2.5 Historical Commercial Passenger Operations

Table 2-9 lists the nonstop destinations from MSO, the airlines serving each destination, and the number of scheduled commercial passenger aircraft departures to each destination in 2019, 2020, 2021 and 2022.

In 2019, twelve destinations were served from MSO with nonstop flights to Atlanta, Denver, Dallas-Ft. Worth, Phoenix-Mesa, Las Vegas, Los Angeles, Minneapolis – St. Paul, Oakland, Chicago, Portland, Seattle, and Salt Lake City. Denver, served a United hub, was the top destination with a 26.4 percent share of total scheduled passenger aircraft departures from MSO.

By 2022 non-stop flights increased to thirteen as San Diego and San Francisco were added by Alaska and Orange County was added by Allegiant and Chicago was dropped by American and Atlanta was dropped by Delta. Salt Lake City, a Delta hub, was the top destination in 2022 with 24.6 percent of departures.

Table 2-9: Scheduled Nonstop Commercial Passenger Aircraft Departures by Destination from MSO, 2019-2022

	2019		2020		2021		2022	
	Number	% Share	Number	% Share	Number	% Share	Number	% Share
ATL - Atlanta, GA	**13**	**0.2%**		**0.0%**	**15**	**0.3%**		**0.0%**
Delta	13	0.2%		0.0%	15	0.3%		0.0%
DEN - Denver, CO	**1,543**	**26.4%**	**787**	**18.3%**	**1,266**	**21.2%**	**1,019**	**23.2%**
Frontier	125	2.1%	48	1.1%	44	0.7%	40	0.9%
United	1,418	24.2%	739	17.2%	1,222	20.5%	979	22.3%
DFW - Dallas - Ft. Worth, TX	**377**	**6.4%**	**502**	**11.7%**	**594**	**9.9%**	**410**	**9.3%**
American	377	6.4%	502	11.7%	594	9.9%	410	9.3%
IWA - Phoenix-Mesa, AZ	**128**	**2.2%**	**107**	**2.5%**	**116**	**1.9%**	**95**	**2.2%**
Allegiant	128	2.2%	107	2.5%	116	1.9%	95	2.2%
LAS - Las Vegas, NV	**106**	**1.8%**	**87**	**2.0%**	**110**	**1.8%**	**95**	**2.2%**
Allegiant	106	1.8%	87	2.0%	110	1.8%	95	2.2%
LAX - Los Angeles, CA	**50**	**0.9%**	**49**	**1.1%**	**289**	**4.8%**	**149**	**3.4%**
Alaska		0.0%	26	0.6%	169	2.8%	0	0.0%
Allegiant	24	0.4%	22	0.5%	24	0.4%	24	0.5%
American		0.0%		0.0%	74	1.2%	125	2.8%
Delta	26	0.4%	1	0.0%	22	0.4%		0.0%
MSP - Mineapolis-St. Paul, MN	**547**	**9.3%**	**352**	**8.2%**	**592**	**9.9%**	**415**	**9.4%**
Delta	547	9.3%	352	8.2%	592	9.9%	415	9.4%
OAK - Oakland, CA	**27**	**0.5%**	**24**	**0.6%**	**23**	**0.4%**	**21**	**0.5%**
Allegiant	27	0.5%	24	0.6%	23	0.4%	21	0.5%
ORD - Chicago, IL	**99**	**1.7%**	**63**	**1.5%**	**121**	**2.0%**		**0.0%**
American	99	1.7%	63	1.5%	121	2.0%		0.0%
PDX - Portland, OR	**392**	**6.7%**	**171**	**4.0%**	**146**	**2.4%**	**26**	**0.6%**
Alaska	392	6.7%	171	4.0%	119	2.0%	26	0.6%
Allegiant		0.0%		0.0%	27	0.5%		0.0%
SAN - San Diego, CA		**0.0%**		**0.0%**	**103**	**1.7%**	**12**	**0.3%**
Alaska		0.0%		0.0%	103	1.7%	12	0.3%
SEA - Seattle, WA	**1,423**	**24.3%**	**1,122**	**26.1%**	**1,300**	**21.8%**	**1,035**	**23.5%**
Alaska	1,423	24.3%	1,122	26.1%	1,300	21.8%	1,035	23.5%
SFO - San Francisco, CA		**0.0%**		**0.0%**	**16**	**0.3%**	**12**	**0.3%**
Alaska		0.0%		0.0%	16	0.3%	12	0.3%
SJC - San Jose, CA		**0.0%**		**0.0%**	**16**	**0.3%**		**0.0%**
Alaska		0.0%		0.0%	16	0.3%		0.0%
SLC - Salt Lake City, UT	**1,148**	**19.6%**	**1,029**	**24.0%**	**1,189**	**19.9%**	**1,080**	**24.6%**
Delta	1,148	19.6%	1,029	24.0%	1,189	19.9%	1,080	24.6%
SNA - Santa Anna - Orange County, CA		**0.0%**		**0.0%**	**76**	**1.3%**	**28**	**0.6%**
Allegiant		0.0%		0.0%	76	1.3%	28	0.6%

Source: MSO Records
Note: Data through Nov. 2022

Commercial Passenger Aircraft Fleet Mix

Table 2-10 shows the fleet mix for commercial aircraft operating at MSO in 2021 (the most recent year full year data is available). **Figure 2-8** shows the changes in the type and mix of aircraft operated at MSO from 2012 to 2022.

Narrow body jet aircraft, which were used to provide only 10.9 percent of the scheduled service at MSO in 2012, have replaced shares of smaller turboprop and regional jet aircraft over the last decade. Narrow body jet aircraft accounted for 38.5 percent of scheduled commercial passenger service in 2022.

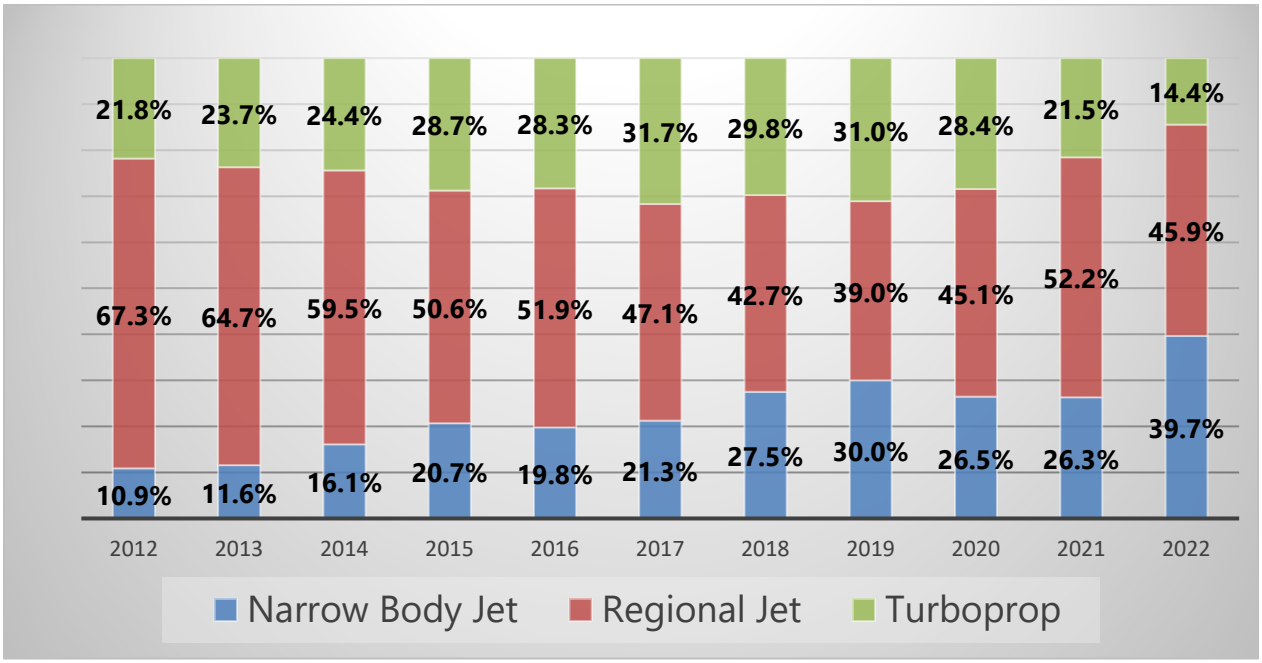
The use of regional jet aircraft is decreasing, mostly by an increasing share of narrow body jets. Regional jets, which provided 67.3 percent of scheduled service at MSO in 2012, accounted for 43.7 percent of scheduled service in 2022.

The use of turboprop aircraft continues at the Airport largely due to operations of Alaska / Horizon's Q400.

Table 2-10: Commercial Aircraft Fleet Mix, 2021

Aircraft	Seats	Departures	% Share
Narrow Body Jet		**1572**	**26.3%**
Airbus Industrie A319	128 -156	745	12.5%
Airbus Industrie A320-100/200	150 - 186	530	8.9%
Airbus Industrie A320-200n	151 - 186	23	0.4%
Airbus Industrie A321/Lr	191	65	1.1%
Boeing 737-700/700LR/Max 7	126	6	0.1%
Boeing 737-800	160-172	195	3.3%
Boeing 737-900ER	180	8	0.1%
Regional Jet		**3118**	**52.2%**
Canadair CRJ 900	90	440	7.4%
Canadair RJ-200ER /RJ-440	50	437	7.3%
Canadair RJ-700	69	157	2.6%
Embraer ERJ-175	70-76	2040	34.1%
Embraer-Emb-170	70	44	0.7%
Turboprop		**1287**	**21.5%**
De Havilland DHC8-400 Dash-8	76	1287	21.5%
Total		**5977**	**100.0%**

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed



Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed

Figure 2-8: Commercial Aircraft Fleet Mix, 2012-2022

Commercial Passenger Aircraft Departures and Seats

Table 2-11 and **Figures 2-9, 2-10** and **2-11** show the historical trends in scheduled commercial passenger service at MSO from 2012 through 2022 in terms of aircraft departures, seats and average number of seats per departure. While there have been fluctuations in total passenger aircraft departures from year to year, passenger aircraft departures from MSO increased 1.6 percent annually, on average, from 2012 through 2021. The number of scheduled passenger aircraft departures increased a total of 16.4 percent from a total of 5,134, or 14 departures per day, in 2012 to 5,977, or approximately 16 departures per day, in 2021.

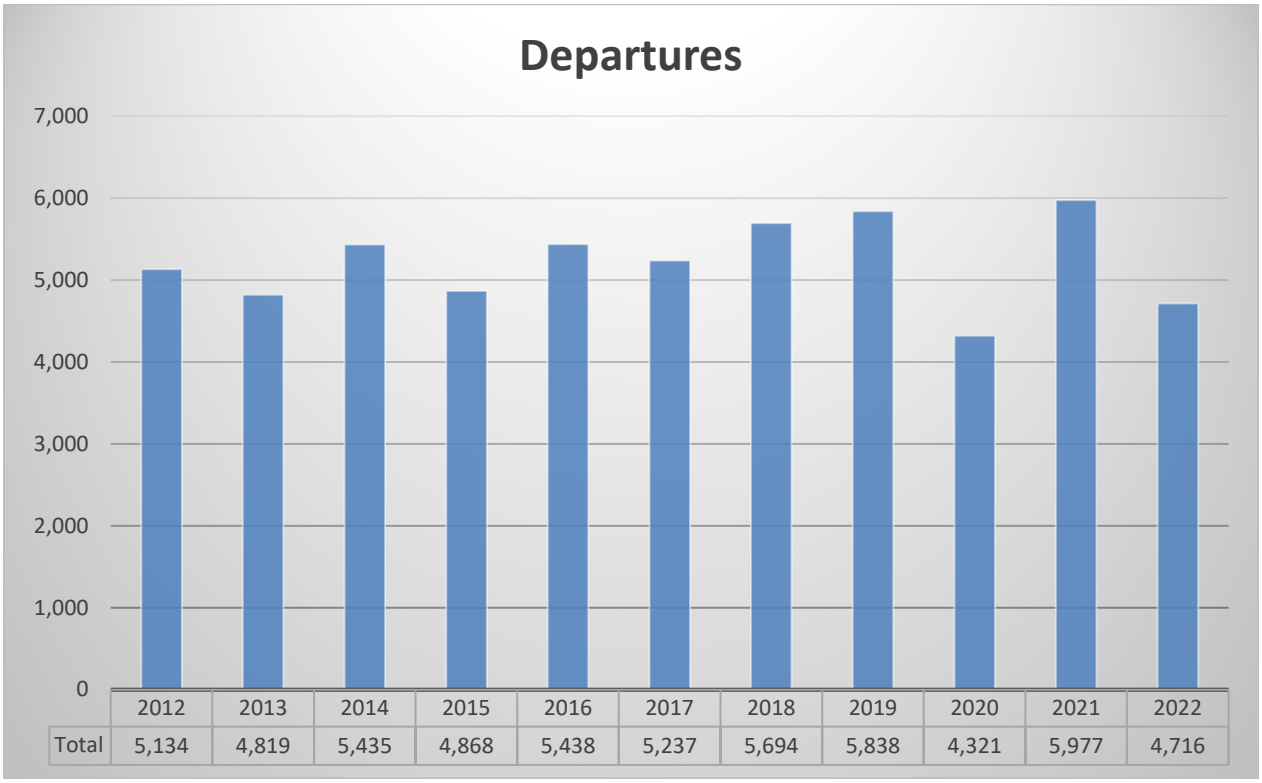
While annual aircraft departures have increased modestly, the air service capacity provided at the Airport has increased more dramatically. Scheduled seats grew from a total of 363,544 in 2012 to 553,383 in 2021 at an average annual rate of 5.4 percent.

The trends in the average number of seats per departure reflect changes in the size and mix of aircraft used by airlines to service the MSO market. The average number of seats per departure increased from 70.8 in 2012 to 93.4 in 2021 and 103.9 for the first nine months of 2022. Between 2012 and 2021, seats per departure at MSO increased at an average annual rate of 3.2 percent. This was due to the replacement of smaller regional jets such as the Canadair RJ 50 seaters with larger regional jets and narrow body jets.

Table 2-11: MSO Aircraft Departures, Seats and Average Seats per Departure 2012-2022

	Departures	Seats Available	Seats / Departure
2012	5,134	363,544	70.8
2013	4,819	336,931	69.9
2014	5,435	407,401	75.0
2015	4,868	404,103	83.0
2016	5,438	455,009	83.7
2017	5,237	446,755	85.3
2018	5,694	512,725	90.0
2019	5,838	551,761	94.5
2020	4,321	396,705	91.8
2021	5,977	558,383	93.4
2022	4,716	492,465	104.4

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed



Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed

Figure 2-9: Commercial Aircraft Departures, 2012-2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	363,544	336,931	407,401	404,103	455,009	446,755	512,725	551,761	396,705	558,383	492,465

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed

Figure 2-10: Available Seats - Commercial Aircraft, 2012-2022

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	71	70	75	83	84	85	90	95	92	93	104

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed

Figure 2-11: Available Seats per Departure - Commercial Aircraft, 2012-2022

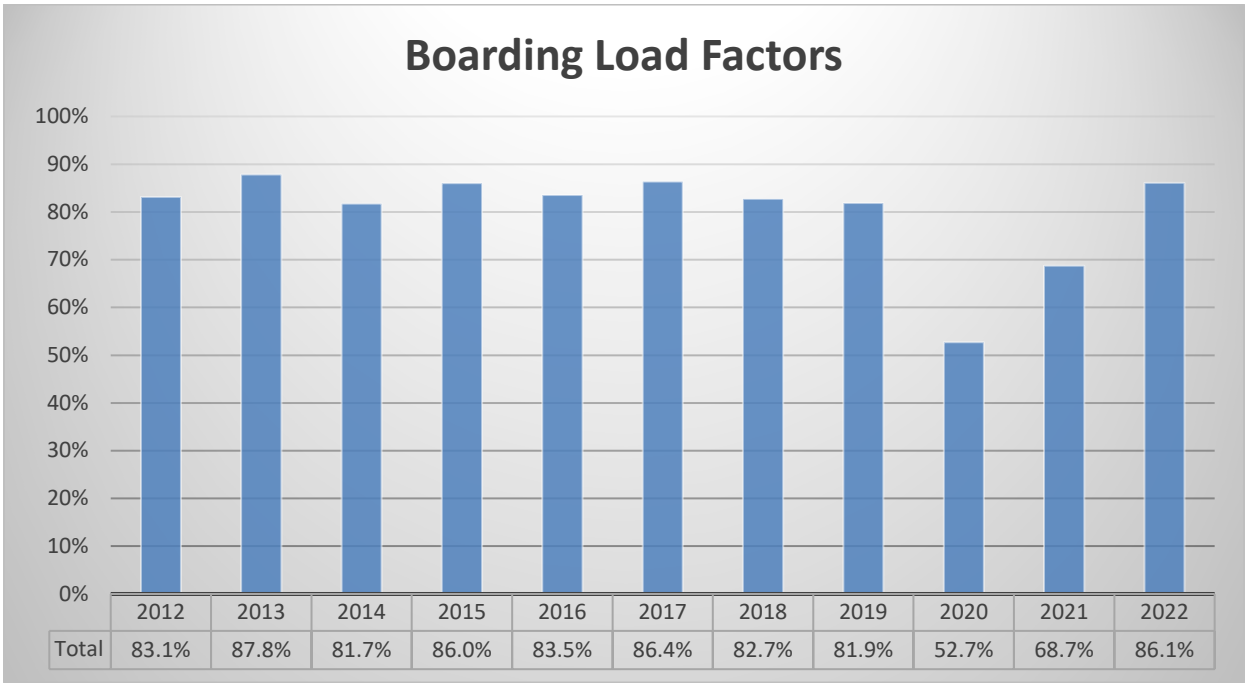
Commercial Passenger Aircraft Boarding Load Factors

Boarding load factors were calculated based on actual enplanements and available seats. **Table 2-12** and **Figure 2-12** show that boarding load factors have, setting aside pandemic year anomalies in 2020 and 2021, remained consistently strong, over the past decade. Even with an increasing share of larger aircraft into the fleet mix, commercial aircraft departing MSO have been consistently over 80 percent full. Monthly boarding load factors reflect the seasonal pattern of enplanements. They are highest during the summer months of July and August.

Table 2-12: Commercial Passenger Monthly Aircraft Boarding Load Factors, 2012-2022

	Monthly Load Factor											
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average
Jan	81.1%	85.7%	82.3%	77.5%	81.2%	83.7%	87.0%	71.1%	81.7%	54.8%	78.9%	78.4%
Feb	84.1%	87.3%	85.1%	79.8%	79.6%	80.9%	89.1%	77.8%	79.5%	53.6%	84.1%	79.8%
Mar	86.2%	86.0%	84.8%	82.1%	82.5%	86.0%	84.6%	83.0%	46.1%	59.0%	86.4%	78.2%
Apr	83.3%	79.9%	86.1%	78.4%	82.3%	76.7%	82.5%	75.1%	11.7%	56.0%	83.3%	74.8%
May	85.5%	85.4%	83.6%	83.2%	85.1%	83.1%	85.9%	80.4%	38.8%	63.5%	88.1%	79.9%
Jun	71.9%	82.8%	79.0%	83.2%	83.7%	83.8%	73.8%	77.4%	55.4%	63.3%	82.8%	76.3%
Jul	81.9%	88.0%	82.8%	89.9%	83.0%	89.3%	84.4%	88.2%	55.9%	72.9%	87.2%	82.2%
Aug	87.4%	93.1%	82.9%	94.9%	83.8%	92.2%	85.9%	85.5%	49.7%	70.2%	86.0%	82.1%
Sep	86.7%	91.0%	75.5%	92.5%	84.7%	89.0%	85.2%	85.8%	52.2%	68.3%	87.0%	80.8%
Oct	83.6%	93.8%	81.5%	90.2%	88.3%	87.9%	81.8%	85.1%	48.3%	84.5%	90.6%	82.5%
Nov	84.2%	86.7%	78.6%	84.4%	83.4%	89.5%	78.9%	81.5%	37.2%	88.0%	89.4%	78.8%
Dec	84.5%	91.5%	82.5%	88.1%	83.3%	89.1%	78.9%	86.6%	46.5%	86.9%	87.5%	82.1%
Average	83.1%	87.8%	81.7%	86.0%	83.5%	86.4%	82.7%	81.9%	52.7%	68.7%	**86.1%**	**79.9%**

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	83.1%	87.8%	81.7%	86.0%	83.5%	86.4%	82.7%	81.9%	52.7%	68.7%	86.1%

Source: BTS T-100 Domestic Segment Data
Note: Scheduled Passenger Service Carriers, Departures Performed

Figure 2-12: Commercial Passenger Annual Aircraft Boarding Load Factors, 2012-2022

2.6 Aviation Forecast

This section presents forecasts of scheduled passenger enplanements, based aircraft and aircraft operations that will serve as the basis for planning facility additions and expansion at MSO. The process begins with the development of enplanement forecasts, which serve as the basis for developing passenger aircraft operations. In addition to passenger aircraft operations, forecasts of air taxi, general aviation and military operations are also provided to arrive at a forecast of total aircraft operations at MSO.

As previously noted, aviation activity and the demand for aviation services can be affected by a variety of unforeseeable and unpredictable influences. Planning and projecting aviation activities for a twenty-year planning period with absolute certainty is unrealistic. Therefore, it is important to remember that forecasts are to serve only as guidelines. Planning and development of improvements must remain a dynamic process, flexible enough to respond to unforeseen facility needs and service demands. Reviewing the airport's activity on a regular basis to determine if changes to the guidelines are necessary is a way to stay current with changing conditions and demands.

The Covid 19 pandemic created a shock to the aviation system resulting in significant downward anomalies in years 2020 and 2021. While 2022 levels are still below pre-pandemic levels, national forecasts predict full recovery to pre-pandemic levels in 2023. Forecasts in this section utilize data through 2019 for historic trend analysis and utilize the FAA's Terminal Area Forecast for 2023 forecast baselines.

2.6.1 Enplanement Forecasts

Several analytical techniques have been used to examine trends in passenger growth. These have included time-series "linear trend" extrapolation, regression analysis, and market share analysis. While the potential timeframes used for time-series can be rather extensive, the past twenty-year period was considered to be a good reflection of recent trends.

Time-Series Linear Trend Extrapolation

Trend extrapolation examines the historical enplanement growth trend and projects this trend into the future. In this chapter, it is implemented using regression techniques where a regression model is specified with enplanements as the dependent variable and time as the explanatory variable. This regression model yields a trendline that best fits the historical enplanement growth trends and can be used to forecast enplanements by extending the trendline into the future.

The acceptability of time-series projections is based upon the correlation between the data. The correlation coefficient (Pearson's "r-squared") measures the association between changes in the dependent and independent variables. If the r-squared value (coefficient of determination) is greater than 0.95, it indicates good predictive reliability, with an r-squared value of 0.90 generally identified as a threshold of statistical reliability. Values lower than that become increasingly unreliable.

Rather than applying an average compounding annual growth rate, a regression-based time series projection produces coefficients which are used to create a "best fit" line through historical data. This can be projected into the future to predict future values based on the linear trend.

Initially, a linear time-series analysis was performed on historical enplanement data for the 20 year 2000-2019 time period. This yielded an r-squared value of 0.860 indicating a relatively low level of predictive reliability.

A linear time-series analysis was also performed on historical enplanement data for the ten-year 2010-2019 time period. This yielded an r-squared value of .938, a relatively high level of predictive reliability.

Regression Analysis

Regression analysis is a method used to measure the degree at which one or more independent variables (predictors) and a dependent variable (response) are linearly related. Once a degree of relation, as measured by Pearson's r-squared noted above, is established, the method can be used to predict the behavior of the response variable in relation to the predictor variable(s).

A regression analysis was performed on enplanements vs. service area population for the ten-year time period between 2010 and 2019. This provided an r-squared value of .972.

A multiple variable regression analysis of population and per capita income for Missoula County between 2010 and 2019 was also performed and provided best predictive reliability of any of the analyses performed, providing an r-squared values of .976.

Market Share Analysis

A market share projection was also developed using a variable share of MSO's historical share of the national regional/commuter market. Historical passenger enplanements, US regional / commuter enplanements and local market share have been summarized in **Table 2-13** for the 20-year period beginning in 2003 and extending through 2022. The airport has experienced a steadily increasing share of the US market consistently over this 20-year period. The annual increase in MSO's market share over the twenty-year period has averaged 0.002% per year over the twenty-year period between 2003 and 2022.

A market share projection was developed using FAA projections for national regional air carrier traffic. A variable market share rate was applied reflecting the increasing market share experienced at MSO over the past 20 years.

Table 2-13 Historical Passenger Enplanements and Market Shares

Year	MSO Passenger Enplanements	U.S. Regional Carriers Scheduled Passenger Traffic	MSO Share of U.S Passenger Traffic
2003	253,761	108,600,000	0.234%
2004	260,039	130,000,000	0.200%
2005	268,745	149,700,000	0.180%
2006	275,125	155,700,000	0.177%
2007	283,478	159,700,000	0.178%
2008	287,934	162,600,000	0.177%
2009	280,884	156,600,000	0.179%
2010	288,807	164,381,978	0.176%
2011	292,530	164,058,380	0.178%
2012	303,016	162,047,362	0.187%
2013	296,797	158,328,133	0.187%
2014	334,417	156,950,195	0.213%
2015	350,361	155,989,891	0.225%
2016	379,532	155,006,546	0.245%
2017	388,028	152,037,412	0.255%
2018	424,836	157,043,008	0.271%
2019	455,272	162,554,893	0.280%
2020	208,473	95,574,134	0.218%
2021	385,818	107,125,464	0.360%
2022	424,945	125,378,083	0.339%

Sources: FAA Aerospace Forecast, FY 2022-2042
Airport Records

2.6.2 Enplanement Forecast Summary

A summary of enplanement forecasts is presented in **Table 2-14**. and in **Figure 2-13**. **Figure 2-13** clearly shows the spread, or envelope, created by the different forecasting methods. The spread between the high and low forecasts is a reasonable window within which actual enplanement numbers may fall in the future, based upon a number of factors: number of local airlines, frequency, equipment, fares, non-stop destinations, and the local economy.

For planning purposes, a mid-range forecast is generally chosen, if it provides a reasonable growth rate. When all of the forecasting methods are compared, as shown in **Figure 2-13**, the population with per-capita income-based forecasts represents the mid-range forecast. In addition, based on historical regression analysis, it is the forecast with the greatest statistical reliability for MSO. This mid-range forecast is consistent with FAA's national forecast assumption that regional/commuter carriers will continue to exhibit strong growth in the future.

Table 2-14 Summary of Passenger Enplanement Forecasts

	2027	2032	2037	2042	R squared
20 Yr. Linear Trend	501,702	550,686	599,671	648,655	0.860
10 Yr. Linear Trend	537,994	632,343	726,693	821,042	0.938
Regression - Population	532,532	629,476	710,301	762,659	0.972
Regression - Population & PCI	532,559	629,540	710,396	762,774	0.976
Market Share	530,274	616,227	723,781	854,788	NA
FAA Terminal Area Forecast	536,192	612,298	691,698	772,819	NA

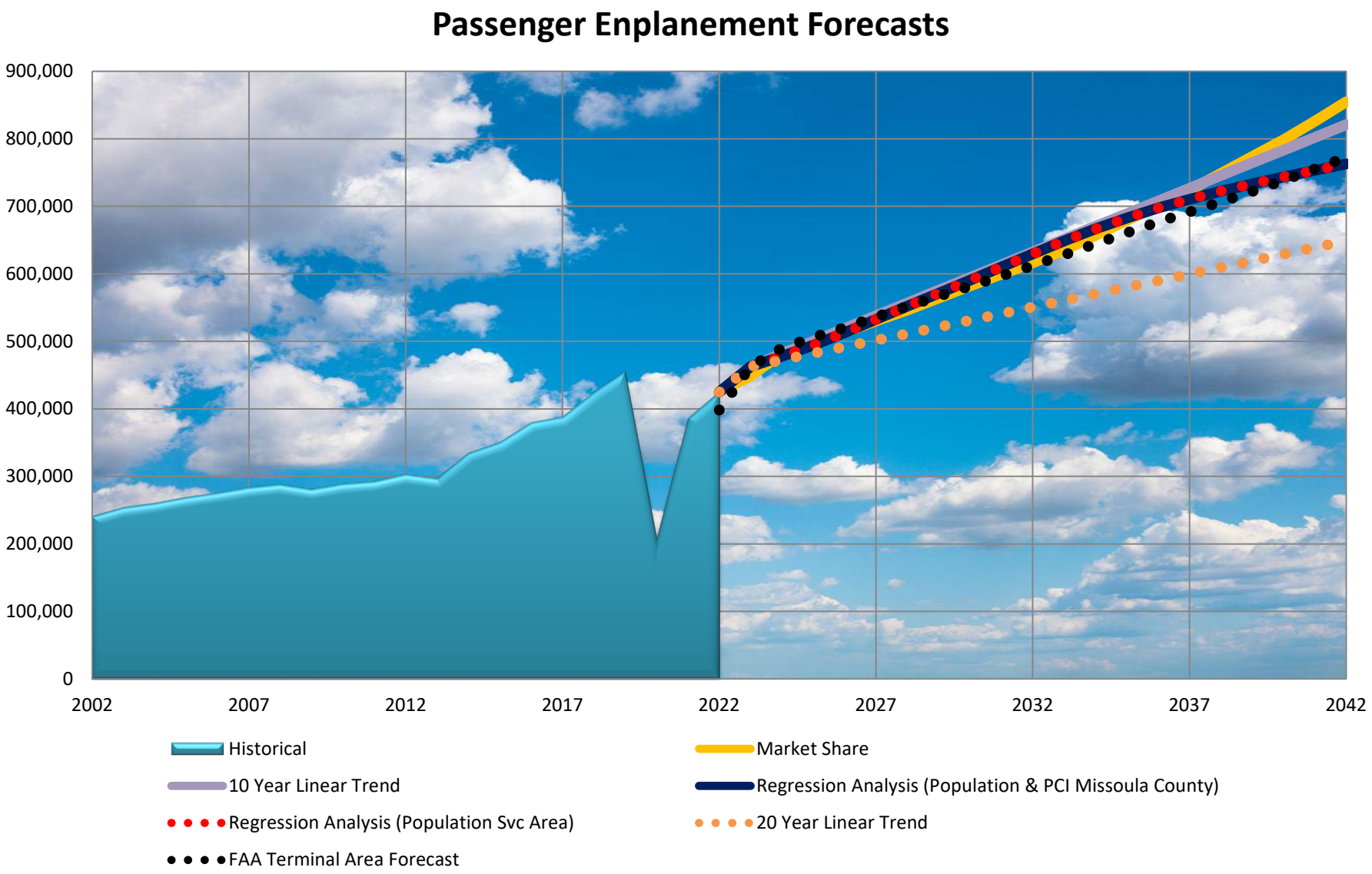


Figure 2-13 Passenger Enplanement Forecasts

2.6.3 Based Aircraft Forecasts

Historic Based Aircraft

The number of general aviation aircraft which can be expected to base at an airport facility is dependent on several factors, such as airport communication practices, available facilities, airport operator's services, airport proximity and access, and similar considerations.

Table 2-15 presents the based aircraft at MSO between 2003 and 2022 by category based on FAA 5010 report data as recorded in the FAA's Terminal Area Forecast. The historical counts show that based aircraft counts have risen from a low of 69 in 2003 to a high of 174 in 2021, then dropping to 169 in 2022. The last 10 years have seen based aircraft counts rise from 150 to 169, representing an average annual growth rate of 1.12 percent. In the last five years, based aircraft counts have increased from 161 to 169, an average annual growth rate of 0.99 percent.

Table 2-15: Historic Based Aircraft

	Single Engine	Jet	Multi	Helicopter	Other	TOTAL
ACTUAL						
2003	32	7	24	6	0	**69**
2004	66	6	22	10	0	**104**
2005	63	6	20	10	0	**99**
2006	63	6	20	10	0	**99**
2007	70	14	42	20	0	**146**
2008	87	9	20	11	0	**127**
2009	59	11	21	12	0	**103**
2010	92	11	20	14	0	**137**
2011	99	19	24	13	0	**155**
2012	87	20	22	16	0	**145**
2013	86	26	20	18	0	**150**
2014	86	26	20	18	0	**150**
2015	86	28	20	18	0	**152**
2016	86	28	19	18	0	**151**
2017	90	29	20	22	0	**161**
2018	90	29	20	22	0	**161**
2019	100	29	20	20	0	**169**
2020	105	29	20	20	0	**174**
2021	105	29	20	20	0	**174**
2022	97	30	15	27	0	**169**

Source: FAA 2021 Terminal Area Forecast
*2022 Data Source: FAA Form 5010, Airport Master Record, eff. 1/26/23

Based Aircraft Forecast

The FAA's Terminal Area Forecast (TAF) for based aircraft at MSO is presented in **Table 2-16**. Adjustment has been made to account for 2022 based aircraft which were not reflected in the 2021 TAF. The TAF forecasts flat growth for the twenty-year planning period. Given the dynamic nature of the service area's population and economy, together with regional and national aviation trends, flat growth is not considered a reasonable reflection of based aircraft demand at MSO.

Table 2-17 presents a based aircraft forecast using a time series trendline for the twenty-year period from 2003 to 2022. This analysis yielded an r squared value of 0.8014

Table 2-18 presents a based aircraft forecast using a time series trendline for the ten-year period from 2013 to 2022 yielding an r squared value of 0.865.

A regression analysis was also performed using the population of Missoula County. **Table 2-19** presents a based aircraft forecast based on population forecasts for the MSO service area. This analysis yielded an r squared value of 0.851.

Other regression analyses were performed, but, showing low predictive values, were discarded.

The mid-range based aircraft forecast based on the past 10 year growth rate (**Table 2-18**) has been selected as the preferred forecast given its highest r squared predictive value. The range of based aircraft forecasts is graphically depicted on **Figure 2-14.**

Table 2-16: FAA Terminal Area Forecast

	Based Aircraft
Base Year	
2022	169
Forecast	
2027	176
2032	176
2037	176
2042	176

Note: Adjusted to reflect 2022 base year data found in FAA Form 5010, Airport Master Record, eff. 1/26/23

Table 2-17: Based Aircraft Projections Based on 2003 to 2022 Linear Trend

	Based Aircraft
Base Year	
2022	169
Forecast	
2027	192
2032	214
2037	237
2042	259

Table 2-18: Based Aircraft Projections Based on 2013 to 2022 Linear Trend

	Based Aircraft
Base Year	
2022	169
Forecast	
2027	184
2032	199
2037	215
2042	230

Table 2-19: Based Aircraft Projections Based on Forecast Population Growth

	Based Aircraft
Base Year	
2022	169
Forecast	
2027	185
2032	197
2037	207
2042	214

Source: CEIC, MT Department of Commerce

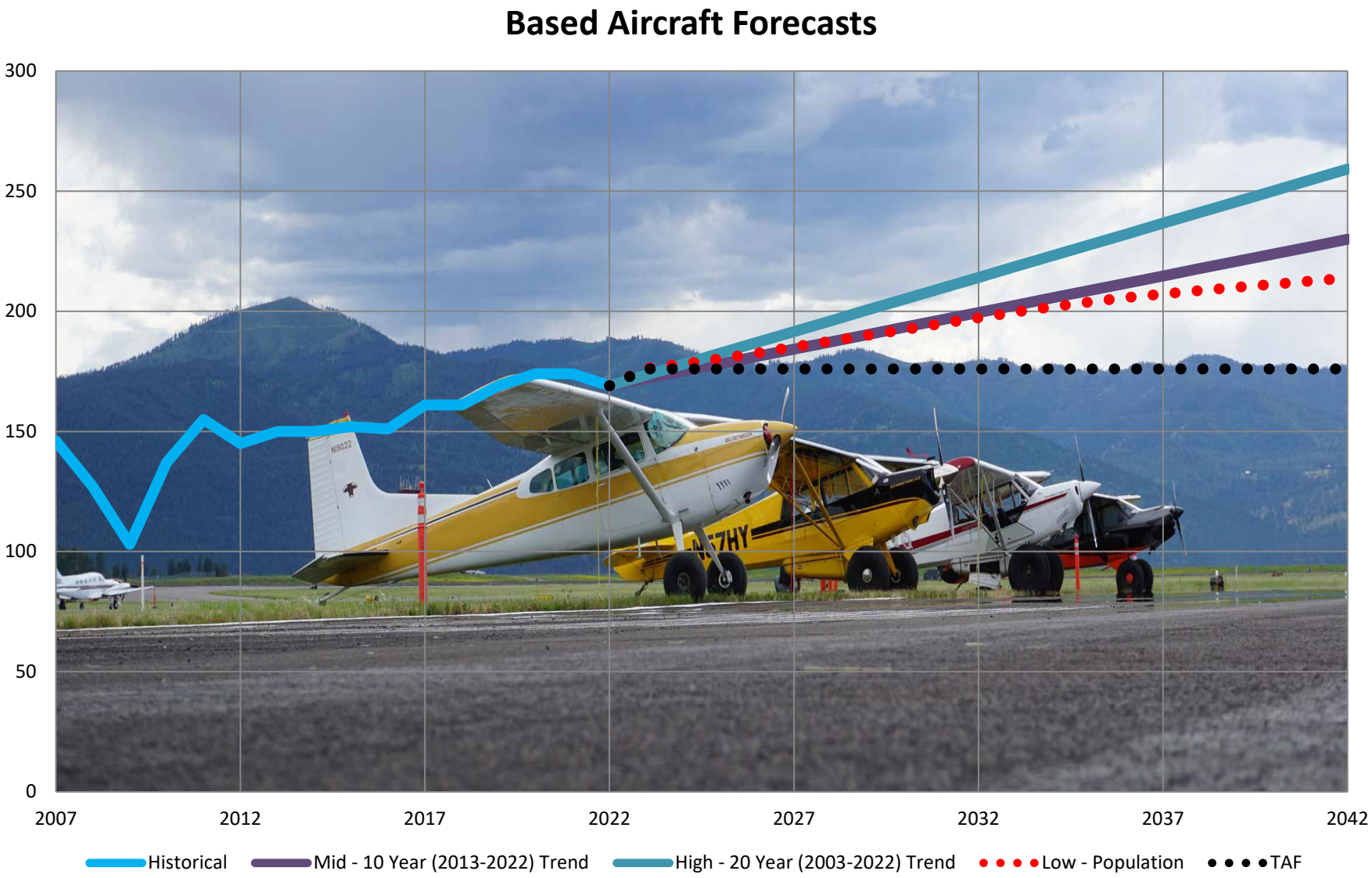


Figure 2-14: Based Aircraft Forecasts

2.6.4 Operations Forecasts

Table 2-20 displays historic commercial air carrier operations by seating capacity as well as load factors and enplanements at MSO for the last five years. As noted earlier in this chapter, regional carriers nationwide are in the process of phasing out smaller regional jets like the CRJ 200 in favor of larger, more fuel efficient and technologically advanced aircraft. Consistent with national trends, MSO has seen a general trend toward larger aircraft as 50 seat regional jets are replaced with 70 to 100 seat aircraft. In addition, due to strong and steadily increasing demand, MSO attracts mainline carriers utilizing aircraft seating in excess of 100 passengers. Aircraft over 100 passengers have represented a steadily increasing share of the fleet mix over the last five years. This trend toward larger aircraft has, excluding the pandemic years of 2020 and 2021, corresponded with a steadily increasing count of enplanements per departure, a steady increase in overall commercial departures from year to year and passenger boarding load factors consistently over 80 percent, all indicators of very high air service demand at MSO.

Table 2-21 summarizes fleet mix and operations projections for commercial service airlines at MSO. Fleet mix projections have been applied to estimate projected future average seats per departure, which (after applying a load factor) were combined with enplanement forecasts to project annual departures. In accordance with national trends, it is expected that the airport will see an increase in average seats per departure as carriers replace the 50 seat CRJ-200 with the 76 seat EMB 175, the 76 seat CRJ-700 and the 90 seat CRJ-900 over the planning period. Larger aircraft in use by mainline carriers are anticipated to continue to represent an increasing share of the fleet mix at MSO over the planning horizon. Currently, Allegiant has 50 new 737 Max aircraft on order, with 173 and 200 seats. Other airlines are currently in discussion with MSO regarding transitioning from regional jets to mainline aircraft. A significant increase in airlines use of mainline aircraft is anticipated in the short term at MSO.

Table 2-20: Historic Scheduled Airline Fleet Mix and Operations

Fleet Mix Seating Capacity	2018	2019	2020	2021	2022
< 40	0%	0%	0%	0%	0%
40 - 59	25%	30%	7%	7%	4%
60-99	50%	53%	66%	66%	58%
>100	25%	17%	27%	27%	38%
(1) Average Seats Per Departure	90	95	92	93	104
(1) Boarding Load Factor	82.7%	81.9%	52.7%	68.7%	86.1%
Enplanements Per Departure	74	77	48	64	90
(2) Annual Enplanements	424,836	455,272	208,473	385,818	424,945
(1) Annual Departures	5,694	5,838	4,321	5,977	4,716
Annual Operations	11,388	11,676	8,642	11,954	9,432

(1) Bureau of Transportation Statistics
(2) MSO Records

Table 2-21: Scheduled Airline Fleet Mix and Operations Forecast

	Forecast			
Fleet Mix Seating Capacity	**2027**	**2032**	**2037**	**2042**
< 40	0.0%	0.0%	0.0%	0.0%
40 - 59	0.0%	0.0%	0.0%	0.0%
60-99	45.0%	30.0%	25.0%	25.0%
>100	55.0%	70.0%	75.0%	75.0%
Average Seats Per Departure	132	147	151	151
Boarding Load Factor	81%	82%	83%	83%
Enplanements Per Departure	107	120	126	126
Annual Enplanements	532,559	629,540	710,396	762,774
Annual Departures	4,971	5,240	5,659	6,076
Annual Operations	9,943	10,481	11,318	12,152

Airline operations are carried forward in all three scenarios from the above analysis. FAA tracking and forecasting methods split commercial air service into two designations, "Air Carrier" and "Air Taxi". Air Carrier operations are counted by the FAA tower as operations by aircraft with seating capacity over 60 seats while Air Taxi operations represent activity by commercial aircraft with seating capacity of 60 seats or less. As 50 seat regional jets are replaced with larger aircraft over the forecast period, it is anticipated that commercial "Air Carrier" operations will displace commercial operations recorded by the tower as "Air Taxi" operations. For the purposes of this report, air carrier operations have been considered to be any commercial flight that uses the terminal regardless of the numbers of seats. Air taxi numbers represent flights of passengers or cargo for hire that do not use the terminal facilities. Data is presented in this format to support planning decisions for the terminal area.

Air taxi operators are defined as being a classification of air carriers which directly engage in the air transportation of persons, property, mail, or in any combination of such transportation and which do not directly or indirectly use large aircraft. At MSO this includes cargo operators and charters. Historical air taxi operations were estimated as the residual between the sum of air carrier and air taxi/commuter operations as reported in the TAF, and the sum of mainline and regional passenger aircraft operations as estimated from Bureau of Transportation Statistics (BTS) T-100 data on scheduled passenger aircraft departures. Air taxi operations are forecast to grow based on the annual national average growth rates in GA hours flown of 2.6% for turbine aircraft projected by the FAA (see FAA Aerospace Forecasts, 2022-2042).

General aviation local operations projected under all growth scenarios assume an Operations Per Based Aircraft (OPBA) of 65 derived from a comparison of based aircraft and local operations in recent years. (Operations per based aircraft are derived by dividing the number of local operations cited in the FAA Terminal Area Forecast by the number of based aircraft). The projection of local operations under the low growth scenario utilizes the low growth-based

aircraft forecast, the mid-range operations forecast utilizes the mid-range based aircraft forecast and the high growth scenario utilizes the high based aircraft forecast.

The projection of itinerant general aviation operations for the low-growth mid-range and the high-growth scenarios utilize an average annual growth rate of 1.0 percent following the annual national average growth rates in GA hours flown projected by the FAA (see FAA Aerospace Forecasts, 2022-2042).

Military operations have historically fluctuated at MSO without a clear upward or downward trend. Because the historical data do not exhibit a clear increasing, decreasing, or cyclical trend, a constant value is assumed utilizing the FAA's Terminal Area Forecast for 2023 levels as a base.

Overall, the total annual operations at the airport are projected to increase over the forecast period under the low, mid-range and high forecasts at compound annual growth rates of 1.1 percent, 1.4 percent and 1.7 percent respectively. Because it represents a balanced view of growth in airport activity, the mid-range forecast will be carried forward as the preferred forecast.

Tables 2-22, 2-23 and **2-24** present aircraft operations forecasts for the low-growth, mid-range and high-growth scenarios and **Figure 2-15** graphically presents the range of operations forecasts.

Table 2-22 Operations Scenario 1: Low Forecast

			Itinerant Operations					Local Operations			
	Based Aircraft	OPBA	Air Carrier	Air Taxi / Commuter	GA	Military	Total Itinerant	GA	Military	Total Local	Total Ops
2027	185	65	9,367	7,787	18,245	399	35,798	12,034	513	12,547	48,345
2032	197	65	9,168	8,683	19,079	399	37,328	12,824	513	13,337	50,665
2037	207	65	9,554	9,578	19,912	399	39,443	13,468	513	13,981	53,424
2042	214	65	10,334	10,474	20,745	399	41,952	13,898	513	14,411	56,363

Table 2-23 Operations Scenario 2: Mid-Range Forecast

			Itinerant Operations					Local Operations			
	Based Aircraft	OPBA	Air Carrier	Air Taxi / Commuter	GA	Military	Total Itinerant	GA	Military	Total Local	Total Ops
2027	184	65	9,943	7,787	18,245	399	36,374	11,976	513	12,489	48,863
2032	199	65	10,481	8,683	19,079	399	38,641	12,967	513	13,480	52,121
2037	215	65	11,318	9,578	19,912	399	41,207	13,957	513	14,470	55,677
2042	230	65	12,152	10,474	20,745	399	43,770	14,948	513	15,461	59,231

Table 2-24 Operations Scenario 3: High Forecast

			Itinerant Operations					Local Operations			
	Based Aircraft	OPBA	Air Carrier	Air Taxi / Commuter	GA	Military	Total Itinerant	GA	Military	Total Local	Total Ops
2027	192	65	9,900	7,787	18,293	399	36,379	12,450	513	12,963	49,342
2032	214	65	10,259	8,683	19,226	399	38,567	13,916	513	14,429	52,996
2037	237	65	11,531	9,578	20,207	399	41,715	15,381	513	15,894	57,609
2042	259	65	13,618	10,474	21,237	399	45,729	16,847	513	17,360	63,088

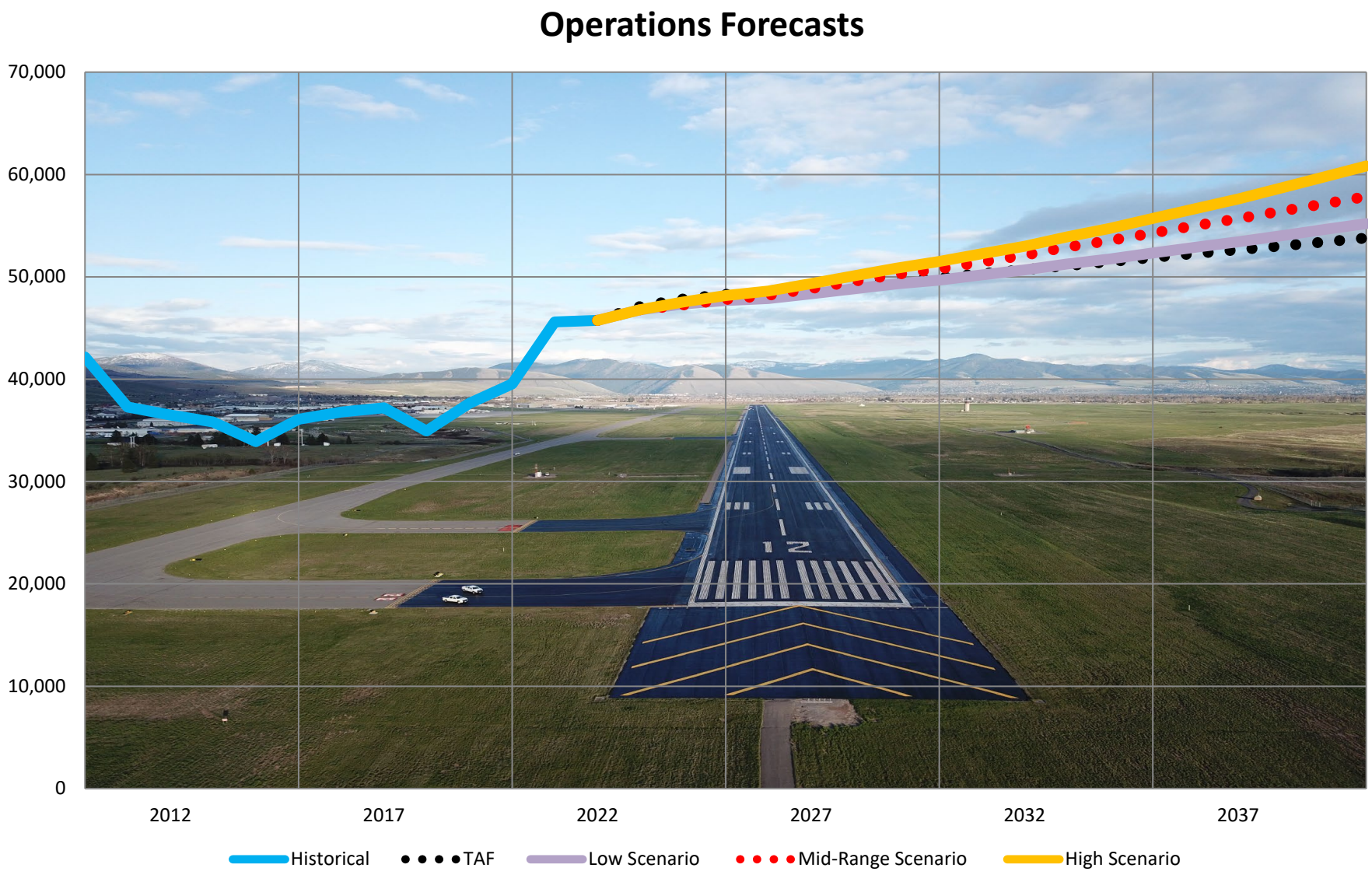


Figure 2-15: Operations Forecasts

2.6.5 Instrument Operations

Annual instrument approaches are recorded by the tower. This data can be used to determine future navigation aid facilities. Historic instrument approaches by aircraft category are displayed in **Table 2-25**.

As operations increase, so will the number of instrument operations. Between 2018 and 2022 instrument operations as a percentage of total operations have averaged 99.5% for Air Carrier, 77.1% for Air Taxi, 15.6% for General Aviation and 32.1% for Military. It is anticipated that these percentages will remain fairly constant throughout the planning period. Forecast Instrument operations based on these percentages are shown in **Table 2-26.**

Table 2-25: Historic Annual Instrument Operations

	Air Carrier	Air Taxi	General Aviation	Military	Total
2013	3,791	7,267	3,507	122	14,687
2014	5,118	7,024	3,571	211	15,924
2015	6,327	4,970	4,074	175	15,546
2016	7,431	4,549	4,476	145	16,601
2017	7,495	4,510	4,595	200	16,800
2018	8,212	4,917	4,484	178	17,791
2019	9,035	3,919	4,300	262	17,516
2020	7,325	4,511	4,064	228	16,128
2021	10,311	4,663	5,440	278	20,692
2022	8,330	4,306	4,546	214	17,396

Table 2-26: Forecast Annual Instrument Operations

	Air Carrier	Air Taxi	General Aviation	Military	Total
2027	9,894	6,001	4,707	164	20,767
2032	10,430	6,691	4,991	164	22,276
2037	11,262	7,381	5,275	164	24,083
2042	12,093	8,072	5,560	292	26,016

2.6.6 Air Cargo

Carriers of cargo include the airlines as well as independent cargo specific operators. Specific carriers operating on the airport include Empire Airlines and FedEx.

The demand for air cargo services is the result of economic activity. Consistent with the volatility in the U.S. economy, air cargo rates have fluctuated over the last 10 years. Increases as high as 12.9% in 2020 were offset by declines as great as -13.7 in 2022.

Historic air cargo statistics for the last ten years are provided in **Table 2-27.** Note that all cargo carriers are not required to report their activity levels. Historical information is provided for air freight which is reported to the airport.

Historically, about 35% of the total air cargo is loaded on, and 65% is off loaded.

Table 2-28 is the forecast for air cargo. An annual growth rate of 1.7 percent was applied, which is consistent with the average annual growth rate over the past ten years.

Table 2-27: Historic Annual Air Cargo (Pounds)

YEAR	TOTAL	Growth Rate	Annual Total On	% On	Annual Total Off	% Off
2013	3,892,458	-1.7%	1,470,716	37.8%	2,421,742	62.2%
2014	4,084,089	4.9%	1,430,524	35.0%	2,653,565	65.0%
2015	4,236,101	3.7%	1,528,128	36.1%	2,707,973	63.9%
2016	3,950,380	-6.7%	1,268,069	32.1%	2,682,311	67.9%
2017	4,143,331	4.9%	1,352,535	32.6%	2,790,796	67.4%
2018	3,864,204	-6.7%	1,254,998	32.5%	2,609,206	67.5%
2019	4,052,086	4.9%	1,286,753	31.8%	2,765,333	68.2%
2020	4,574,946	12.9%	1,785,036	39.0%	2,789,910	61.0%
2021	4,780,284	4.5%	1,819,964	38.1%	2,960,320	61.9%
2022	4,517,681	-5.5%	1,581,045	35.0%	2,936,636	65.0%

Source: BTS T-100 Domestic Segment Data

Table 2-28: Air Cargo Forecast (Pounds)

YEAR	TOTAL	Annual Total On	Annual Total Off
2027	4,870,233	1,704,326	3,165,906
2032	5,250,297	1,837,329	3,412,968
2037	5,660,020	1,980,711	3,679,309
2042	6,101,718	2,135,282	3,966,436

2.6.7 Fuel Volume

Table 2-29 summarizes the Historic Fuel Sales at MSO for the ten year period from 2013 to 2022. The sales include Avgas and Jet-A, including sales to the airlines by the Fixed Base Operators.

Sales have fluctuated considerably over the years with annual changes ranging from a 22.9 percent decline in 2020 to a 144.1 percent increase in 2014. With the exception of 2020, which

was severely impacted by the Covid 19 pandemic, sales overall have been trending upward since 2013.

In general, all things being equal, fuel volumes are projected to increase as operations increase over the next 20 years. Fuel storage areas should be reserved for such an increase.

Table 2-30 applies a non-compounded annual growth rate of 6.2 percent to airline fuel and a non-compounded annual growth rate of 10.1 percent to non-airline jet fuel, which are consistent with the average annual growth rates over the past five years. Av gas sales have historically been trending downward are forecast at no growth. Due to past fluctuations, the forecasts in **Table 2-30** should be viewed as fairly speculative. Additional research is required before making any investment decision based on forecast fuel sales.

Table 2-29: Historic Fuel Usage (Gallons)

YEAR	TOTAL FUEL	Growth Rate	Airline Fuel	Growth Rate	Non-Airline Jet Fuel	Growth Rate	Av Gas 100LL	Growth Rate
2013	1,970,435		1,571,970		351,719		46,746	
2014	4,809,220	144.1%	3,859,927	145.5%	844,594	140.1%	104,699	124.0%
2015	4,700,126	-2.3%	3,525,501	-8.7%	1,060,350	25.5%	114,275	9.1%
2016	5,055,238	7.6%	3,774,823	7.1%	1,160,419	9.4%	119,996	5.0%
2017	5,376,181	6.3%	3,649,432	-3.3%	1,559,970	34.4%	166,779	39.0%
2018	6,109,666	13.6%	4,488,730	23.0%	1,545,156	-0.9%	75,780	-54.6%
2019	6,271,523	2.6%	4,694,254	4.6%	1,495,715	-3.2%	81,554	7.6%
2020	4,833,707	-22.9%	3,152,502	-32.8%	1,610,843	7.7%	70,362	-13.7%
2021	7,959,733	64.7%	5,301,805	68.2%	2,583,760	60.4%	74,168	5.4%
2022	7,200,692	-9.5%	4,786,671	-9.7%	2,344,932	-9.2%	69,089	-6.8%

Source: FBO Records

Table 2-30: Forecast Fuel Usage (Gallons)

Year	TOTAL FUEL	Airline Fuel	Non-Airline Jet Fuel	Av Gas 100LL
2027	9,877,367	6,278,297	3,524,879	74,191
2032	12,548,941	7,769,924	4,704,827	74,191
2037	15,220,515	9,261,550	5,884,774	74,191
2042	17,892,089	10,753,176	7,064,722	74,191

2.6.8 Peaking Characteristics

Most facility planning relates to levels of peak activity. The following planning definitions apply to the peak periods:

- **Peak Month:** The calendar month when peak passenger enplanements or aircraft operations occur.
- **Design Day:** The average day in the peak month.
- **Peak Day:** The busy day of a typical week in the peak month.
- **Design Hour:** The peak hour within the design day.

It is important to recognize that only the peak month is an absolute peak within a given year. All of the others will be exceeded at various times during the year. However, they represent reasonable planning standards that can be applied to future facility needs.

The peak month for passenger enplanements in 2022 was August with 11.6 percent of the annual total. This percentage has been applied to the forecasts of annual enplanements.

The design day is derived by dividing the peak month operations or enplanements by the number of days in the month. A review of tower operations indicates that there are 12 percent more air carrier operations on the peak day (Monday) than the average day, therefore, a 12 percent adjustment has been applied to the design day enplanement figures to reflect the peak day enplanement activity for terminal planning purposes.

The design hour enplanements were estimated at 21 percent of the peak day after reviewing the peak hourly departures from the airline schedule, aircraft seating capacity and average load factors.

Peak monthly airline operations were projected at 14 percent of annual operations based on a review of historic airline operations data.

Design day and hour airline operations were calculated upon review of current schedules. The forecast of design day airline operations was calculated as 3 percent of peak month activity. Airline design hour operations were estimated at 21 percent of design day operations based on a review of flight schedules.

Peak month general aviation operations and military were projected based on monthly tower operations counts at 12 percent of total annual operations. Design day operations were estimated as peak month operations divided by the number of days in the month (31). Overall design hour operations were estimated at 15 percent of design day operations.

Table 2-32 summarizes peak activity forecasts for the MSO.

Table 2-32 MSO Peaking Characteristics

		Forecasts			
	2022	2027	2032	2037	2042
Airline Enplanements					
Annual	424,945	532,559	629,540	710,396	762,774
Peak Month	49,425	61,942	73,221	82,626	88,718
Design Day	1,594	1,998	2,362	2,665	2,862
Peak Day	1,786	2,238	2,645	2,985	3,205
Design Hour	375	470	556	627	673
Airline Operations					
Annual	9,452	9,943	10,481	11,318	12,152
Peak Month	1,282	1,349	1,422	1,535	1,648
Design Day	41	44	46	50	53
Design Hour	9	9	10	10	11
General Aviation & Military Operations					
Annual	35,447	38,920	41,640	44,359	47,079
Peak Month	4,260	4,678	5,005	5,332	5,659
Design Day	137	151	161	172	183
Design Hour	18	20	21	23	24
Total Operations (Airline Operations + GA Operations)					
Annual	44,899	48,863	52,121	55,677	59,231
Peak Month	5,543	6,027	6,427	6,867	7,307
Design Day	179	194	207	222	236
Design Hour	27	29	31	33	35

2.6.9 Forecast Summary

This chapter has outlined the key aviation demand levels anticipated over the planning period. Long term growth at the MSO will be sustained by local promotion of the airport trends experienced at the national level. The next step in the master planning process will be to assess the capacity of existing facilities, their ability to meet forecast demand, and to identify changes to the airfield or landside facilities which will create a more functional facility. The preferred aviation forecasts have been summarized in **Table 2-33**.

Table 2-33 Aviation Demand Forecast Summary

	2022	2027	2032	2037	2042
Enplanements	**424,945**	**532,559**	**629,540**	**710,396**	**762,774**
Based Aircraft	**169**	**184**	**199**	**215**	**230**
Annual Operations					
Air Carrier	9,452	9,943	10,481	11,318	12,152
Air Taxi	6,891	7,787	8,683	9,578	10,474
Military					
Local	382	513	513	513	513
Itinerant	452	399	399	399	399
General Aviation					
Local	11,060	11,976	12,967	13,957	14,948
Itinerant	16,662	18,245	19,079	19,912	20,745
Total	**44,899**	**48,863**	**52,121**	**55,677**	**59,231**

2.6.10 Comparison with the TAF

The FAA annually updates a Terminal Area Forecast (TAF), which forecasts enplanements, based aircraft and operations. The 2018 TAF was the version available at the time of the preparation of this forecast. The FAA requires that forecasts be consistent with the TAF or include sufficient documentation to explain the difference.

The FAA generally considers a forecast consistent with the TAF if it differs by less than 10 percent in the five-year forecast and less than 15 percent in the ten-year forecast.

Table 2-34 compares the preferred Master Plan forecasts with the TAF as recommended in Appendix C of the FAA document, Forecasting Aviation Activity by Airport. Master Plan forecasts for Enplanements, Operations and Based Aircraft.

The preferred enplanement forecast, operations forecast and based aircraft forecast are within 10 percent in the five-year and 15 percent in the ten-year period and are therefore consistent with the TAF.

Table 2-34: Comparison of Master Plan and TAF Forecasts

	Year	Airport Forecast (AF)	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2022	424,945	398,139	6.7%
Base yr. + 5yrs.	2027	532,559	536,192	-0.7%
Base yr. + 10yrs.	2032	629,540	612,298	2.8%
Base yr. + 15yrs.	2037	710,396	691,698	2.7%
Total Operations				
Base yr.	2022	44,899	45,744	-1.8%
Base yr. + 5yrs.	2027	48,863	48,739	0.3%
Base yr. + 10yrs.	2032	52,121	50,689	2.8%
Base yr. + 15yrs.	2037	55,677	52,653	5.7%
Based Aircraft				
Base yr.	2022	169	169	0.0%
Base yr. + 5yrs.	2027	184	176	4.7%
Base yr. + 10yrs.	2032	199	176	13.3%
Base yr. + 15yrs.	2037	215	176	22.0%

TAF Data is on a U.S. Government fiscal year basis (October through September)

2.7 Critical Aircraft and Airport Reference Code

Federal Aviation Administration (FAA) Advisory Circular AC150-5325-4B, *Runway Length Requirements for Airport Design*, indicates that critical aircraft, upon which runway design is based, are required for federally funded projects to "have at least 500 or more annual itinerant operations at the airport (landings and takeoffs are considered as separate operations) for an individual airplane or a family grouping of airplanes." The AC also states that adjustments may be made to the 500 total annual itinerant operations threshold after considering the circumstances of a particular airport.

The FAA has established aircraft classification systems that group aircraft types based on their performance and geometric characteristics. These classification systems, described and illustrated in **Table 2-35**, are used to determine the appropriate airport design standards for specific runway, taxiway, apron, or other facilities, as described in FAA AC 150/5300-13B *Airport Design*. The Aircraft Approach Category (AAC) represents a grouping of aircraft based on approach reference speed, typically 1.3 times the aerodynamic stall speed. Approach speed drives the dimensions and size of runway safety and object free areas. The Airplane Design

Group (ADG) classification of aircraft is based on wingspan and tail height. The ADG drives the dimensions of taxiway and apron object free areas, as well as apron and parking configurations.

Under former guidance, taxiway design was based on ADG. In the updated Advisory Circular AC 150/5300-13B, taxiway design is based on **Taxiway Design Groups (TDG)**, which are based on the overall Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance. TDG classifications are presented in **Figure 2-16**.

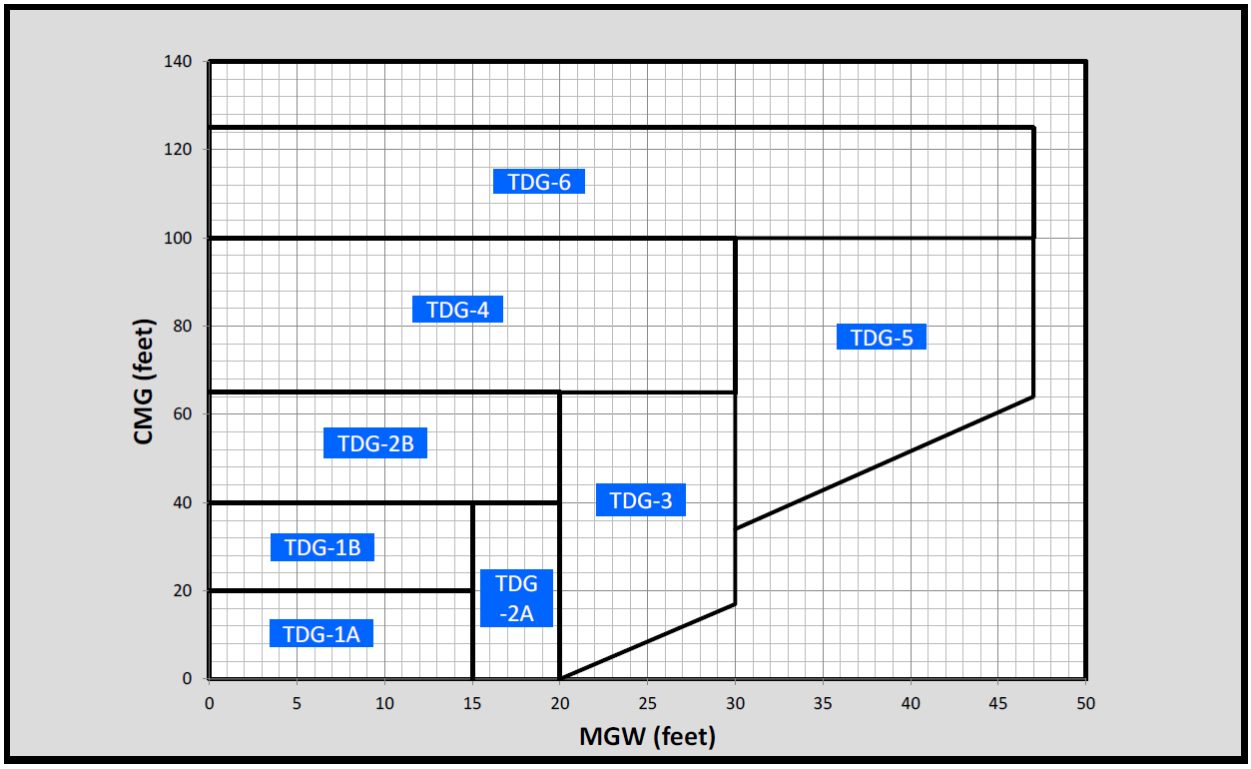
Table 2-35: Airfield Classification Systems

Aircraft Approach Category (AAC)		
AAC	**Approach Speed (1.3 X Stall Speed)**	
A	Less than 91 knots.	
B	91 knots or more but less than 121 knots.	
C	121 knots or more but less than 141 knots.	
D	141 knots or more but less than 166 knots.	
E	166 knots or more.	
Airplane Design Group (ADG)		
ADG	**Tail Height (ft.)**	**Wingspan (ft.)**
I	<20'	< 49'
II	20' - < 30'	49' - < 79'
III	30' - < 45'	79' - < 118'
IV	45' - < 60'	118' - < 171'
V	60' - < 66'	171' - < 214'
VI	66' - < 80'	214' - < 262'

Aircraft weight criteria is considered in airport capacity and runway length calculations. FAA AC 150/5060-5 *Airport Capacity and Delay* classification of aircraft is shown in **Table 2-36** below.

Table 2-36 Aircraft Weight Classifications

Aircraft Classification	Maximum Takeoff Weight (MTOW)	Number of Engines	Wake Turbulence
A	< 12,500 lbs,	Single	Small (S)
B		Multi	Small (S)
C	12,500-300,000 lbs.	Multi	Large (L)
D	>300,000 lbs	Multi	Heavy (H)



Source: Figure 1-1 from AC 5300-13B

Figure 2-16: Taxiway Design Groups

In order to gain an understanding of the most demanding aircraft utilizing the airport, existing air traffic data was analyzed to determine the approximate makeup of aviation traffic. Data was retrieved from the FAA's Traffic Flow Management System Counts (TFMSC) database. TFMSC data provide specific air traffic movement details including aircraft type, date and occurrence for flights for which a plan had been filed, and that are radar-detectable. TFMSC data are built largely upon flight plan filings, in addition to data provided by aircraft with radar-detectable equipment. General aviation operators frequently do not have the equipment necessary to be captured by the NAS, and commonly opt not to file flight plans. Additionally, flight plans do not capture practice operations, such as touch-and-go's, that are likely to be performed by GA and military operators. Therefore, GA operations are under-represented in the TFMSC database.

Table 2-37 depicts a representation of the more demanding aircraft types in approach categories C and D observed at the airport over the course of calendar year 2022. The data presented in **Table 2-38** represents a summary of TFMSC operations counts by Aircraft Approach Category and Airplane Design Group.

Table 2-37 AAC C & D Aircraft Filing Instrument Flight Plans – MSO

Aircraft Type	AAC	ADG	Wing Span	Operations
H25B - BAe HS 125/700-800/Hawker 800	C	I	54'4"	87
LJ31 - Bombardier Learjet 31/A/B	C	I	44'0"	31
LJ40 - Learjet 40; Gates Learjet	C	I	48'0"	19
LJ45 - Bombardier Learjet 45	C	I	48'0"	84
LJ55 - Bombardier Learjet 55	C	I	44'0"	8
LJ60 - Bombardier Learjet 60	C	I	44'0"	64
WW24 - IAI 1124 Westwind	C	I	44'10"	4
CL60 - Bombardier Challenger 600/601/604	C	II	64'0"	66
LJ70 - Learjet 70	C	II	51'0"	2
LJ75 - Learjet 75	C	II	51'0"	44
ASTR - IAI Astra 1125	C	II	54'7"	8
CL30 - Bombardier (Canadair) Challenger 300	C	II	64'0"	250
CL35 - Bombardier Challenger 300	C	II	64'0"	248
CRJ2 - Bombardier CRJ-200	C	II	69'7"	308
G150 - Gulfstream G150	C	II	55'7''	20
G280 - Gulfstream G280	C	II	63'0"	22
GALX - IAI 1126 Galaxy/Gulfstream G200	C	II	58'0"	46
CRJ7 - Bombardier CRJ-700	C	II	76'0"	40
E135 - Embraer ERJ 135/140/Legacy	C	II	65'9"	4
E35L - Embraer 135 LR	C	II	65'9"	30
GL5T - Bombardier BD-700 Global 5000	C	III	94'0"	2
GLEX - Bombardier BD-700 Global Express	C	III	94'0"	50
P3 - Lockheed P-3C Orion	C	III	99'7"	4
B462 - BAe 146 -200	C	III	86'5"	37
RJ1H - Avro RJ-100 Avroliner	C	III	86'5"	1
A319 - Airbus A319	C	III	117'5"	1444
A320 - Airbus A320 All Series	C	III	117'5"	1155
A321 - Airbus A321 All Series	C	III	112'0"	2
B733 - Boeing 737-300	C	III	94'9"	3
B734 - Boeing 737-400	C	III	95'0"	2
B735 - Boeing 737-500	C	III	94'9"	8
B737 - Boeing 737-700	C	III	113'0"	15
E170 - Embraer 170	C	III	85'4"	184
E75L - Embraer 175	C	III	85'4"	3703
E75S - Embraer 175	C	III	85'4"	119

C130 - Lockheed 130 Hercules	C	IV	132'0"	14
C30J - C-130J Hercules ; Lockheed	C	IV	132'7"	4
B752 - Boeing 757-200	C	IV	124'10"	2
K35R - Boeing KC-135 Stratotanker	C	IV	33'0"	4
F18 - Boeing FA-18 Hornet	D	I	37'5"	1
F18H - F/A 18 Hornet	D	I	37'5"	1
F18S - F18 Hornet	D	I	37'5"	8
F22 - Boeing Raptor F22	D	I	44'6"	2
LJ35 - Bombardier Learjet 35/36	D	I	40'0"	20
GLF4 - Gulfstream IV/G400	D	II	77'10"	116
GLF5 - Gulfstream V/G500	D	III	94'0"	89
GLF6 - Gulfstream	D	III	99'7"	52
B738 - Boeing 737-800	D	III	117'5"	948
B739 - Boeing 737-900	D	III	117'5"	20
P8 - Boeing P-8 Poseidon	D	III	123'0"	51

Source: FAA Traffic Flow Management System Counts (TFMSC) Jan 2022-Dec 2022

Table 2-38: Instrument Flight Plans by Type MSO – 2022

AAC / ADG	2022 Operations
Approach Category A	1,642
Approach Category B	8,567
Approach Category C	8,138
Approach Category D	1,308
Aircraft Design Group I	2,603
Aircraft Design Group II	7,209
Aircraft Design Group III	9,816
Aircraft Design Group IV	27

Source: FAA Traffic Flow Management System Counts (TFMSC) Jan 2022-Dec 2022

The totals in **Table 2-38** indicate that the most demanding aircraft type that currently exceeds 500 operations are aircraft in Aircraft Approach Category D and Airplane Design Group III.

In terms of taxiway design, the most demanding aircraft regularly operating at MSO is the Bombardier Dash 8 Q-400 (TDG 5). According to TFMSC data, the Dash 8 Q-400 had 1,379 operations in 2022.

Given the operations counts in recent years, it is recommended that D-III and TDG 5 aircraft should function as the current critical aircraft.

Considering forecast trends, it is recommended that **D-III and TDG 5 aircraft also serve as future critical aircraft and the basis of design for future airport design.**

MSO has historically been planned and built to ARC D-IV / TDG 5 and greater standards. While it is not expected that aircraft in design group IV will account for more than 500 operations in the planning horizon, existing separation safety standards which are designed to D-IV specifications should be maintained. Chapter 3, Facility Requirements will examine in detail the extent to which airport facilities meet current and future design standards, their ability to meet forecast demand, and identify changes to the airfield or landside facilities which will create a more functional facility.