

CHAPTER 2 AVIATION DEMAND FORECAST

MASTER PLAN COLUMBIA REGIONAL AIRPORT

Prepared For
THE CITY OF COLUMBIA
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DRAFT



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CHAPTER 2

AVIATION DEMAND FORECAST

Aviation demand forecasts at Columbia Regional Airport are presented in this chapter for the 20-year planning period (2007-2027). Forecasts of aviation demand provide a basis for determining the type, size, and timing of aviation facility development. Consequently, the forecasts influence virtually all phases of the planning process.

The FAA's Terminal Area Forecast (TAF) for Columbia Regional Airport serves as the basis for the Master Plan Forecasts. The purpose of this chapter is to present the TAF in the context of Columbia Regional Airport's operating environment, show alternative forecast scenarios, and present various peak period derivative forecasts.

The FAA's Terminal Area Forecast is the best source for the forecast of enplanements and operations at Columbia Regional Airport. Although an alternative forecast may be provided given the strong local socioeconomic conditions, the historical trends at the Airport do not reflect the trends indicated by the socioeconomic data.

The historical aviation activity trends at Columbia Regional Airport have been affected by aviation industry issues (air line and cargo consolidation, high fuel prices, changing aviation business strategies, etc.) that are largely unrelated to the Airport and the region it serves. These factors have contributed to the Airport's downward aviation activity historical trends. While these and other factors have negatively affected the historical trends, there are other factors that support an aviation activity forecast that does not continue the historical declines. These include strong local socioeconomic trends, the decline of St. Louis as an airline hub (which has historically been a large source of passenger diversion from Columbia Regional Airport) and the Essential Air Service (EAS) Program which ensures the Airport will maintain a minimum level of air service onto which to build future service.

Given the relative uncertainty surrounding the aviation industry and the need to undertake a master plan that is viable in the face of such uncertainty, the forecast also examines alternative passenger and air cargo scenarios to supplement the base forecast. In addition, the forecast chapter includes a review of historical trends and an examination of factors that impact aviation activity to allow the reader to place the Columbia Regional Airport forecast in proper context.

The forecasts of aviation demand for the Airport are presented in the following sections of this chapter.

- Historical Activity Review
- Factors Affecting Future Aviation Demand
- Annual Enplaned Passengers Forecast
- Annual Aircraft Operations Forecast
- Based Aircraft Forecast
- Design Day/Design Hour Activity Forecasts
- Summary of Forecasts

The forecasts provide for five, 10, and 20-year estimates of future aviation activity at the Airport. The association of various forecast periods with specific time frames is necessary in order to develop a schedule of improvement needs and assess the ability of the Airport to finance the

recommended development plan. If actual growth occurs faster than anticipated, the implementation schedule should be reassessed and accelerated as necessary. Similarly, slower than projected growth may warrant deferment of planned improvements to a later date. Actual activity growth should be frequently compared to projected growth so schedule corrections can be identified and implemented.

2.1 HISTORICAL ACTIVITY REVIEW

This section presents a general overview of commercial service airports followed by a brief review of long-term historical trends in various elements of aviation activity at Columbia Regional Airport. Elements reviewed include airlines serving the Airport, market services, market share, annual enplaned passengers, and annual aircraft operations.

2.1.1 Regional Commercial Service Airports

Columbia Regional Airport is classified as a non-hub airport by the Federal Aviation Administration (FAA). The FAA’s definition of a hub is not to be confused with the designation of a city/airport used by an airline where flights are concentrated in a hub-and-spoke operating concept. The FAA definitions are important because federal Airport Improvement Program (AIP) funding is dependent, in part, upon hub classification.

The FAA hub classifications are based on the percentage of enplanements at an airport compared to the total number of enplanements in the United States. These percentages are as follows:

- **Large Hub** – Enplanes more than 1.0 percent of the nation’s enplaned passengers
- **Medium Hub** – Enplanes at least 0.25 percent, but less than 1.0 percent
- **Small Hub** – Enplanes at least 0.05 percent, but less than 0.25 percent.
- **Non-Hub** – Enplanes more than 10,000, but less than 0.05 percent

In 2007, Columbia Regional Airport was ranked the 384th busiest airport in the nation. It is the fifth busiest commercial service airport in Missouri as shown in Table 2-1.

Table 2-1
MISSOURI AIRPORT RANKINGS

Class	National Rank	Airport Code	Airport Name	City	State	CY 2007 ACAIS Data	
						Boardings	Total
M	33	STL	Lambert-St. Louis International	St. Louis	MO	7,124,020	0.93%
M	34	MCI	Kansas City International	Kansas City	MO	5,833,059	0.76%
S	129	SGF	Springfield-Branson International	Springfield	MO	433,269	0.06%
N	352	JLN	Joplin Regional	Joplin	MO	15,816	0.00%
N	384	COU	Columbia Regional	Columbia	MO	11,554	0.00%
Total Missouri Airports						12,990,823	1.70%
Total All US Airports						762,590,503	100.00%

Source: FAA’s CY07 Air Carrier Activity Information System (ACAIS) Database

2.1.2 Airlines Serving the Airport

Prior to the deregulation of the airline industry, the Civil Aeronautics Board regulated the airlines on pricing and the routes they flew. In 1978, deregulation occurred and service declined at many smaller airports across the nation. At Columbia Regional Airport service fell dramatically as most airlines began operating with a hub-and-spoke concept and competing on routes and pricing. A hub is a collecting point for traffic where passengers arrive on flights from multiple origination points, connect to other flights timed to provide multiple destination options, and depart again to their final destination. While large air carriers using this operating concept were able to compete more aggressively in smaller markets after deregulation, smaller carriers were not as successful. As air carriers streamlined their markets, air fares typically increased to smaller destinations such as Columbia Regional Airport.

There have been at least eight different passenger airlines that have served the Columbia Regional Airport since 1975. Ozark Airlines predominately flew to the Airport from 1975 to 1983. The Airport experienced the highest demand for passenger air service during the mid 1980s. During this time several carriers competed for service at the Airport. From 1984 to 1986, service by Ozark became more sporadic. Eastern Air Midwest and Air Illinois were among the carriers that provided air service to Columbia Regional Airport during the 1980s.

During the early 1990s, passenger service began to slightly decline but was still robust. Trans World Express provided a large market share of service from 1988 to 2001 when its parent company Trans World Airlines (TWA) was acquired by American Airlines. American Connection continued providing service until 2006 when Air Midwest started as an Essential Air Service airline at Columbia Airport. Air Midwest served Columbia Airport with service until June of 2008. In August of 2008, Northwest Airlin (Mesaba Aviation) began providing Essential Air Service to Columbia Regional Airport from Memphis, Tennessee.

2.1.3 Markets Served

Since airline economic deregulation in 1978, most of the major airlines adopted a hub-and-spoke operating concept. Columbia Regional Airport operates chiefly as a spoke airport with commuter airlines feeding traffic to the airlines' respective hub airports. The hub-and-spoke system is a means for a single flight from a spoke airport to have multiple one-stop markets through the hub airport. Principal hub information by the major airlines is shown in Table 2-2.

Table 2-2
PRIMARY DOMESTIC HUB AIRPORTS

Airline	Hub City
AirTran	Atlanta
Alaska	Seattle, Anchorage
Allegiant	Las Vegas, Phoenix (Mesa), Orlando
American	Dallas-Ft.Worth, Chicago (O'Hare), St. Louis, Miami
Continental	Houston, Newark, Cleveland
Delta	Atlanta, Cincinnati, Salt Lake City, Orlando, Las Angeles, New York(JFK)
Frontier	Denver
JetBlue	Boston, New York (JFK), Orlando
Midwest	Milwaukee
Northwest	Detroit, Minneapolis-St. Paul, Memphis
Southwest	Dallas (Love Field), Chicago (Midway), Las Vegas, Phoenix, Houston (Hobby), Baltimore
Spirit	Detroit, Ft. Lauderdale
US Airways	Philadelphia, Charlotte, Phoenix, Las Vegas
United	Chicago (O'Hare), Denver, San Francisco, Washington (Dulles)

As a spoke airport, the air service at Columbia Regional Airport is focused on the hub airports of the major and regional airlines. Because the Airport is a relatively small market, flights to an airline hub provide multiple service destinations that could not be supported by the amount of locally generated traffic. Most spoke airports typically have service limited to hub airports, except for some key recreational and/or seasonal services to cities such as Las Vegas or Orlando. Currently Mesaba Airlines (Northwest Airlin) serves Columbia Regional Airport.

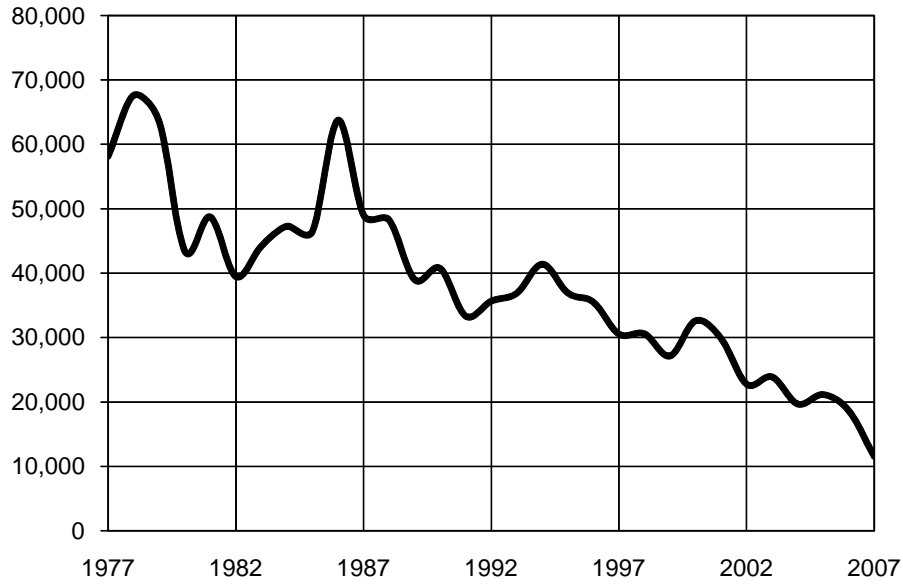
This pattern of service reflects the industry trends in hub and spoke services and offers insight into potential future services. Specifically, airlines compete by offering hub services that are equal to or greater than those of other airline hubs, the objective being to maximize the size of the hub by serving as many spoke markets as feasible. This implies that hub airlines not currently serving Columbia Regional Airport are candidates for future services to assure the competitiveness of their hub.

The key positive aspect of the hub-and-spoke concept for airports like Columbia Regional Airport is numerous one-stop service destinations, available through the hub airports that would not typically be available on a non-stop basis. The negative impact is that passengers must make flight connections at the hub airport.

2.1.4 Annual Enplaned Passengers

An extended history of passengers boarding commercial service aircraft, or enplanements, at the Airport is presented in Table 2-3. Enplanements at Columbia Regional Airport have declined at an average annual rate of about 3.0 percent over the last 35 years. This growth rate has varied with several multi-year peak and drop fluctuations in enplanements due to national and local economic conditions. Over the last six years, enplanements at Columbia Regional Airport have declined at an average annual rate of about 9.0 percent. This decline is attributable to declines in air service as airlines have shifted their market focus onto larger cities.

Table 2-3
HISTORICAL ENPLANEMENTS



Year	Total Enplanements	Annual Increase / Decrease
1977	58,137	
1980	43,411	
1985	46,480	
1990	40,727	
1995	36,894	
1996	35,494	
1997	30,538	-14.0%
1998	30,567	0.1%
1999	27,119	-11.3%
2000	32,604	20.2%
2001	29,855	- 8.4%
2002	22,749	-23.8%
2003	23,877	5.0%
2004	19,667	-17.6%
2005	21,141	7.5%
2006	18,635	-11.9%
2007	11,521	-38.2%

Source: FAA TAF

2.1.5 Annual Aircraft Operations

An aircraft operation is defined as either a takeoff or a landing. Table 2-4 presents a long-term history of the annual aircraft operations recorded at the Airport in four categories: air carrier, commuter/air taxi (commuter), general aviation, and military. An air carrier operation represents either a takeoff or a landing of a commercial aircraft with a seating capacity of more than 60 seats (including similarly sized a cargo aircraft). Commuter operations represent scheduled commercial flights for aircraft with 60 or fewer seats and include air taxi operations, which are nonscheduled flights or for-hire flights of aircraft with 60 or fewer seats (including similarly sized air cargo aircraft). General Aviation operations represent all civil aviation aircraft takeoffs and landings not classified as commercial (air carrier or commuter) or military.

Air carrier operations (including passenger and cargo operations) were at their highest annual historical level at more than 13,100 operations in 1987. Air carrier operations generally declined each year through 1996 and have remained relatively steady between 100 and 200 operations in recent years by cargo and charter aircraft.

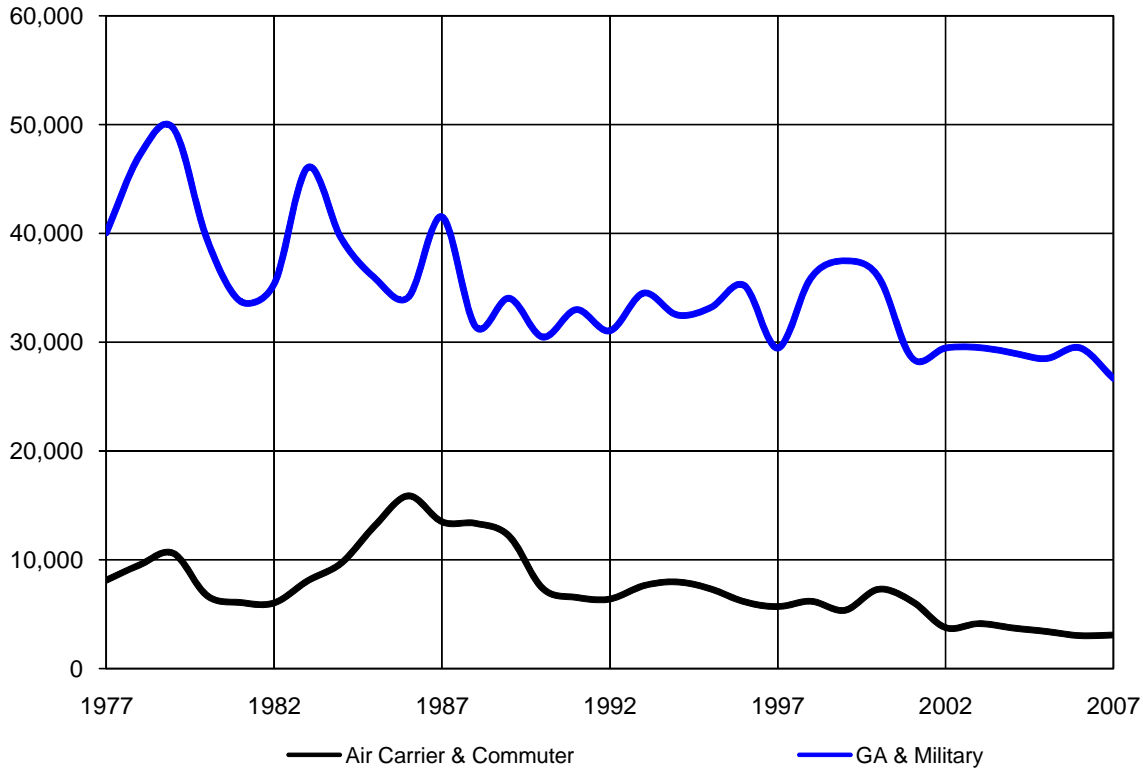
Commuter operations (including passenger and cargo operations) have grown considerably since 1980, increasing from approximately 1,300 to a peak of more than 14,700 operations in 1994. After declines in the mid 1990s, commuter operations have remained relatively steady between 11,000 and 14,000 annual operations in recent years.

Until the early 1990s, air carrier operations significantly exceeded commuter operations. However, consistent with airline industry trends throughout the US, Columbia air service became much more reliant on commuter category aircraft in the 1990s as evidenced by the increase in the number of annual commuter operations relative to air carrier operations. This trend has grown even more pronounced throughout the US and at Columbia Regional Airport in recent years. At Columbia Regional Airport, commuter operations now outnumber air carrier operations by roughly a four to one margin.

General aviation operations represent all civil aviation aircraft takeoffs and landings not classified as commercial (air carrier or commuter) or military. As shown in Table 2-4, general aviation operations were at their highest annual level at more than 47,000 operations throughout the late 1970s. General aviation has had a generally flat trend with a relative decline from the 1970s. There were nearly 25,500 operations in 2007 by general aviation aircraft.

Military aircraft operations have fluctuated within a range of approximately 1,000 to 3,000 annual operations over the past 25 years. There were more than 1,200 annual military operations at Columbia Regional Airport in 2007.

Table 2-4
HISTORICAL OPERATIONS



Year	Commercial Service			General Aviation	Military	Subtotal	Total
	Air Carrier	Commuter	Subtotal				
1977	6,000	3,235	9,235	39,000	892	39,892	49,127
1980	4,291	2,399	6,690	38,506	959	39,465	46,155
1985	2,575	10,554	13,129	32,915	2,974	35,889	49,018
1990	43	7,312	7,355	28,056	2,412	30,468	37,823
1995	581	6,743	7,324	31,857	1,313	33,170	40,494
2000	205	7,077	7,282	33,520	2,497	36,017	43,299
2001	115	6,061	6,176	26,989	1,548	28,537	34,713
2002	121	3,633	3,754	27,147	2,322	29,469	33,223
2003	96	4,029	4,125	27,200	2,305	29,505	33,630
2004	153	3,570	3,723	27,379	1,642	29,021	32,744
2005	160	3,242	3,402	26,641	1,855	28,496	31,898
2006	137	2,873	3,010	27,864	1,619	29,483	32,493
2007	185	2,891	3,076	25,468	1,211	26,679	29,755

Source: FAA Terminal Area Forecast

2.2 FACTORS AFFECTING FUTURE AVIATION DEMAND

Aviation activity at Columbia Regional Airport is influenced by a number of factors. Among these factors are national economic conditions, local socioeconomic conditions, airline hubs, air fares, airline competition, and unforeseen events. These factors are reviewed in this section to provide insight on how these variables may influence demand for future aviation activity at Columbia Regional Airport.

2.2.1 National Economic Conditions

National economic conditions can have a strong effect on future aviation demand. Aviation demand is typically robust during periods of strong economic growth and weaker during economic recessions. During production of this forecast, the national economy was experiencing an economic slowdown. Passengers' price sensitivity to the cost of air travel with a slowing economic economy and increased competition within the industry has resulted in airlines either streamlining their operations financially and/or merging with other airlines in order to stay competitive and remain solvent.

Despite economic conditions, the national economy is cyclical and grows over long periods of time. The national FAA forecast and other national forecasts anticipate GDP growing at about 3.0 percent annually over the long term. While these forecasts have been considered in calculating future annual growth rates at the Airport, the timing, extent, and rate of annual growth in the US economy and future changes in real disposable income will affect the rate of future airline traffic both nationally and at Columbia Regional Airport.

2.2.2 Local Socioeconomic Conditions

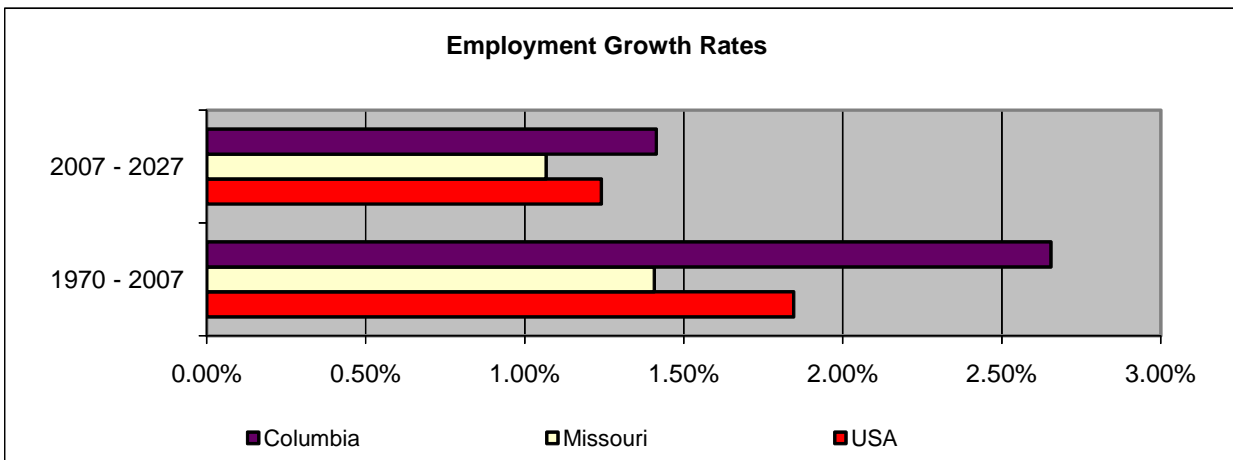
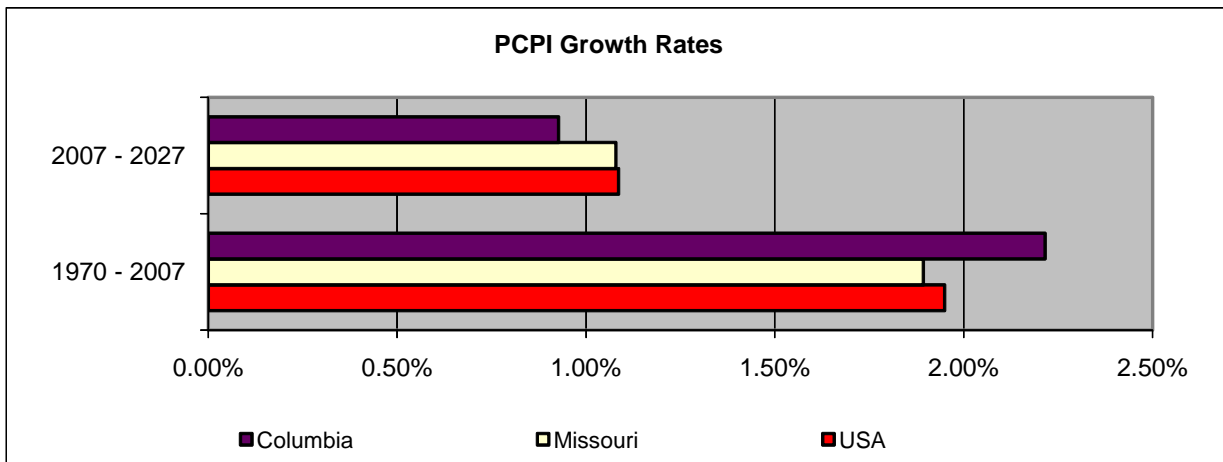
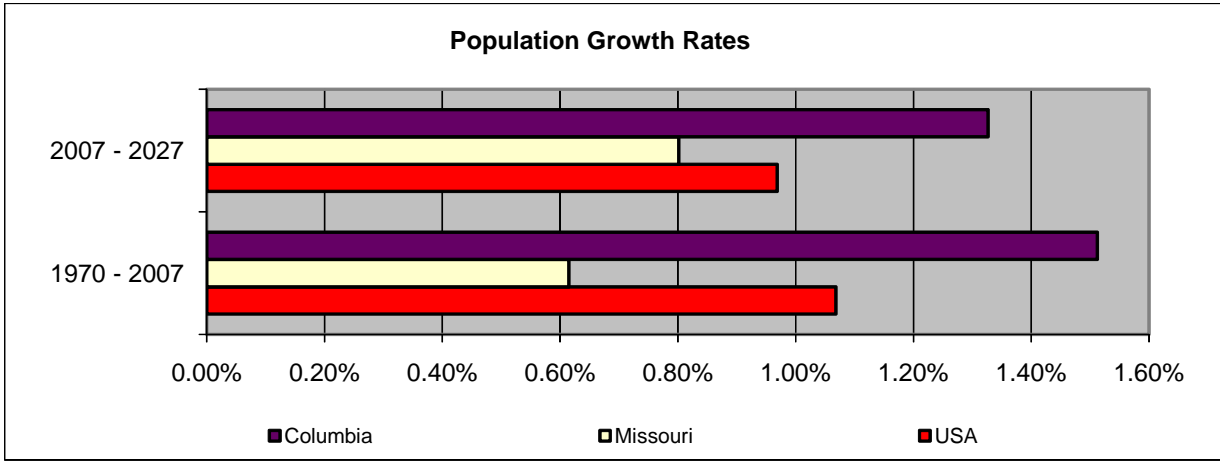
Consideration of a community's economic character is particularly important to the determination of business travel, general aviation, and air cargo levels. Current and projected economic trends and population projections associated with the Airport's primary air service area were examined. The Airport's primary service area is the City of Columbia. Table 2-5 shows historical and projected information for the Columbia metropolitan statistical area, Missouri, and the US.

The following summarizes this demographic information:

- Historical population growth rates for the Columbia air service area are higher than the Missouri and US rates from 1970 through 2007. Population growth rates in the Columbia air service area are projected to remain higher than the US and Missouri.
- Historical per capita personal income (PCPI) growth rates are higher for Columbia compared to the US and the state. However, PCPI growth rates for the Columbia air service area are projected to decrease to below the US and Missouri rates.
- Historical growth rates for employment in the Columbia air service area have been solidly higher than the US and Missouri (1970 through 2007). The Columbia air service area is projected to remain higher than the US and Missouri; however, only by small margin.

The local socioeconomic picture derived from examination of the historical trends and forecasts presented in Table 2-5 presents positive outlooks for the air service area. It is expected that population will continue to grow strongly while the economy grows at a more average rate similar to the State and the US.

Table 2-5
HISTORICAL AND DEMOGRAPHIC INFORMATION



Source: Woods & Poole

2.2.3 Airline Hubs

The disadvantage of air service from a spoke city is the necessity to make a connection. Passenger diversion occurs when passengers who would otherwise use Columbia Regional Airport, choose to drive to alternative airports to avoid connections as well as to seek out lower air fares. The nearest airline hub to Columbia Regional Airport is St. Louis Lambert International Airport where American Airlines has a hub. While St. Louis International Airport is declining in importance as an American Airlines hub, Southwest Airlines has provided a significant share of service to the Airport with low air fares. St. Louis is approximately a two hour drive from Columbia. Kansas City International Airport also has low air fares from Southwest Airlines and is also approximately two hours away from Columbia. As a result, St. Louis International and Kansas City International are significant sources of passenger diversion for Columbia Regional Airport.

2.2.4 Air Fares

Air fare levels have an important effect on the demand for airline service nationally and at the Airport. Air fares are influenced by airline operational costs such as aircraft maintenance, industry competition, and fuel. Overall, aviation fuel has dramatically increased in price over the last three years. The FAA's long range fuel cost forecast acknowledges the short range increases and calls for cost stability for the balance of the forecast period. Other costs impacting profits are air fares and labor costs which are forecast to increase nominally during the forecast period. Significant competition from low-cost carriers will limit the industry's ability to pass on higher operating costs to passengers via higher air fares.

Airline mergers and the number of air carriers serving an airport also have an effect on air fares. Airports served by one airline typically have higher air fares than airports with service from multiple air carriers. While Columbia Regional Airport only receives air service from Mesaba Airlines (Northwest Airlin), St. Louis and Kansas City International receive service from multiple carriers.

2.2.5 Airline Competition

Competitive factors have a significant influence on air fares. On routes that are more competitive or in a city with a competitive environment such as one or two major air carriers and a low-fare carrier, airfares are significantly lower. Changes in competitive forces such as airline bankruptcies, mergers, and acquisitions would significantly influence, positively or negatively, airline traffic at the Airport.

Because competition causes airlines to pursue the most profitable routes, airports in rural communities with lower demand for commercial air service are not attractive destinations to airlines in the face of competition. In 1978, when the Airline Deregulation Act was enacted, Congress added Section 419 the Federal Aviation Act to ensure that smaller communities would retain commercial air service with Federal subsidy where necessary. Through this system of FAA regulation the minimum level of service required by determining the minimum number of round trips, available seats, certain characteristics of the aircraft used, and the maximum permissible number of intermediate stops to the hub. The FAA will normally select a carrier to provide service for a period of two years. At the end of the period, the FAA will either renegotiate a rate with the current carrier or solicit proposals for new carriers. This program is known as the Essential Air Service program. Columbia Regional Airport is classified as an essential air service airport with service provided by Mesaba Airlines (Northwest Airlin) to their hub in Memphis, Tennessee.

2.2.6 Unforeseen Events

Two unforeseen events that have had a pronounced impact on aviation demand are the recent events of September 11, 2001 and recent record high fuel costs.

All airports were negatively affected by the events of September 11th, some more than others. Columbia Regional Airport and many other airports were impacted by the airline economic troubles that followed September 11th. As the number of passenger enplanements declined following the attacks, airlines also cut service to many city pairs. Service cutbacks were widespread and deeply impacted many smaller communities.

Record high fuel costs have also created unforeseen affects on air carriers. As a result, the operating cost for air carriers increased significantly while air fares remained competitive.

2.2.7 Summary

The variables discussed in this portion of the master plan play an important role in the future demand for aviation activity at the Airport. The Columbia Regional Airport air service area has experienced steady population, economic, and employment growth since 1969 to the present, and these socioeconomic factors are projected to continue to grow through the forecast period. However, the Airport receives only limited air service. Limited air service at an airport typically means higher air fares and less convenient schedules. These higher air fares and less convenient schedules have made it more attractive for passengers to drive to alternative airports. As a result, Columbia Regional Airport's enplanements are constrained by the available air service and would likely respond favorably to air service improvements.

2.3 ENPLANED PASSENGER FORECAST

The forecast of enplaned passengers is the foundation upon which other commercial service activity forecasts are developed. The enplaned passenger forecasts are also the basis for determination of the future facilities needed to accommodate projected passenger demands. While alternative methodologies were examined, the FAA's TAF for Columbia Regional Airport serve as the basis for the master plan forecasts.

The Federal Aviation Administration prepares the TAF, which is the official aviation activity forecast for all airports in the National Plan of Integrated Airports System. The TAF is the forecast of the overall national aviation system growth, breaking that growth down into the numerous categories, and then distributing the growth to the individual airports according to size and activity levels. The August 2008 TAF enplanements forecast for Columbia Regional Airport is presented in Table 2-6.

The FAA TAF anticipates enplanements reaching approximately 12,004 enplanements by 2012 and 12,511 by 2017. The TAF shows an average growth rate of 0.8 percent throughout the forecast horizon. While the TAF does not provide forecast enplanements for the year 2027, projections using the TAF's average growth rate show approximately 13,600 enplanements for 2027.

In addition to the TAF, three alternative forecast scenarios were examined. Because Columbia Regional Airport enplanements vary considerably with the level and quality of air service, the three scenarios were based on differing levels of air service.

2.3.1 Loss of Air Service Scenario

The Loss of Air Service Scenario at Columbia Regional Airport presents a case in which the Airport loses its existing Essential Air Service. This scenario would occur if the current Essential Air Service agreement for Columbia Regional Airport was cancelled. The number of annual operations lost at the Airport would be approximately 1,500 and the passenger count would fall to near zero. Under this scenario passengers would be forced to go to alternative airports such as Kansas City or St. Louis International. Although this scenario is possible, the Essential Air Service program has a long legislative history, and is considered to be a relatively stable federal program. Therefore a Loss of Air Service Scenario at Columbia Regional Airport is considered a less-than-likely scenario.

2.3.2 Enhanced Air Service Scenario

The Enhanced Air Service scenario examines the possible impact on enplanements and operations at Columbia Regional Airport if the frequency and perceived quality of air service improved over the current level by increasing the number of daily departures to four per day using a mix of regional jets and turboprops.

Existing air service provided through the Essential Air Service program provides for two daily flights to Northwest Airlines' hub in Memphis using 34 seat turboprop aircraft. This service is perceived to be inefficient because the two daily flights to the Northwest's hub do not provide enough opportunities to connect to other flights without long wait times and layovers. In addition, two daily flights limit the number of available seats during busy travel times and opportunities to advance purchase discounted fares.

The Enhanced Air Service scenario envisions fundamental improvements in air service in terms of frequency and aircraft type utilized by increasing the number of daily departures to four per day using a mix of regional jets and turboprops. It is generally accepted that four daily flights to an airline hub provides very effective connecting opportunities and, when compared to two daily flights, significantly cuts unwanted wait times and layovers. In addition, a mix of regional jets and turboprops better balances the number of seats available throughout the day with the need to travel, making bookings more efficient and increasing the opportunity to purchase lower cost, advance purchase fares.

The Enhanced Air Service scenario assumes that four daily flights would "supply" the Columbia Regional Airport air service market with approximately 60,000 to 80,000 annual seats depending on the daily mix of regional jet and turboprop aircraft. The two fundamental questions underlying this scenario is the Columbia Regional Airport air service market's ability to support this number of seats and is the scenario realistic within the context of the many factors affecting airline service decisions.

Approximately 60,000 to 80,000 annual seats per year at an 80 percent load factor would require approximately 48,000 to 64,000 annual enplanements.¹ It is reasonable that the Columbia Regional Airport air service market can generate this level of enplanements based on historical enplanement levels and based on observations of enplanement per capita levels at similar airports.

¹ Load factor is the percentage of occupied seats determined by dividing the number of revenue passengers by the number of seats. While load factors vary considerably, a load factor of 80 percent is typically associated with a profitable and successful market.

Historical enplanement levels at Columbia Regional Airport were in excess of 48,000 annual enplanements from 1977 through 1988, and in some years were substantially above that number. This is a strong indicator that the market will respond to improved air service in a positive and substantial way. In addition, similar markets were examined on a current (2007) enplanement per capita basis. 48,000 enplanements at Columbia Regional Airport results in a 0.30 enplanement per capita ratio, which is well within the observed range of ratios at similar airports. Examination of similar markets also indicates that four flights per day to the serving airline's hub is a very realistic scenario. Therefore, while not a prediction of future air service, the Enhanced Air Service scenario is a reasonably attainable scenario and could occur at the Airport under a variety of future situations.

2.3.3 Greatly Enhanced Air Service Scenario

The Greatly Enhanced Air Service scenario examines the possible impact on enplanements and operations at Columbia Regional Airport if the frequency and perceived quality of air service improved over the current level by increasing the number of serving airlines from one to two and the number of daily departures to eight per day using a mix of regional jets and turboprops.

As described in the previous scenario, existing air service provided through the Essential Air Service program provides for two daily flights to Northwest Airlines hub in Memphis using 34 seat turboprop aircraft. This service is perceived to be inefficient because the two daily flights to the Northwest's hub do not provide enough opportunities to connect to other flights without long wait times and layovers. In addition, two daily flights limit the number of available seats during busy travel times and opportunities to advance purchase discounted fares. Finally, service by a single carrier results in very little fare competition.

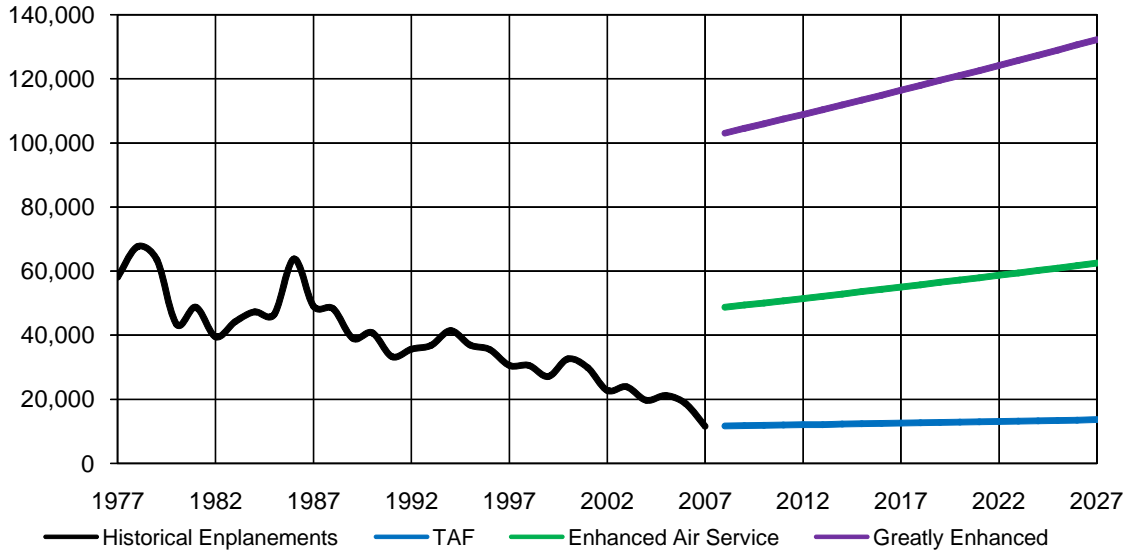
The Greatly Enhanced Air Service scenario envisions fundamental improvements in air service in terms of the number of airlines, frequency of flights, and aircraft type utilized by increasing the number of airlines to two, daily departures to eight per day (four for each airline) and using a mix of regional jets and turboprops. Two airlines competing in a market with four daily flights each to their respective hubs provides greatly improved connecting opportunities, minimal layovers, and significant fare competition.

The Greatly Enhanced Air Service scenario assumes that eight daily flights would "supply" the Columbia Regional Airport air service market with approximately 130,000 to 165,000 competitively-priced daily seats depending on the mix of regional jet and turboprop aircraft.

Approximately 130,000 seats per year at an 80 percent load factor would require approximately 108,000 annual enplanements. It is not certain that the Columbia Regional Airport air service market can generate this level of enplanements based on historical enplanement levels and based on observations of enplanement per capita levels at similar airports.

Historical levels at Columbia Regional Airport are far less than 108,000 annual enplanements from 1977 through 2007. In addition, similar markets were examined on a current (2007) enplanement per capita basis. 108,000 enplanements at Columbia Regional Airport results in a 0.60 enplanement per capita ratio, which is at the high end of the observed range of ratios at similar airports. Examination of similar markets also indicates that two airlines providing four flights per day their respective hub is a somewhat optimistic scenario. Therefore, while not a prediction of future air service, the Greatly Enhanced Air Service scenario is not a realistically attainable scenario and is less likely to occur at the Airport under a variety of future situations.

Table 2-6
ENPLANEMENT PROJECTIONS



Year	Historical Enplanements	TAF	Enhanced Air Service	Greatly Enhanced Air
1980	43,411			
1985	46,480			
1990	40,727			
1995	36,894			
2000	32,604			
2005	21,141			
2007	11,521			
2012		12,004	51,400	108,800
2017		12,511	55,000	116,400
2027		12,721	62,500	132,200
Avg. Growth Rates				
			34.9%	56.7%
			16.9%	26.0%
			8.8%	13.0%

Source: FAA Terminal Area Forecast. 2027 extrapolated from TAF years 2015 to 2025.

2.4 AIR CARGO FORECAST

Cargo service at Columbia Regional Airport has historically been provided by DHL, a dedicated cargo carrier. In August of 2008, DHL and UPS announced that UPS would take over flight operations for DHL and provide air carriage for DHL's cargo on UPS's existing network. Following the announcement, air cargo operations were reduced dramatically at the Airport, and remain near zero. It is uncertain if a similar operation at the Airport will resume by UPS for DHL. However, indications are that air cargo operations will not resume.

Given the uncertainty of cargo service at the Airport, two scenarios are examined in this chapter. The scenarios include a Ramp Sort Scenario and a Facility Based Sortation Scenario.

2.4.1 Ramp Sortation Scenario

Fully integrated package carriers like DHL, UPS, and FedEx operate different types of air package handling facilities on airports depending on the volume of business in an area. The most simple air to truck operation is a ramp sortation. Under the ramp sortation scenario, the operator (UPS, FedEx, etc.) would operate one or two smaller cargo feeder aircraft such as a Cessna Caravan. These aircraft would arrive at the Airport early in the morning. After arriving, these aircraft would be met on an apron by delivery trucks, packages are off loaded onto the delivery trucks, and in some cases the aircraft departs to other airports. Cargo is not typically warehoused or further sorted at the Airport. At the end of the day, the delivery trucks return to the Airport, off load the day's packages on to the aircraft, and then the aircraft depart the Airport. The feeder aircraft transport the cargo to a centrally-located airport to meet a trunk aircraft.

The Ramp Sortation Scenario assumes approximately two operations per weeknight and two operations per weekend which equates to approximately 630 operations per year when considering additional holiday flights. As the fully integrated package carrier industry evolves, it is quite possible that a ramp sortation may be established at the Airport.

2.4.2 Facility-Based Sortation Scenario

DHL's operation at the Airport was a Facility-Based sortation operation. Resumption of this type of service by UPS or FedEx would likely be centered around a trunk aircraft such as a Boeing 757, feeding the existing sortation facility. Under this scenario, the aircraft would arrive early on weekday mornings. The aircraft would be unloaded by a ground crew and the cargo sorted in the sortation facility and loaded onto trucks for delivery. The day's outgoing cargo gathered would be gathered over the day by delivery handled through the sortation facility late in the evening by a ground crew. The aircraft would be loaded again for a late night departure to a UPS or FedEx cargo hub. It is possible that in addition to a trunk aircraft feeding the sortation facility's trucks, the operation could also include feeder aircraft (two to eight typically) such as Cessna Caravans. These feeder aircraft arrive and depart the facility at times similar to the truck operation and extend the reach of the operation by several hundred miles.

The Facility-Based Sortation assumes approximately two weeknight and two weekend flights by the trunk aircraft and two weeknight and two weekend flights by each feeder aircraft. This equates to approximately 630 operations per year by the trunk aircraft and 1,260 to 5,040 operations per year by the feeder aircraft depending upon the number of feeders.

There are limited opportunities within UPS' and FedEx's existing air cargo networks for new, major facility based sortation operations and it is less likely that such an operation would be reestablished at Columbia Regional Airport.

2.5 BASED AIRCRAFT FORECAST

Based aircraft at an airport represent the total number of active civil aircraft permanently located or projected to be located at an airport during a specific period. Based aircraft categories include single-engine, multi-engine, turboprop, jet, and rotorcraft. The national general aviation industry has experienced declines in nearly all measures of activity since the early 1980s including new aircraft shipments, active fixed base operators (FBOs), hours flown, etc. The number of aircraft based at individual airports has dropped at many facilities. At Columbia Regional Airport the number of based aircraft has declined over the last three years, but has begun to show signs of revitalization for fiscal year 2007. According to the FAA records, the number of based aircraft at the Airport increased 23 aircraft in 1995 to 80 in 2001. From 2002 to 2006, the number of based aircraft declined to 44. The number of based aircraft increased to 47 in 2007.

The FAA's TAF for Columbia Regional Airport serves as the basis for the Master Plan Forecasts and shows based aircraft continuing to increase at average annual growth rate of almost two percent throughout the planning period.

While the number of single engine aircraft is assumed to remain constant over the planning horizon, the number of multi-engine and jet aircraft is anticipated to increase at Columbia Regional Airport consistent with national general aviation trends. Table 2-7 shows estimates of future types of based aircraft at Columbia Regional Airport.

Table 2-7
BASED AIRCRAFT PROJECTIONS

Year	Single Engine	Multi Engine	Jet	Rotorcraft	Other	Total
2007	21	15	10	1		47
2012	21	16	13	1		51
2017	21	17	17	1		56
2027	21	22	25	1		69
Avg Growth Rate						
2007-2012	0.0%	1.3%	5.4%	0.0%	0.0%	1.6%
2007-2017	0.0%	1.3%	5.4%	0.0%	0.0%	1.8%
2007-2027	0.0%	1.9%	4.7%	0.0%	0.0%	1.9%

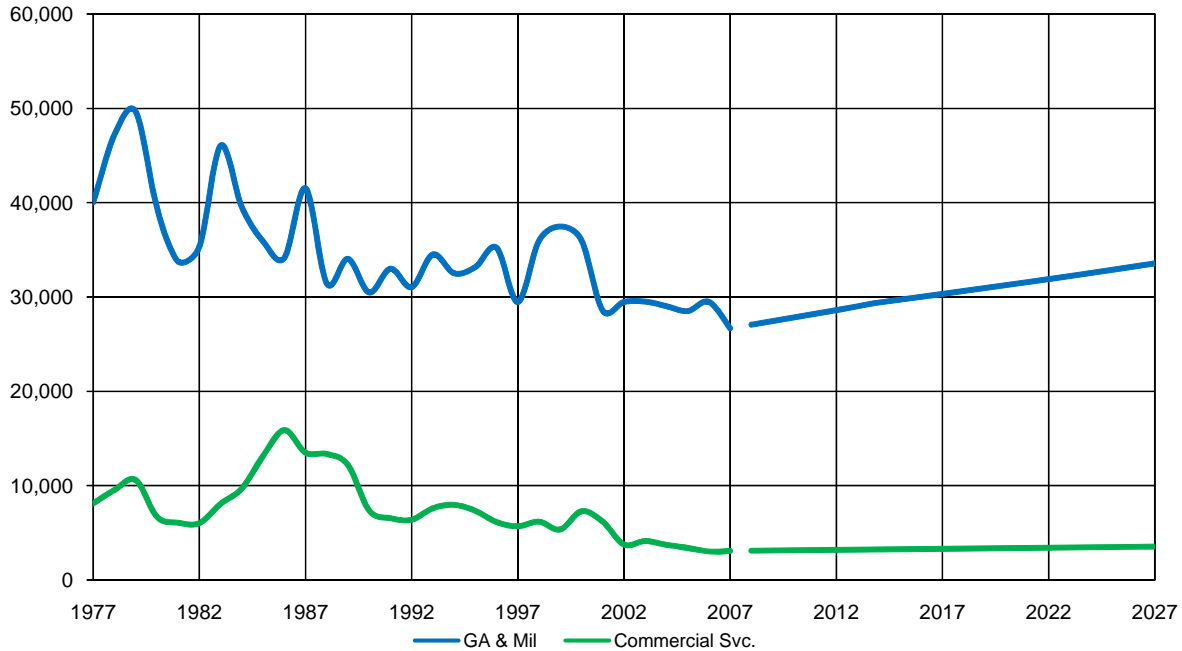
Source: FAA TAF. 2027 extrapolated from TAF years 2015 to 2025.

2.6 ANNUAL AIRCRAFT OPERATIONS FORECAST

Forecasts of annual aircraft operations were prepared for two categories of aviation activity using the TAF. The two categories include commercial service (air carrier and commuter) operations and general aviation and military operations. General Aviation operations represent all civil aviation aircraft takeoffs and landings not classified as commercial (air carrier or commuter) or military.

Table 2-8 shows the total operations forecast for two categories of aviation originating from the TAF. A general observation of historical data and the forecast suggests that commercial service operations have been flat over the last five years and are forecast to remain fairly consistent. General aviation historical data shows a relatively flat trend as well when looking at the last five to 10 years. The forecast of general aviation operations is projected to be stronger than air carrier growth but still remaining consistent with the last 10 years of historical data.

Table 2-8
TOTAL OPERATIONS FORECAST



Year	Commercial Service			General Aviation			Military			Total
	Air Carrier	Commuter	Subtotal	Itinerant	Local	Subtotal	Itinerant	Local	Subtotal	
1977	6,000	2,112	8,112	21,000	18,000	39,000	627	420	1,047	48,159
1982	2,877	3,149	6,026	21,025	8,671	29,696	1,535	4,100	5,635	41,357
1987	13,165	318	13,483	23,026	15,066	38,092	825	2,612	3,437	55,012
1992	67	6,311	6,378	19,400	9,536	28,936	689	1,419	2,108	37,422
1997	129	5,556	5,685	19,659	8,525	28,184	359	914	1,273	35,142
2002	121	3,633	3,754	19,658	7,489	27,147	722	1,600	2,322	33,223
2007	185	2,891	3,076	18,669	6,799	25,468	600	611	1,211	29,755
2012	185	3,000	3,185	20,094	7,310	27,404	593	611	1,204	31,793
2017	185	3,112	3,297	21,268	7,858	29,126	586	611	1,197	33,620
2027	185	3,347	3,532	23,294	9,084	32,378	573	611	1,184	37,094
Avg. Growth Rates										
2007-2012	0%	1%	0.7%	1.5%	1.5%	1.5%	-0.2%	0.0%	-0.1%	1.3%
2007-2017	0%	1%	0.7%	1.3%	1.5%	1.4%	-0.2%	0.0%	-0.1%	1.2%
2007-2027	0%	1%	0.7%	1.1%	1.5%	1.2%	-0.2%	0.0%	-0.1%	1.1%

Source: FAA Terminal Area Forecast. 2027 extrapolated from TAF years 2015 to 2025.

2.7 IMPACT OF SCENARIOS ON OPERATIONS

The forecast of enplanements and air cargo at Columbia Regional Airport were analyzed with alternative scenarios. The alternative scenarios have relatively minor impacts on the level of operations at the Airport and summarized below. The highest of the high operations scenarios would be as high as 6,000 operations. The lowest of the low number of operations would no increase in operations.

2.7.1 Impact of Air Service Scenarios On Operations Forecast

The three air service scenarios have a relatively small impact on the base operations forecast. Under the Loss of Air Service scenario, the base operations forecast drops by approximately 1,500 commuter operations per year. Under the Enhanced Air Service scenario, the base operations forecast increased by approximately 1,500 commuter operations. Under the Greatly Enhanced Air Service scenario the base operations forecast increases by approximately 4,400 commuter operations per year.

2.7.2 Impact of Cargo Scenarios on Operations Forecast

The two cargo scenarios also have a relatively small impact on the base operations forecast. Under the Ramp Sortation scenario, the base operations forecast increases by approximately 630 operations per year. Under the Facility-Based Sortation Scenario, the base operations forecast increased by approximately 630 operations by the trunk aircraft and 1,260 to 5,040 operations by the feeder aircraft per year.

2.8 INSTRUMENT APPROACH FORECAST

An instrument approach, as defined by the FAA for towered airports, is an approach to an airport by an aircraft with an instrument flight plan where visibility is less than three miles or the ceiling is at or below the minimum initial approach altitude. Instrument approaches are used by the FAA to determine an airport's eligibility for enhanced instrument approach capability and additional navigational aids. They are only recorded when an approach is conducted in instrument conditions.

Instrument approaches are projected to increase throughout the forecast period at the same pro-rata share that each component of total operations is anticipated to increase over the planning period. The forecast projections are estimated and are based on limited available data sources. Forecast instrument approaches are projected using a two step method. The first step estimates the number of instrument flight rule operations (regardless of weather conditions) based on historical records. The second step estimates the number of instrument flight rule operations that occur under instrument meteorological conditions based on the percentage of time instrument meteorological conditions occur at the Airport. Instrument meteorological conditions occur approximately 10 percent of the year at Columbia Regional Airport. Therefore it is assumed that 10 percent of Instrument Flight Rules operations take place in instrument meteorological conditions at the Airport. Historical instrument flight rule activity at the Airport is presented on Table 2-9. Table 2-10 presents the projected number of instrument approaches at the Airport.

Table 2-9
PERCENT INSTRUMENT FLIGHT RULES OPERATIONS

Year	IFR Itinerant					Itinerant				
	Air Carrier	Commuter	Aviation	Military	Total	Air Carrier	Commuter	Aviation	Military	Total
1990	2	4,945	6,373	161	11,481	17	5,481	15,643	527	21,668
1991	13	5,844	7,139	154	13,150	52	6,485	20,914	651	28,102
1992	14	5,735	7,504	197	13,450	67	6,311	19,400	689	26,467
1993	322	6,684	8,255	287	15,548	438	7,161	21,136	1,068	29,803
1994	413	6,833	8,290	122	15,658	569	7,388	20,279	444	28,680
1995	443	6,224	8,718	85	15,470	581	6,743	20,298	447	28,069
1996	111	5,293	7,296	51	12,751	199	5,932	23,402	389	29,922
1997	57	5,144	7,530	40	12,771	129	5,556	19,659	359	25,703
1998	343	5,027	9,150	73	14,593	530	5,646	22,337	670	29,183
1999	381	4,238	8,178	137	12,934	564	4,778	22,773	1,110	29,225
2000	86	5,684	8,055	58	13,883	205	7,077	23,360	747	31,389
2001	42	4,846	6,922	58	11,868	115	6,061	19,938	538	26,652
2002	110	3,541	7,315	144	11,110	121	3,633	19,658	722	24,134
2003	89	3,788	7,218	163	11,258	96	4,029	18,483	740	23,348
2004	34	2,836	7,508	77	10,455	153	3,570	19,487	658	23,868
2005	121	3,163	7,819	183	11,286	160	3,242	19,194	688	23,284
2006	137	2,799	6,703	183	9,822	137	2,873	19,712	617	23,339
2007	181	2,858	6,744	184	9,967	185	2,891	18,669	600	22,345
Total	2,899	85,482	136,717	2,357	227,455	4,318	94,857	364,342	11,664	475,181
Percent IFR Itinerant	67%	90%	38%	20%	48%					

Sources: Air Traffic Activity System (ATADS)

Table 2-10
INSTRUMENT APPROACHES

Year	Air Carrier	Commuter	General Aviation	Military	Total
<u>2007 (estimate)</u>					
Total Itinerant Operations	185	2,891	18,669	600	22,345
Percent IFR Itinerant	67.1%	90.1%	37.5%	20.2%	
IFR Operations	124	2,605	7,005	121	9,856
Percent Instrument Meteorological Conditions	10.0%	10.0%	10.0%	10.0%	
IFR in Instrument Meteorological Conditions	12	261	701	12	986
Instrument Approaches	6	130	350	6	493
<u>2012</u>					
Total Itinerant Operations	185	3,000	20,094	593	23,872
Percent IFR Itinerant	67.1%	90.1%	37.5%	20.2%	
IFR Operations	124	2,704	7,540	120	10,488
Percent Instrument Meteorological Conditions	10.0%	10.0%	10.0%	10.0%	
IFR in Instrument Meteorological Conditions	12	270	754	12	1,049
Instrument Approaches	6	135	377	6	524
<u>2017</u>					
Total Itinerant Operations	185	3,112	21,268	586	25,151
Percent IFR Itinerant	67.1%	90.1%	37.5%	20.2%	
IFR Operations	124	2,804	7,981	118	11,028
Percent Instrument Meteorological Conditions	10.0%	10.0%	10.0%	10.0%	
IFR in Instrument Meteorological Conditions	12	280	798	12	1,103
Instrument Approaches	6	140	399	6	551
<u>2027</u>					
Total Itinerant Operations	185	3,347	23,294	573	27,399
Percent IFR Itinerant	67.1%	90.1%	37.5%	20.2%	
IFR Operations	124	3,016	8,741	116	11,997
Percent Instrument Meteorological Conditions	10.0%	10.0%	10.0%	10.0%	
IFR in Instrument Meteorological Conditions	12	302	874	12	1,200
Instrument Approaches	6	151	437	6	600

2.9 DESIGN DAY/DESIGN HOUR ACTIVITY FORECASTS

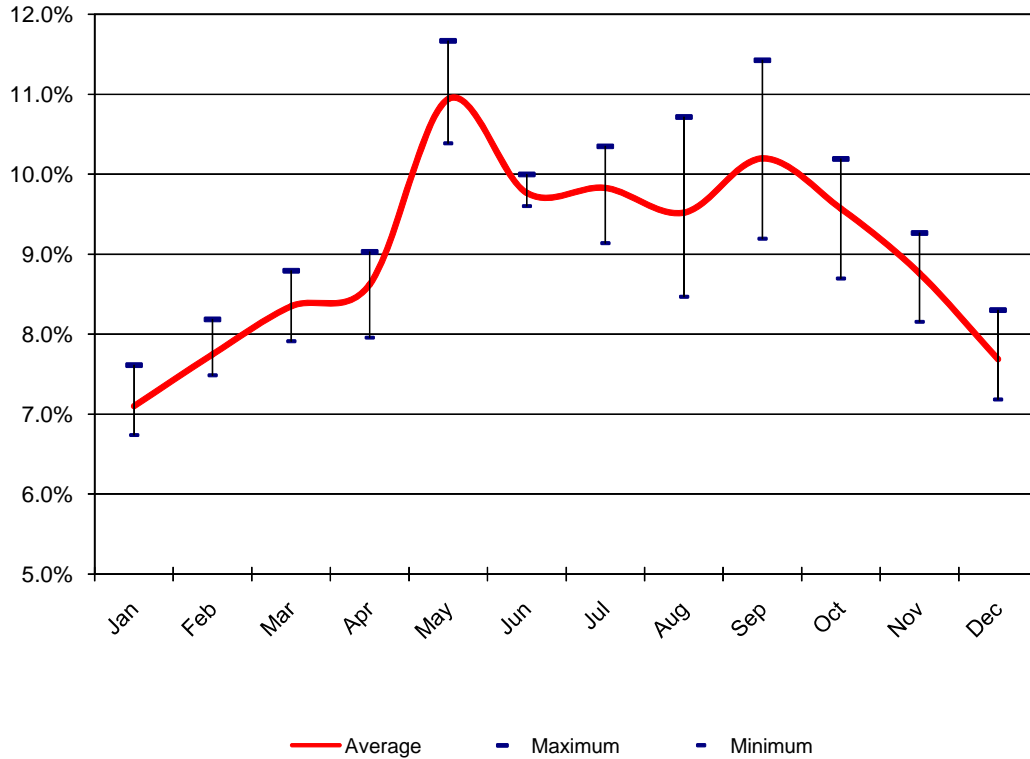
Capacity analyses and determination of future facility requirements of various elements of airport facilities are often based on design day or design hour activity levels. To avoid the construction and operational cost of acquiring capacity that would be rarely used, design day and design hour activity levels should not be the absolute busiest period at the Airport. Rather the design day and design hour activity levels should be representative of busy periods but not the absolute peak periods. Often the design day is generally equivalent to the 85th percentile of activity for the design year. Facilities designed to accommodate this level of activity in the design year will provide a comfortable level of service for the large majority of the time. During unusually high activity periods such as the Wednesday before and the Sunday after Thanksgiving Day, Airport facilities can be expected to experience more crowded conditions and longer, but not unreasonable or intolerable, processing times.

The design day level of activity is often calculated in airport planning efforts using a peak month/average day definition. Tables 2-11 through 2-12 show the high, low, and average monthly distributions of annual total operations, and annual commercial service operations from 2004 to 2007 at the Airport. As is common when evaluating such data at various airports, the calendar month that experienced the highest level of activity in a given year often varies. Annual activity in the peak month expressed as a percentage of annual activity is usually fairly constant from year to year. If annual activity were equally distributed among all 12 months in a year, monthly activity would be approximately 9.0 percent.

Annual peak month total operations is shown to take place consistently during the month of August. Table 2-11 shows the monthly distribution of total. This trend may reflect the strong tourist traffic and favorable flying conditions during the late summer months in the Columbia area. The peak hour for total operations is projected to be 10.9 percent of the average daily activity.

The design day and design hour activity levels that result from the application of these factors to annual forecasts of the respective demand elements are presented on Table 2-12.

Table 2-11
MONTHLY DISTRIBUTION OF TOTAL OPERATIONS



Month	Average	Maximum	Minimum
January	7.1%	7.6%	6.7%
February	7.7%	8.2%	7.5%
March	8.3%	8.8%	7.9%
April	8.6%	9.0%	8.0%
May	10.9%	11.7%	10.4%
June	9.8%	10.0%	9.6%
July	9.8%	10.3%	9.1%
August	9.5%	10.7%	8.5%
September	10.2%	11.4%	9.2%
October	9.6%	10.2%	8.7%
November	8.8%	9.3%	8.2%
December	7.7%	8.3%	7.2%

Source: FAA Air Traffic Activity Data System (ATADS), CY2003 to CY2006

Table 2-12
DESIGN DAY/DESIGN HOUR ACTIVITY FORECASTS

Description	2007	Planning Period		
		2012	2017	2027
Enplanements - Base				
Annual Enplanements	11,521	12,004	12,511	13,604
Peak Month	3,042	3,169	3,303	3,591
Average Day (31 Days)	98	102	107	116
Peak Hour Passenger Enplanements	34	34	34	34
Peak 20 Minute Passenger Enplanements (2/3)	23	23	23	23
Enplanements - Enhanced				
Annual Enplanements	11,521	51,400	55,000	62,500
Peak Month	4,283	5,140	5,500	6,250
Average Day (31 Days)	138	166	177	202
Peak Hour Passenger Enplanements	34	36	39	44
Peak 20 Minute Passenger Enplanements (2/3)	23	24	26	30
Enplanements - Greatly Enhanced				
Annual Enplanements	11,521	108,800	116,400	132,200
Peak Month	9,067	10,880	11,640	13,220
Average Day (31 Days)	292	351	375	426
Peak Hour Passenger Enplanements	34	77	83	94
Peak 20 Minute Passenger Enplanements (2/3)	23	52	55	63
Passenger Airline Operations				
Peak Hour Departures	1	1	1	1
Peak Hour Passenger Arrivals	1	1	1	1
Passenger Airline Operations - Enhanced				
Peak Hour Departures	1	1	1	1
Peak Hour Passenger Arrivals	1	1	1	1
Passenger Airline Operations - Greatly Enhanced				
Peak Hour Departures	1	2	2	2
Peak Hour Passenger Arrivals	1	2	2	2
Total Operations				
Annual Operations	29,755	31,793	33,620	37,094
Peak Month (10.9% of annual)	3,243	3,465	3,665	4,043
Average Day (31 days)	105	112	118	130
Peak Hour (15.0%)	16	17	18	20

2.10 COMPARISON WITH OTHER FORECASTS

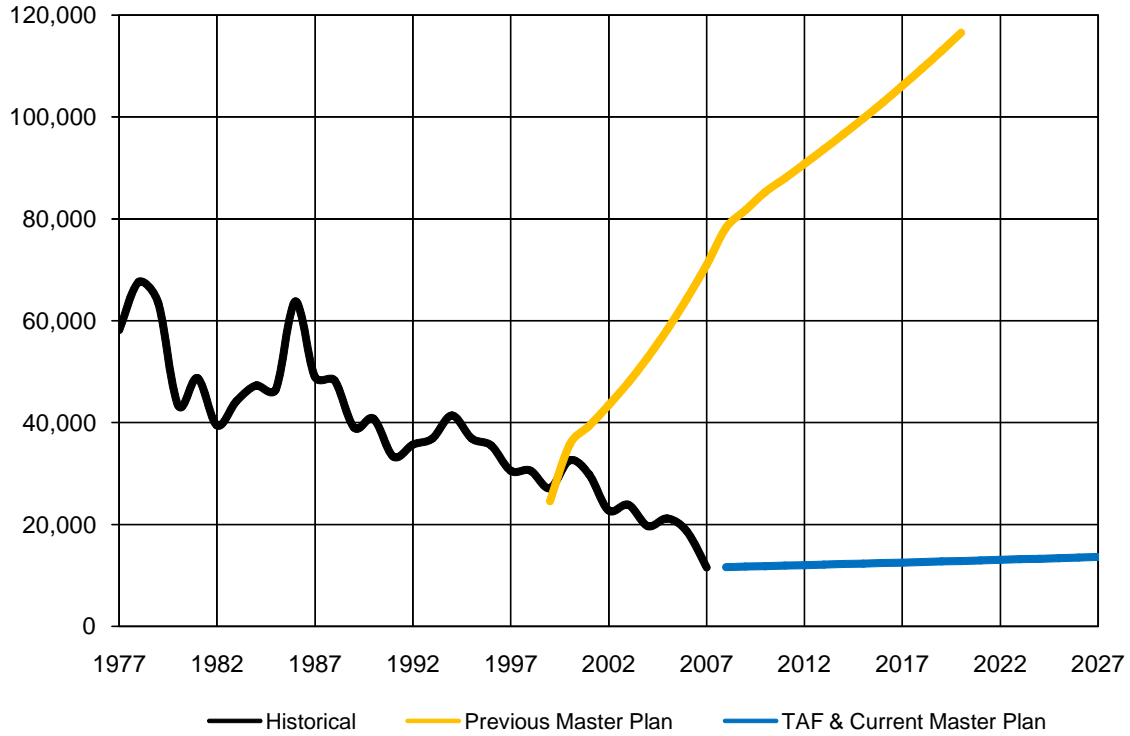
Forecasts prepared in a master plan are reviewed by the FAA and compared to the Terminal Area Forecast (TAF) projections. FAA Order 5090.3C, *Field Formulation of The National Plan of Integrated Airport Systems* provides guidance on the FAA review process. However, the FAA Revision to Guidance on Review and Approval of Aviation Forecasts (June 2008) letter states that the FAA Office of Aviation Policy and Plans will find a locally developed forecast for operations, based aircraft, and enplanements consistent with the Terminal Area Forecast if it meets any of the following three conditions for a Commercial Service airport.

- First, the forecast differs less than 10 percent in the 5-year forecast period and less than 15 percent in the 10-year period.
- Second, the forecast activity levels do not affect the timing or scale of an airport project.
- Third, the forecast activity levels do not affect the role of the Airport as defined in FAA Order 5090.3C.

The FAA's Terminal Area Forecasts (TAF) for Columbia Regional serves as the basis for the Master Plan Forecast. Table 2-13 presents a comparison of the enplanements forecast prepared in this chapter with the forecasts prepared in the previous master plan undertaken for the Airport in 1999. The previous master plan's forecast for the period 1999 through 2020 is high when compared to historical enplanements at the Airport.

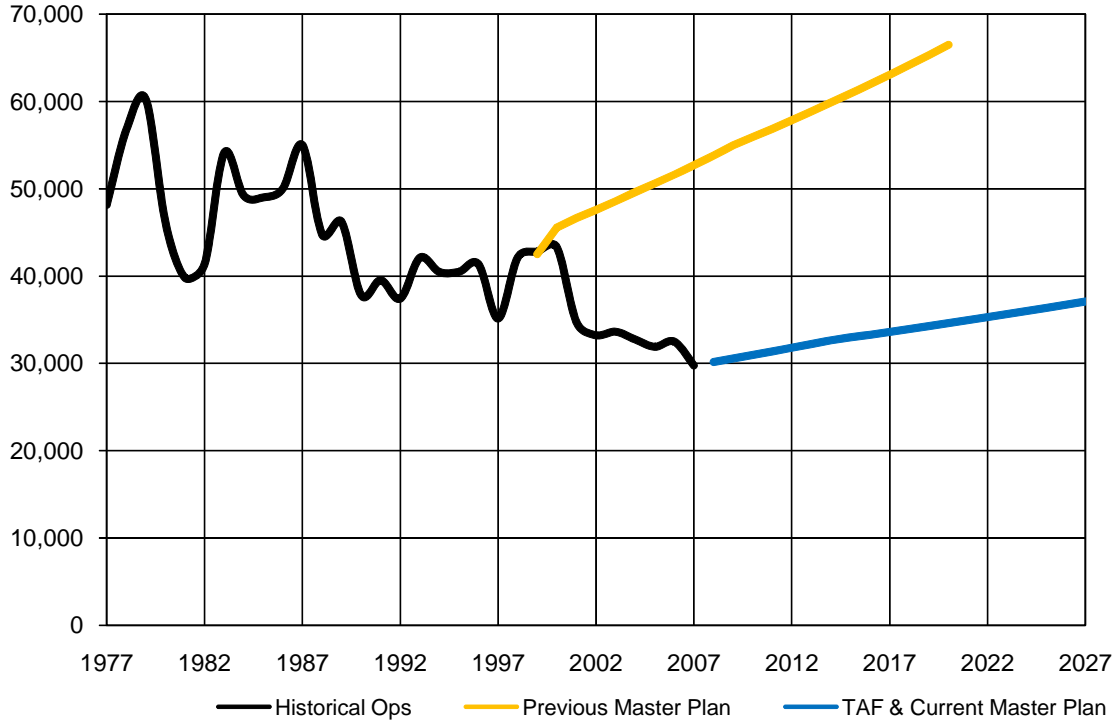
The forecast of aircraft operations in this chapter are lower than the previous master plan forecasts. Table 2-14 illustrates the comparison of the operations forecast prepared in this chapter with the forecast prepared in the previous master plan. The previous master plan's forecast is also high when compared to historical operations at the Airport.

Table 2-13
ENPLANEMENT COMPARISON



Year	Historical	TAF	Previous Master Plan	Current Master Plan
1977	58,137			
1982	39,447			
1987	49,000			
1992	35,648			
1997	30,538			
2002	22,749		43,378	
2007	11,521	11,521	70,963	
2012		12,004	90,772	12,004
2017		12,511	106,115	12,511
2027		13,604		13,604

Table 2-14
OPERATIONS COMPARISON



Year	Historical	TAF	Previous Master Plan	Current Master Plan
1977	48,159			
1982	41,357			
1987	55,012			
1992	37,422			
1997	35,142			
2002	33,223		47,541	
2007	29,755	29,755	52,687	
2012		31,793	57,867	31,793
2017		33,620	63,072	33,620
2027		37,094		37,094

2.11 SUMMARY OF FORECASTS

Table 2-15 presents a summary listing of the aviation demand forecasts at the Airport. These projections are used in the next chapter of the master plan to assess the capacity of existing facilities and determine facility expansions or improvements needed to satisfy future activity levels.

Table 2-15
FORECAST SUMMARY

Description	2007	Planning Period			Average Annual Growth (2007 - 2027)
		2012	2017	2027	
ENPLANEMENTS					
Annual	11,521	12,004	12,511	13,604	0.8%
Peak Month	3,042	3,169	3,303	3,591	
Average Day	98	102	107	116	
Peak Hour	34	34	34	34	
ANNUAL OPERATIONS					
Commercial Service					
Air Carrier	185	185	185	185	0.0%
Commuter	2,891	3,000	3,112	3,347	1.0%
Subtotal	3,076	3,185	3,297	3,532	
General Aviation					
Local	6,799	7,310	7,858	9,084	1.5%
Itinerant	18,669	20,094	21,268	23,294	1.1%
Subtotal	25,468	27,404	29,126	32,378	
Military					
Local	611	611	611	611	0.0%
Itinerant	600	593	586	573	0.0%
Subtotal	1,211	1,204	1,197	1,184	
Total Annual Operations	29,755	31,793	33,620	37,094	1.1%
PEAK OPERATIONS					
Total Operations	29,755	31,793	33,620	37,094	1.1%
Peak Month	3,243	3,465	3,665	4,043	
Average Day	105	112	118	130	
Peak Hour	16	17	18	20	
BASED AIRCRAFT					
	47	51	56	69	1.9%