Chapter 3 – Aviation Activity Forecasts

The overall goal of aviation activity forecasting is to prepare forecasts that accurately reflect current conditions, relevant historical trends, and provide reasonable projections of future activity, which can be translated into specific airport facility needs anticipated during the next twenty years and beyond.

Introduction

This chapter provides updated forecasts of aviation activity for Eastern Oregon Regional Airport (PDT) for the twenty-year master plan horizon (2015-2035). Forecasts of general aviation, military and unmanned aerial systems (UAS) activity are contained in this chapter. Commercial passenger and cargo activity will be presented separately in a forecast addendum after the master plan's air service consultant provides an overview of their findings to the City officials. The two elements of the forecast chapter will be consolidated in the final forecast chapter.

The forecasts are consistent with PDT's current role as a regional general aviation airport, with scheduled commercial passenger and express service provided by FAR Part 135 air carriers.

Unless specifically noted, the forecasts of activity are unconstrained and assume that the facility improvements necessary to accommodate anticipated demand can be provided. Through the evaluation of airport development alternatives later in the master plan, the City of Pendleton will consider if any unconstrained demand will not or cannot be reasonably met.

The FAA-defined airport master plan forecasting process for general aviation airports is designed to address elements critical to airport planning by focusing on two key activity segments: based aircraft and aircraft operations (takeoffs & landings). Detailed breakdowns of these are provided including aircraft fleet mix, activity peaking, distribution of local and itinerant operations, and the determination of the critical aircraft, also referred to as the design aircraft. The commercial air service elements at Eastern Oregon Regional Airport including enplaned passengers, annual aircraft operations, commercial aircraft fleet mix, and enplaned air cargo will be evaluated as a specific activity. Other unique activity segments at Eastern Oregon Regional Airport include military and unmanned aerial systems (UAS). Existing aviation activity forecasts are examined and compared against current and recent historical activity.

The design aircraft represents the most demanding aircraft type or family of aircraft that uses an airport on a regular basis (a minimum of 500 annual takeoffs & landings). The existing and future design aircraft are used to define the airport reference codes (ARC) to be used in airfield planning. The activity forecasts also provide consistency in evaluating future demand-based facility requirements such as runway and taxiway capacity, aircraft parking and hangar capacity, and other planning evaluations such as airport noise.

Forecast Process

The Federal Aviation Administration (FAA) provides guidance on forecasting aviation activity in airport master planning projects. FAA Advisory Circular (AC) 150/5070-6B, Airport Master Plans, outlines seven standard steps involved in the forecast process:

1) **Identify Aviation Activity Measures**: The level and type of aviation activities likely to impact facility needs. For general aviation, this typically includes based aircraft and operations. Common measures related to commercial air service include enplaned passengers and cargo, fleet mix and aircraft operations.
2) **Previous Airport Forecasts**: May include the FAA Terminal Area Forecast (TAF), state or regional system plans, and previous master plans.
3) **Gather Data**: Determine what data are required to prepare the forecasts, identify data sources, and collect historical and forecast data.
4) **Select Forecast Methods**: There are several appropriate methodologies and techniques available, including regression analysis, trend analysis, market share or ratio analysis, exponential smoothing, econometric modeling, comparison with other airports, survey techniques, cohort analysis, choice and distribution models, range projections, and professional judgment.
5) **Apply Forecast Methods and Evaluate Results**: Prepare the actual forecasts and evaluate for reasonableness.

6) **Summarize and Document Results**: Provide supporting text and tables as necessary.
7) **Compare Forecast Results with FAA's TAF**: Follow guidance in FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems. In part, the Order indicates that forecasts should not vary significantly (more than 10 percent) from the TAF. When there is a greater than 10 percent variance, supporting documentation should be supplied to the FAA. The aviation demand forecasts are then submitted to the FAA for their approval.

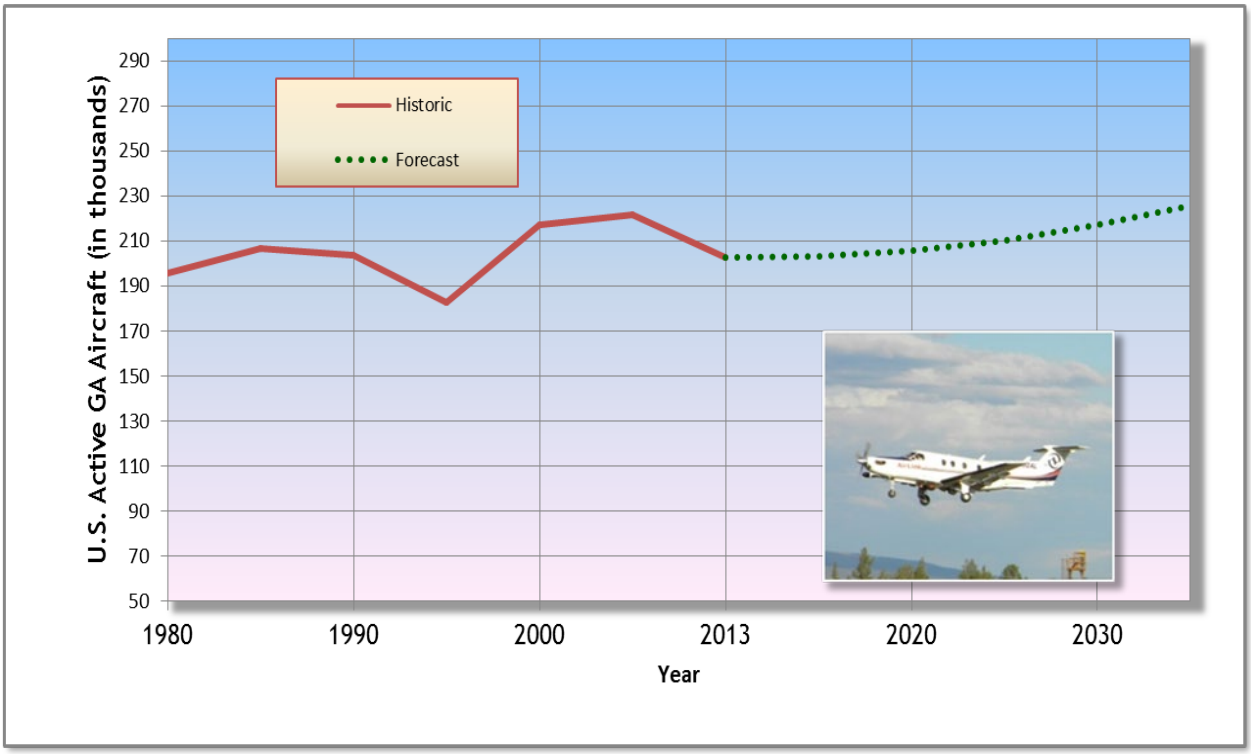
National General Aviation Activity Trends

The first fifteen years of the 21st Century was a tumultuous time for General Aviation (GA). The industry was battered by poor economic conditions and steadily rising fuel prices that slowed growth and negatively affected elements such as aircraft manufacturing, on-demand air travel, aircraft ownership, and aircraft utilization levels. Ongoing concerns over the potential replacement and future availability of 100LL aviation gasoline (AVGAS) have also created uncertainty within general aviation. On a national level, most measures of GA activity declined sharply through the "great recession" and have only recently started to show modest signs of improvement.

The FAA's long-term forecasts predict that the U.S. active GA aircraft fleet will grow modestly at an average annual rate of 0.4 percent between 2014 and 2035.[1] As depicted in **Figure 3-1**, the active GA fleet is expected to increase by approximately 15,400 aircraft over the next twenty years (+8 percent). The FAA forecasts reflect net growth that will be realized through a combination of new aircraft production and fleet attrition.

[1] FAA Aerospace Forecast Fiscal Years 2015-2035

FIGURE 3-1: US ACTIVE GENERAL AVIATION AIRCRAFT FORECAST



Data maintained by the FAA show significant system-wide declines of several key general aviation activity indicators between 2001 and 2014 (piston hours flown -34%; active piston aircraft -16%; active GA pilots -7%). AVGAS consumption levels dropped every year between 2001 and 2014, ending 30 percent below 2001 levels.

It is noted that within the overall forecast growth, several segments are projected to decline in actual numbers including single engine piston aircraft (-12%) and multi-engine piston aircraft (-8%). These declines reflect attrition of an aging fleet, which is not being fully offset by new aircraft production. Encouraging areas within the GA fleet are found in turboprops (particularly single engine) (+37%), experimental aircraft (+35%), sport aircraft (+144%), and business jets (+77%) growth through 2035. In addition to stronger production activity, these aircraft segments are experiencing lower levels of fleet attrition.

Aircraft manufacturing has shown positive gains in recent years after an extended period of weak sales. Worldwide GA aircraft deliveries in 2014 totaled 2,454 units, an increase of 4.3 percent over the previous year, but about 11 percent below recent peak of shipments in 2008.[2] The adaption of both turbine and diesel engines for small general aviation aircraft by several established manufacturers is positive indication that evolving engine technology may be a significant factor in the long-term future of general aviation. In

[2] General Aviation Manufacturers Association (GAMA), 2014 Delivery Report

addition, the resurgence of unleaded automobile gasoline powered small aircraft engines may provide a reliable power source for a growing Light Sport Aircraft (LSA) and experimental aircraft fleet.

Although the FAA maintains a moderately favorable long-term outlook, many of the activity segments associated with piston engine aircraft and AVGAS consumption are not projected to return to "pre-recession" levels until the 2025 to 2035 timeframe. Although some segments of general aviation are expected to grow at moderately high rates, most measures of the general aviation industry suggest modest, sustained growth in the range of 1 to 2 percent annually is expected over the next 20 years. The FAA's annual growth assumptions for individual general aviation activity segments are summarized in **Table 3-1.**

TABLE 3-1: FAA LONG RANGE FORECAST ASSUMPTIONS (U.S. GENERAL AVIATION)

ACTIVITY COMPONENT	FORECAST ANNUAL AVERAGE GROWTH RATE (2014-2035)
Components with Annual Growth Forecast < 0%	
Single Engine Piston Aircraft in U.S. Fleet	-0.6%
Multi-Engine Piston Aircraft in U.S. Fleet	-0.4%
Hours Flown - GA Fleet (Piston AC)	-0.5%
Student Pilots (Indicator of flight training activity)	-0.3%
AVGAS (Gallons consumed - GA only)	-0.1%
Private Pilots	-0.3%
Components with Annual Growth Forecast < 1%	
Commercial Pilots / Airline Transport Pilots	0.4% / 0.5%
Instrument Rated Pilots	0.2%
Active Pilots (All Ratings, excluding Airline Transport)	0.1%
GA Operations at Towered Airports (all AC types)	0.9%
Active GA Fleet (# of Aircraft)	0.4%
Components with Annual Growth Forecast 1%-2%	
Experimental Aircraft in U.S. Fleet	1.4%
Turboprop Aircraft in U.S. Fleet	1.5%
Components with Annual Growth Forecast > 2%	
Piston Helicopters in U.S. Fleet	2.1%
Sport Pilots	5.2%
Turbine Helicopters in U.S. Fleet	2.8%
Light Sport Aircraft in U.S. Fleet	4.3%
Turbojet Aircraft in U.S. Fleet	2.8%
Hours Flown - GA Fleet (Turbine AC)	2.9%
Hours Flown – Experimental AC	2.4%
Hours Flown – Light Sport AC	5.1%
Jet Fuel (Gallons consumed – GA only)	2.5%
Source: FAA Long Range Aerospace Forecasts (FY 2015-2035)	

Airport Service Area

The airport service area refers to the geographic area surrounding an airport that generates most "local" activity. A 30- or 60-minute surface travel time is used to approximate the boundaries of a service area for a typical general aviation airport and a three-hour drive time is used to approximate the boundaries of a

commercial service airport. The population, economic characteristics, and capabilities of competing airports within an airport's service area are important factors in defining locally-generated demand for aviation facilities and services, and influence the airport's ability to attract transient aircraft activity.

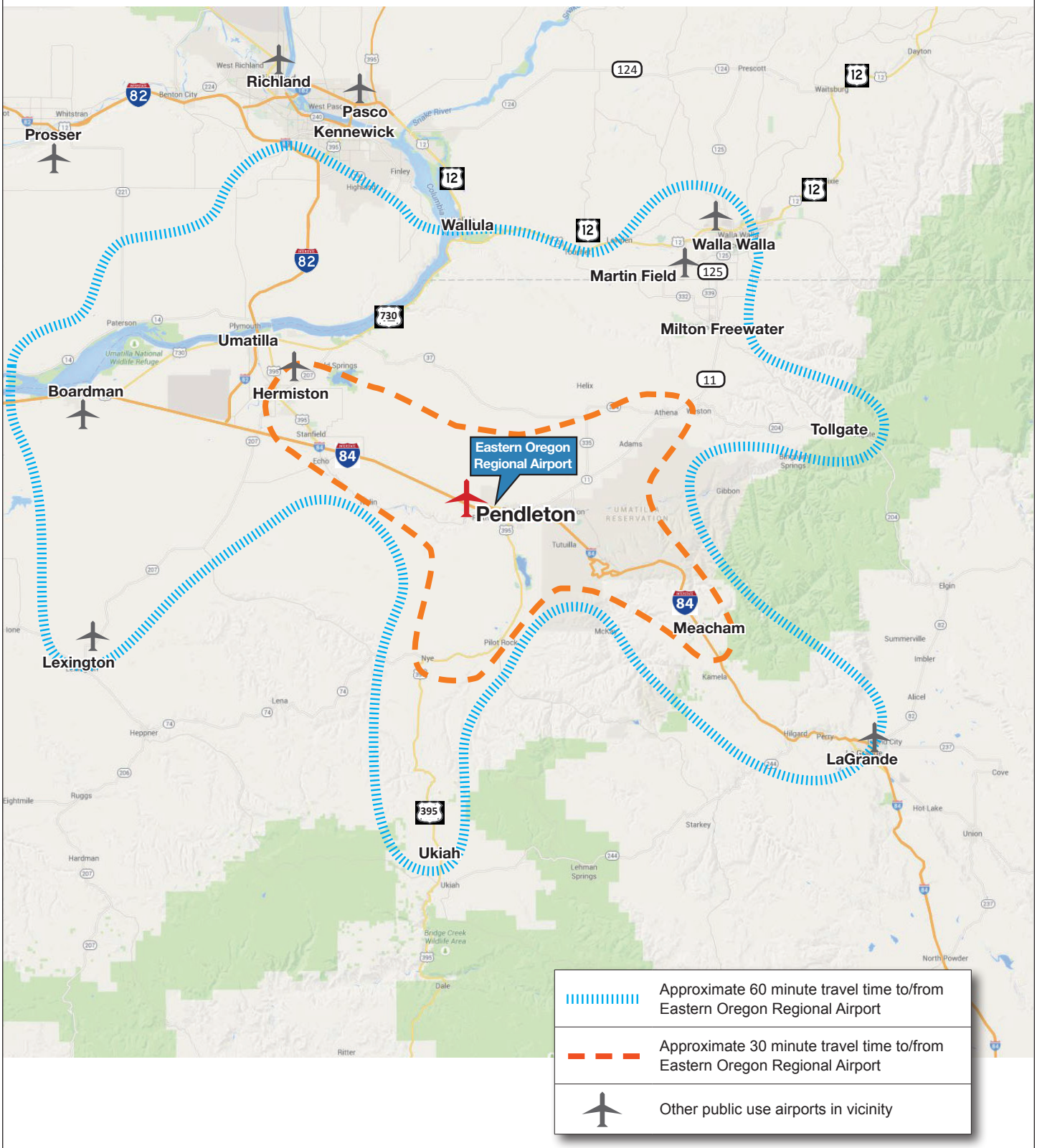
Figure 3-2 illustrates the approximate boundary of an estimated 30- and 60-minute drive from Eastern Oregon Regional Airport within the local area. Competing airports located beyond the service area typically have less impact on local airport activity due to the redundancy provided by closer facilities. With numerous airports nearby, service areas often overlap, creating competition between airports for items such as hangar space, fuel, and aviation services. These items are sensitive to cost, convenience, and quality of facilities or services for both locally based and transient users. The airport's commercial service area, often referred to as the "catchment area," will be addressed separately in the commercial activity evaluation.

Table 3-2 lists the publicly owned, public use airports within a 50 nautical mile (air miles) radius of Eastern Oregon Regional Airport. It is noted that some of the public use airports listed provide competitive facilities and services with master plans that provide for future facility expansion.

TABLE 3-2: PUBLIC USE AIRPORTS IN VICINITY OF EASTERN OREGON REGIONAL AIRPORT

AIRPORT	LOCATION/DIST. (NAUT.MILES)	RUNWAY LENGTH (FEET)	LIGHTED RUNWAY	FUEL
Hermiston Municipal Airport	20 NW	4,500	MIRL	100LL, Jet-A
Martin Field	28 NE	3,819	LIRL	100LL, MOGAS
Walla Walla Regional Airport	33 NE	6,527	HIRL	100LL, Jet-A
Tri-Cities Airport	36 NW	7,711	HIRL	100LL, Jet-A
Lexington Airport	38 SW	4,156	MIRL	100LL
Richland Airport	42 NW	4,009	MIRL	100LL, Jet-A
Boardman Airport	42 W	4,200	MIRL	None
La Grande/Union County Airport	43 SE	6,260	MIRL	100LL, Jet-A
Prosser Airport	50 NW	3,451	MIRL	100LL

Hermiston Municipal Airport (HRI) is the closest airport in the service area that provides similar general aviation facilities and services. HRI has one 4,500-foot runway, instrument approach capabilities, on-field weather observation, and aircraft fuel. Other nearby airports (Pasco, Walla Walla, La Grande/Union County) also accommodate general aviation operations with a full range of facilities and services. Pasco and Walla also accommodate scheduled commercial air service.



AIRPORT SERVICE AREA
FIGURE 3.2

EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

Socioeconomic Trends and Forecasts

City of Pendleton Economy

Historically, downturns in general aviation activity often occur during periods of weak economic conditions and growth typically coincides with favorable economic conditions. It is evident that the recent economic recession and the slow recovery that followed, has constrained general aviation activity locally, statewide, and throughout the national airport system. However, as indicated in the FAA's national long-term aviation forecasts, the overall strength of the U.S. economy is expected to sustain economic growth over the long-term, which will translate into modest to moderate growth in aviation activity.

Manufacturing, agriculture, and food processing have historically led the City of Pendleton's local and regional economy. While these industries continue to grow, in recent years the region has experienced a broader base of new employment segments such as warehousing and distribution, technology and data centers, tourism, unmanned aircraft systems (UAS), and clean technology. According to the City of Pendleton's Economic Development Resource Guide, Pendleton's key industries include:

Manufacturing

Pendleton has a long history in supporting manufacturing beginning with the historic Pendleton Woolen Mill, a weaving mill built in 1909 and still in operation. In 2000, Keystone RV Manufacturing opened in Pendleton, which has continued to grow with the merger of Dutchman RV Manufacturing in 2013.[3] In addition, Pendleton is home to two long time saddle producers, Hamley and Company and Severe Brothers Saddlery.

Warehousing and Distribution

In the last fifteen years, both FedEx and Walmart have constructed distribution centers in the region. The region is centrally located between Seattle, Portland, Spokane, and Boise with multiple transportation options for shipping and receiving including rail, interstate highway, and air cargo. Although the large distribution facilities are located outside of Pendleton, the impact on the local and regional economies extends throughout Umatilla County.

Agriculture and Food Processing

Agriculture and food processing has a long history in Pendleton. The region's climate and dry land makes the area an excellent location for growing wheat and other crops. Pendleton is home to the 100-year old Pendleton Flour Mill and Newly Wed Foods, which deliver bulk flour and food coatings around the world. Barhyte Specialty Foods is located in Pendleton, and produces private label specialty sauces for

[3] East Oregonian. Wheeler, Natalie. New RV Plant will add 125 jobs in Pendleton. September 24, 2013.

supermarkets and restaurants chains. More recently, The Prodigal Son Brewery & Pub, Pendleton's first craft brewery, opened in 2010 and now provides both local service and distribution throughout Oregon.

Aviation and Unmanned Aerial Systems

Aviation has been a vital part of Pendleton's history for more than 80 years. The Airport opened in 1934 and during World War II, airport facilities were expanded to accommodate military training activities. After the war, the airport was transferred from federal to local (City of Pendleton) ownership to serve the community's air transportation needs. The Airport is home to a diverse group of tenants and users located both on the-airport and in the adjacent Airport Industrial Park. The airport is located within the Pendleton UAS Range (PUR). PUR covers an area of 14,000 square miles and the airport is the designated test site airport for the PUR. Initial activity involving civilian UAS systems began in 2013 and programs are currently under development to obtain required FAA regulatory approvals for ongoing UAS activity.

The Oregon Army National Guard facility located on the airport supports helicopter and unmanned aerial vehicle (UAV) flight operations. SeaPort Airlines provides scheduled passenger air service at Eastern Oregon Regional Airport. SeaPort's current schedule consists of 22 weekly departures and arrivals between Pendleton and Portland with 9-passenger Cessna Caravan turboprop aircraft. Empire Airlines, a contract operator for FedEx, provides 5-day per week air cargo service between Spokane, Pendleton, and La Grande.

Umatilla County Economy

Umatilla County's economy has historically been led by government, healthcare & social assistance, retail trade, manufacturing, and farming. Over the next twenty years, farming and manufacturing employment are forecast to decline slightly, while government and healthcare & social assistance are expected to grow. **Table 3-3** summarizes current and projected employment (by industry segment) in Umatilla County.

TABLE 3-3: UMATILLA COUNTY EMPLOYMENT DATA

INDUSTRY	2011 EMPLOYMENT	% OF TOTAL EMP	2015 EMPLOYMENT	% OF TOTAL EMP	2035 EMPLOYMENT	% OF TOTAL EMP
State & Local Government	6,206	16%	6,341	15.6%	6,888	13.6%
Healthcare & Social Assistance	4,127	10.7%	4,507	11.1%	6,779	13.4%
Retail Trade	4,019	10.4%	4,281	10.5%	5,646	11.2%
Manufacturing	3,429	8.8%	3,434	8.5%	3,367	6.7%
Farm	3,101	8%	3,086	7.6%	2,948	5.8%
Transportation & Warehousing	2,713	7%	2,890	7.1%	3,869	7.6%
Accommodation & Food Services	2,379	6.1%	2,541	6.3%	3,423	6.8%
Other	12,795	33%	13,553	33.4%	17,702	35%

Note 1: 2011 Employment (Historic); 2015 and 2035 Employment (Forecast)
Note 2: Percentages of employment are rounded
Source: Woods and Poole Economics– Umatilla County Employment Data (2014)

A review of seasonally adjusted unemployment over the last fifteen years indicates Umatilla County typically has higher levels of unemployment than Oregon's statewide average.[4] This is often a reflection of seasonal industries such as agriculture that experience distinct seasonal shifts in employment. From 2000 through 2014, average annual county unemployment levels were higher than the statewide levels in twelve of fifteen years. During this period, unemployment in Umatilla County peaked at 10.3 percent in 2010, while Oregon's peak level (11.3 percent) was experienced in 2009. During a two-year period in 2009 and 2010, Oregon's statewide unemployment rate was higher than Umatilla County. Statewide and Umatilla County unemployment rates were the same (9.5%) in 2011. This short-lived trend appeared to reflect the prolonged impacts of Oregon's slow recovery from the recent recession. In February 2015, Umatilla County's unemployment rate was 7.8 percent while Oregon's unemployment rate was 6.2 percent.[5] The per capita income for Umatilla County in 2014 was $33,240, approximately 15 percent below Oregon's per capita income level of $39,286. A summary of historical and forecast income and employment data are provided in **Table 3-4**.

[4] Oregon Employment Department data

[5] United States Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics Map (February 2015)

TABLE 3-4: PER CAPITA PERSONAL INCOME & EMPLOYMENT DATA

	HISTORICAL		FORECAST				
	2000	2011	2015	2020	2025	2030	2035
Per Capita Income (in current dollars)							
U.S.	$30,319	$41,561	$46,411	$56,808	$72,344	$93,177	$120,708
State of Oregon	$28,728	$37,528	$41,760	$50,960	$64,731	$83,172	$107,496
Umatilla County	$21,944	$30,701	$34,326	$41,901	$53,159	$68,170	$87,893
Umatilla County % of Oregon	76.4%	81.8%	82.2%	82.2%	82.1%	81.9%	81.7%
Employment (Umatilla County)							
# Jobs	38,022	38,769	40,606	42,976	45,434	47,985	50,622
Source: Woods and Poole Economics– U.S., Oregon, and Umatilla County Data (2014)							

Population

In broad terms, an airport's service area population affects the type and scale of aviation facilities and services that can be supported. Although a large number of airport-specific factors can affect activities at an airport, changes in population often reflect other broader economic conditions that may also affect airport activity. The Eastern Oregon Regional Airport service area extends beyond the City of Pendleton and Umatilla County and includes portions of Benton and Walla Walla counties in Washington, and Union and Morrow counties in Oregon. However, for the purpose of forecasting aviation activity, an evaluation of local city and Umatilla county population trends will provide a reasonable indication of activity.

Historical Population

Certified estimates of population for Oregon counties and incorporated cities are developed annually by the Portland State University (PSU) Population Research Center. The annual PSU estimates, coupled with the decennial U.S. Census, provide an indication of local area population trends over an extended period.[6] The 2014 PSU certified population estimate for the City of Pendleton was 16,700; the 2014 PSU estimate for Umatilla County was 78,340.

The City of Pendleton's population has declined slightly since the 2010 Census, while Umatilla County has experienced a modest population increase. Annual population growth over the last 25 years has been modest, averaging 1 percent or less, compared to statewide average growth that is typically between 1 and 2 percent per year. Recent historical population data and average growth rates for the City of Pendleton, Umatilla County, and Oregon are summarized in **Table 3-5**.

[6] Portland State University Population Research Center July 1, 2014 estimates; 1990, 2000, 2010 U.S. Census

TABLE 3-5: HISTORICAL POPULATION

YEAR	UMATILLA COUNTY	CITY OF PENDLETON (INCORPORATED AREA ONLY)	PENDLETON SHARE (%) OF UMATILLA COUNTY POPULATION	OREGON
1990[2]	59,249	15,142	25.6%	2,842,337
2000[1]	70,548	16,354	23.2%	3,421,399
2010[1]	75,889	16,745	22.1%	3,831,074
2014[2]	78,340	16,700	21.3%	3,962,710
Average Annual Rates (AAR) of Growth				
	Umatilla County	City of Pendleton		Oregon
1990-2000	1.7%	.77%		1.87%
2000-2010	.73%	.23%		1.14%
2000-2014	.75%	.15%		1.05%
2010-2014	.79%	(.06%)		.8%

1. U.S. Census data
2. Portland State University certified annual estimates.

Population Forecasts

Two recent forecasts of local population were reviewed to evaluate future growth expectations for the City of Pendleton and Umatilla County. Both forecasts indicate local population will grow at a slower rate than Oregon's population over the next twenty years, although the projected growth is consistent the area's historical record of population growth. Future population growth within the airport service area is expected to be a positive factor affecting future activity at Eastern Oregon Regional Airport. **Table 3-6** summarizes the population forecasts for the current planning period.

Oregon Office of Economic Analysis (OEA)

The Oregon Office of Economic Analysis (OEA) periodically generates long-term population forecasts to support local and statewide planning. The most recent OEA long-term forecasts released in March 2013 projected modest, sustained growth for Umatilla County through 2050. Within the current twenty-year master planning horizon, Umatilla County's population is projected to increase from 76,000 in 2010 to 98,820 in 2035. This reflects an overall increase of 30 percent over the 25-year period at a 1.06 percent average annual growth rate.[7]

[7] Office of Economic Analysis-Forecasts of Oregon's County Population and Components (March 28, 2013)

TABLE 3-6: PENDLETON, UMATILLA COUNTY & OREGON POPULATION FORECASTS

	2010	2010 CENSUS	2014 PSU EST.	2015	2020	2025	2030	2035
City of Pendleton								
Population Forecast[1] (1.06% AAR 2010-2035)	18,392	16,745	16,700	19,090	20,172	21,384	22,668	23,914
Umatilla County								
OEA Forecast[2] (1.06% AAR 2010-2035)	76,000	75,889	78,340	78,887	83,359	88,366	93,673	98,820
Oregon								
OEA Forecast[2] (1.06% AAR, 2010-2035)	3,837,300	3,831,074	3,962,710	4,001,600	4,252,100	4,516,200	4,768,000	4,995,200
City % of County Population	24.2	22.0	21.3	24.2	24.2	24.2	24.2	24.2
Umatilla County % of Oregon Population	1.98	1.98	1.97	1.97	1.96	1.95	1.96	1.97

1. Winterbrook Planning, Technical Memo: 2033 Population Projection
2. Prepared by Office of Economic Analysis, Department of Administrative Services, State of Oregon (March 28, 2013)

City of Pendleton Population Forecast

A population forecast was prepared for the City of Pendleton in February 2011, to support local planning using existing State of Oregon Office of Economic Analysis (OEA) long-term forecasts for Umatilla County.[8] The forecast projected annual population growth of 1.06 percent for both the City and Umatilla County through 2033. Pendleton's urban area accounts for approximately 24.2 percent of Umatilla County's population in current and future projections. The City of Pendleton's population is projected to increase from 18,392 to 23,914 (+30%) between 2010 and 2035 (2035 data was extrapolated based on the OEA annual growth rate). The forecast represents an expectation that the city and county population growth will keep pace with Oregon's statewide growth over the next twenty years.

It is noted that recent estimates of Pendleton's population (2010 Census and the 2014 PSU certified estimate), generated after the OFM forecasts were published, show a decline from the 2010 base year population used in the OFM forecast. The PSU certified estimate for 2014 (16,700) is approximately 13 percent lower than the forecast for 2015 (19,090). The initial trend appears to be deviating from the long-term forecast, although the forecast's relatively low annual growth rates (1 percent) suggest that it may be premature to adjust the forecast or to modify long term assumptions based on the first four years of a forty-year forecast.

[8] Winterbrook Planning, Technical Memorandum 1: 2033 Population Projection (February 16, 2011)

Overview of Recent Local Events

Commercial Air Service

Horizon Airlines served Eastern Oregon Regional Airport under a contract with the U.S. Department of Transportation, Essential Air Service (EAS) program prior to November 2008. This agreement provided a subsidy for two of the three 37-seat Q200 flights that operated between Pendleton and Portland. In 2008, Horizon Airlines phased out the 12 remaining 37-seat Q200s in their fleet, replacing them with larger 76-seat Q400s. During an EAS contract bid, Horizon Airlines sought to change its route, opting for one-stop flights from Pendleton to Pasco then to Seattle. With the upgrade to the larger aircraft, Horizon's proposal included reducing the frequency of flights in and out of Pendleton to one roundtrip daily. The City of Pendleton opted to maintain its Portland service after evaluating Horizon's proposal against other providers, and chose SeaPort Airlines proposal, which offered three daily roundtrip flights to Portland with smaller 9-seat aircraft.[9] A detailed description of the status of commercial air service is provided in the evaluation of commercial aviation activity.

Unmanned Aerial Systems (UAS)

As noted in the Inventory chapter, Eastern Oregon Regional Airport is the designated test site airport for the Pendleton UAS Range, which received initial FAA operating approval in September, 2014. UAS activity on the airport includes both military and civilian operations. However, civilian UAS activity has been slow to develop as it is subject to the FAA's current rule-making process. Military UAS activity is not regulated by FAA, so the majority of activity to date has been generated by the Oregon Army National Guard (OANG). OANG indicates that approximately 260 flight hours have been logged by Shadow unmanned aerial vehicles (UAV) at Eastern Oregon Regional Airport since May 2013, averaging about 130 hours per year. OANG estimates UAVs account for 10 percent of "tower tracked" operations at the airport, with helicopters accounting for 90 percent. Based on a total of 2,802 military operations recorded by the control tower in 2014, this translates into approximately 280 military UAV operations. Combined with a limited amount of civilian activity, the current level of UAS/UAV activity at the Airport is estimated to be approximately 300 annual operations. This number is expected to increase significantly as OANG expects to increase its activity and civilian testing and training activity becomes established. The control tower UAS/UAV operations counts (takeoffs and landings) are not recorded by aircraft type, but by user group (e.g., military, general aviation, etc.).

[9] Department of Transportation. Essential Air Service at Pendleton, Oregon. Order reselecting carrier and setting final subsidy rates, Order 2008-10-25 (October 21, 2008)

Fuel Data

Fuel records provided by the airport's fixed base operator (FBO), indicate the volume of 100LL (AVGAS) and Jet-A have declined significantly over the last several years. Historical fuel data is summarized in **Table 3-7**. [10] While changes in commercial air service and related fueling activities would be expected to impact jet fuel volumes, the decline in reported aviation gasoline sales is perplexing. For example, the annual sales of 100LL reported at Eastern Oregon Regional Airport have not exceeded 10,000 gallons since 2005, with a low of 1,369 gallons reported in 2011. The reported fuel sales yield averages as low as 30 gallons per based piston aircraft, well below the volumes generated at most general aviation airports. By comparison, nearby Lexington Airport, with a total of 9 piston engine-based aircraft, had a total of 10,871 gallons of 100LL delivered in the twelve months extending from April 2012 to March 2013, which is approximately 120 gallons per based aircraft. Ken Jernstedt Airfield in Hood River has averaged 36,000 gallons of 100LL over the last five years with about 90 based aircraft, or about 400 gallons per based aircraft.

TABLE 3-7: PDT FBO REPORTED FUEL SALES (HISTORICAL)

YEAR	100LL[1] (GALLONS)	JET-A[1] (GALLONS)	AIRCRAFT OPERATIONS[2] (GA/COMMERCIAL)
2005	21,782	81,923	23,359
2006	7,004	96,075	20,769
2007	9,221	63,827	18,412
2008	6,598	28,419	18,125
2009	5,422	34,071	16,049
2010	2,653	19,936	11,985
2011	1,369	25,478	12,370
2012	1,830	13,521	11,150
2013	2,007	32,138	12,057
2014	4,127	24,478	9,579

1. PDT FBO reported fuel sales 2005-2014
2. Air Traffic Activity System (ATADS) Tower Operations 2005-2014

Although aircraft fueling patterns may be affected by a variety of market conditions, the significant decline in sales volumes reported to the airport in recent years should be examined further. To ensure consistency and uniform contributions among airport users, the City should consider modifying its airport fuel flowage fee policy to assess all aviation fuel deliveries to the airport, rather than retail sales. This would ensure that both private tenant and commercial fueling activities are contributing to the airport's revenues. Aviation fuel distributors provide a record of deliveries to airports if required, as condition for conducting commercial activities on the premises.

[10] Pendleton Aviation (FBO) reported fuel sales from 2005-2011

Airport Traffic Control Tower (ATCT) Operations Counts

Eastern Oregon Regional Airport has an airport traffic control tower operating from 6 am to 8 pm daily. Although the tower operates 14 hour per day, tower management estimates that their aircraft operations counts reflect approximately 95 percent of total traffic at the airport. Based on this assumption, the 2014 aircraft operations count (12,381) from the airport traffic control tower reflects total airport operations of approximately 13,033 for 2014. It is recommended that the adjusted 2014 aircraft operations level be used as the baseline for the updated aircraft operations forecast.

The commercial activity generated at the Airport includes scheduled passenger and cargo service. Based on current flight schedules, a portion of this activity involves arrivals/departures before 6 am or after 8 pm. The OANG estimates approximately 12.5 percent of its helicopter activity involves night training when the tower is closed indicting that this segment of activity is not fully captured in tower counts and should be adjusted in baseline activity estimates. UAS activity is currently restricted to daylight hours and is reflected in tower operations counts by category of user (e.g., military, general aviation, etc.).

A review of historical tower data for Eastern Oregon Regional Airport (1990 through 2014) reflects an overall decline in operations that has involved several incremental downward steps. Aircraft operations levels in 2014 were 63 percent lower than 1990. Between 1990 and 2004, airport operations consistently topped 30,000, and once exceeded 40,000 (1998). This was followed by four consecutive years (2005-2008) with at least 20,000 operations and six consecutive years (2009-2014) where annual operations fluctuated between 10,000 and 20,000.

Table 3-8 summarizes historical airport traffic control tower aircraft operations counts for the Airport. **Figure 3-3** depicts the historical aircraft operations data.

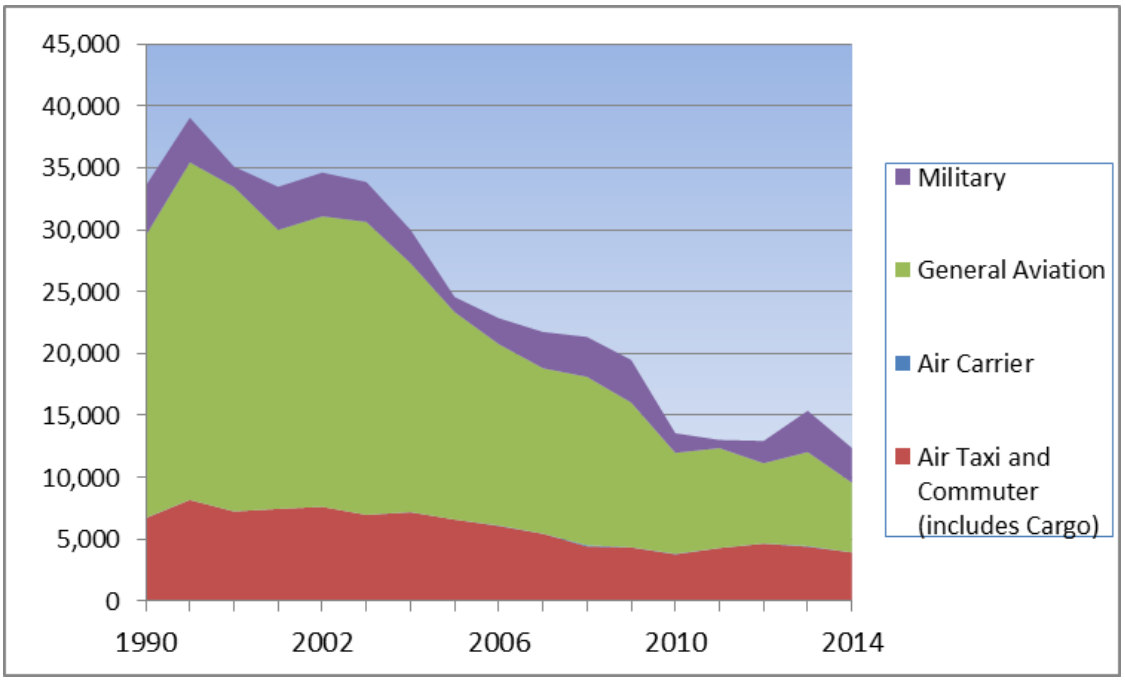
TABLE 3-8: AIR TRAFFIC ACTIVITY SYSTEM (ATADS) TOWER OPERATIONS

YEAR	AIR CARRIER	AIR TAXI AND COMMUTER	GENERAL AVIATION	MILITARY	TOTAL AIRCRAFT OPERATIONS
1990	22	6,708	22,809	4,024	33,563
1995	4	8,181	27,274	3,605	39,064
2000	8	7,247	26,225	1,636	35,116
2001	4	7,456	22,537	3,483	33,480
2002	4	7,621	23,473	3,525	34,623
2003	12	6,969	23,669	3,214	33,864
2004	10	7,191	20,104	2,696	30,001
2005	0	6,594	16,765	1,212	24,571
2006	36	6,081	14,652	2,094	22,863
2007	18	5,447	13,356	2,933	21,754
2008	86	4,429	13,610	3,220	21,345
2009	16	4,343	11,690	3,441	19,490
2010	34	3,792	8,159	1,582	13,567
2011	10	4,291	8,069	663	13,033
2012	16	4,651	6,481	1,795	12,943
2013	53	4,407	7,589	3,338	15,387
2014	6	3,940	5,633	2,802	12,381

Source: OPSnet – Air Traffic Activity System (ATADS) Tower Operations 1990-2014
Glossary: **Air Carrier** is an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation.
Air Taxi is an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation. The FAA TAF combines Air Taxi and Commuter activity in a single category.

Although commercial activity has declined in real numbers from recent peaks, the segment currently represents a larger percentage (32 percent) of total airport operations than it did in 1990 (20 percent). General aviation represents the largest single decline in airport activity over the last 25 years. In 1990, general aviation accounted for 68 percent of operations. In 2014, general aviation accounted for 46 percent of total airport operations. There appears to be no clear, single cause for the recent decline and in fact it may reflect a combination of macroeconomic conditions, competition from other nearby airports, and a variety of airport-specific factors.

FIGURE 3-3: EASTERN OREGON REGIONAL AIRPORT – ANNUAL AIRCRAFT OPERATIONS (ATCT)



Terminal Area Forecast (TAF) Data

As noted by the Federal Aviation Administration (FAA): "*The Terminal Area Forecast (TAF) is the official FAA forecast of aviation activity for U.S. airports. It contains active airports in the National Plan of Integrated Airport Systems (NPIAS) including FAA towered airports, Federal contract towered airports, nonfederal towered airports, and non-towered airports. Forecasts are prepared for major users of the National Airspace System including air carrier, air taxi/commuter, general aviation, and military. The forecasts are prepared to meet the budget and planning needs of FAA and provide information for use by state and local authorities, the aviation industry, and the public.*"

When reviewing FAA TAF data, it is important to note that when there is no change from year to year it often indicates a lack of data, rather than no change in activity. Similarly, a large change in data in a single year may follow updated reporting that captures changes that occurred over several years. At Eastern Oregon Regional Airport, the availability of airport traffic control tower activity counts provides a more reliable basis for estimating air traffic than at non-towered airports. However, based aircraft data is periodically updated based on airport management reports and updates of airport master plans with FAA approved forecasts.

A review of historical TAF operations data for the Airport (1990 through 2013) is relatively consistent with airport traffic control tower counts described earlier in the chapter. However, the TAF based aircraft totals reflect more significant changes over time. Between 1990 and 2007 based aircraft totals reflect several adjustments within a gradual increase (data range of 62 to 108). A significant downward adjustment in

data is listed in 2008, with 39 based aircraft, a reduction of 69 aircraft from the previous year. The basis for this adjustment is unknown, although it appears some reduction in based aircraft at the airport occurred–perhaps over time–that was not accurately reflected in the annual data immediately preceding the adjustment. The TAF currently lists 46 based aircraft, which is well below the recent airport management count of 71 aircraft documented in the 2002 master plan. The forecast data within the TAF maintains 46 based aircraft at the airport through 2040. TAF data on passenger enplanements are relatively consistent with changes in commercial air service noted elsewhere in this chapter.

Table 3-9 summarizes historical TAF based aircraft, aircraft operations, and passenger enplanement data for the Airport, as currently published by the FAA.

TABLE 3-9: FAA TAF DATA – EASTERN OREGON REGIONAL AIRPORT

YEAR	AIRCRAFT OPERATIONS	BASED AIRCRAFT	PASSENGER ENPLANMENTS
1990	27,522	76	8,759
2000	36,957	97	13,990
2001	34,090	101	14,408
2002	34,759	106	10,427
2003	34,435	107	9,169
2004	29,899	106	8,037
2005	26,091	108	6,851
2006	23,291	108	7,494
2007	22,088	103	7,194
2008	21,837	39	8,073
2009	19,624	39	3,947
2010	13,128	46	4,900
2011	12,221	46	4,955
2012	12,286	46	4,986
2013	17,268	46	4,284
2014	12,541	50	4,268
2015*	11,848	71	4,232

* 2015 TAF data is estimated.

Commercial Air Service

As noted previously, Eastern Oregon Regional Airport is currently served by SeaPort Airlines, operating a nine seat Cessna Caravan 208 with 22 nonstop roundtrips per week to Portland International Airport (PDX). SeaPort Airlines is on a four-year Essential Air Service (EAS) contract that began January 1, 2013. Since air transportation and the airline industry are always changing, a Passenger Demand Analysis (included in **Appendix B)** was conducted to provide the necessary data needed to compile objective air service forecasts. The analysis included a thorough review of the current airline industry, current service provided at Pendleton, and the airline market for Pendleton's service area. This information was used to create four likely scenarios for the City of Pendleton to consider for its future service needs. The four scenarios included:

1. Maintain existing EAS service with SeaPort Airlines 9-seat aircraft;
2. Maintain EAS service with a larger aircraft;
3. Maintain existing EAS service with a 9-seat aircraft while adding new leisure market service on a once-weekly basis; or
4. A. Continuing service with a 9-seat aircraft operating without an EAS subsidy;
   B. Loss of scheduled service.

The City of Pendleton has selected a forecast that assumes a change in service to include larger aircraft based on a review of the air service forecast scenarios. The Passenger Demand Analysis used PenAir, a regional carrier operating 30-seat Saab SF-340 aircraft, as a model airline with service operating under EAS subsidies for similar size communities in Oregon such as Klamath Falls.

The selected forecast assumes a 1.64 percent average annual growth rate for passenger demand. Forecast passenger enplanements range from 4,174 in 2014 to 5,900 in 2035. The forecast assumes changes in service frequency to accommodate targeted load factors. Service frequency would average 8 or 9 departures per week, with 1.2 to 1.3 departures per day. Annual operations are projected to decline from current levels by 2020, due to the change in service levels (aircraft size and reduced frequency), then decline slightly further in subsequent forecast years as the carrier manages its passenger load factors. The forecast level of service in 2035 is equivalent to a 47 percent load factor. With an EAS subsidy, it is expected that a load factor above 30 percent would make the route viable. Without an EAS subsidy, the carrier would require closer to a 70 percent load factor.

Table 3-10 summarizes forecast commercial air service activity at Eastern Oregon Regional Airport. It should be noted the air taxi/commuter operations category includes both passenger and cargo operations using aircraft with 60 seats or less, and a maximum payload capacity of 18,000 pounds. The table shows passenger air taxi/commuter operations separate from cargo "other" air taxi/commuter operations.

TABLE 3-10: EASTERN OREGON REGIONAL AIRPORT – COMMERCIAL AIR SERVICE FORECAST

DESCRIPTION	HISTORIC	FORECAST			
	2014	2020	2025	2030	2035
Operations					
Air Carrier	6	0	0	0	0
Passenger Air Taxi/Commuter	2,214	930	930	890	840
Other Air Taxi	1,599	1,990	2,090	2,180	2,290
Total	**3,819**	**2,920**	**3,020**	**3,070**	**3,130**
Passenger Enplanements					
Air Carrier	0	0	0	0	0
Air Taxi/Commuter	4,174	4,600	5,000	5,400	5,900
Total	**4,174**	**4,600**	**5,000**	**5,400**	**5,900**
Annual Departures	1,107	465	465	445	420
Seats per Departure	9	30	30	30	30
Total Available Seats	9,963	13,950	13,950	13,350	12,600
Annual Enplanements	4,174	4,600	5,000	5,400	5,900
Boarding Load Factor	.42	.33	.36	.40	.47

Other Air Taxi Operations

Air taxi activity includes operations regulated by the FAA under FAR Part 135, including scheduled passenger service with small aircraft (discussed in the previous section), on-demand passenger service (charter and fractional), small parcel transport (cargo), and air ambulance activity. Air taxi activity at Eastern Oregon Regional Airport currently includes all of these categories.

The FAA Terminal Area Forecast (TAF) classifies air taxis as "air taxi & commuter," although the airport traffic control tower records commercial activity as either "air carrier" or "air taxi." Historical and forecast "Other" air taxi operations at Eastern Oregon Regional Airport are listed in **Table 3-10**.

Air Cargo

Empire Airlines, a contract operator for FedEx, provides scheduled air cargo (express) service between Spokane, Pendleton, and La Grande using a Cessna Caravan 208 aircraft. The aircraft schedule has two morning and afternoon arrivals/departures at Eastern Oregon Regional Airport on a 5-day per week schedule. Ameriflight, a contract operator for UPS, previously operated on a 5-day per week schedule using a Beechcraft 1900 aircraft. Ameriflight recently relocated its service to Hermiston Airport and currently uses Pendleton when conditions require.

The Boeing Commercial Airplane World Air Cargo Forecast 2014-2015 indicates package express activity in North America flattened in recent years, averaging 5.4 million daily deliveries in 2011 and 2012. Activity in 2013 increased to 5.5 million daily deliveries (+10%), which appears to be consistent with the overall improvement in economic conditions. Boeing projects that North America express activity (revenue tonne-kilometers) will average 2.2 percent annual growth through 2025, then 2.1 percent annually through 2035. This growth rate appears to be reasonable to apply to enplaned and deplaned air cargo at Eastern Oregon Regional Airport through the twenty-year planning period.

A review of current cargo volume and aircraft fleet mix suggests the current schedule can accommodate a significant increase in cargo weight without requiring additional flights or larger aircraft. Based on the Empire flight schedule and potential for occasional Ameriflight activity, it is reasonable to maintain a static air cargo operations level based on 20 operations per week (1,040 annual operations) through the twenty years planning period.

Table 3-11 summarizes forecast cargo activity at Eastern Oregon Regional Airport.

TABLE 3-11: EASTERN OREGON REGIONAL AIRPORT – CARGO FORECAST

DESCRIPTION	HISTORICAL	FORECAST			
	2014	2020	2025	2030	2035
Cargo Operations	1,024	1,040	1,040	1,040	1,040
Total Enplaned Cargo (Tons)	129	150	165	180	200
Total Deplaned Cargo (Tons)	183	210	235	260	290

General Aviation Activity

Based Aircraft

A review of current based aircraft was performed in order to provide the most accurate data for estimating current activity and developing updated activity forecasts. Airport staff provided a current based aircraft list, identifying 67 total based aircraft in February of 2015. This number was subsequently increased to 71 based on the Oregon Army National Guard (OANG) reporting of four unmanned aerial vehicles in addition to six CH47-Chinook helicopters.

The based aircraft fleet mix is primarily single engine piston airplanes with a small number of multi-engine piston airplanes, ultralights, and helicopters. The current based aircraft count is summarized in **Table 3-12**.

TABLE 3-12: EASTERN OREGON REGIONAL AIRPORT BASED AIRCRAFT

AIRCRAFT TYPE	TOTAL
Based Aircraft – Updated 2015 Count	
Single-Engine Piston	39
Multi-Engine Piston	2
Turboprop	1
Turbojet	0
Rotorcraft (Civilian)	14
Ultralight	5
Military (Rotorcraft)	6
Military (UAS/UAV)	4
Total Based Aircraft	**71**

Aircraft Operations

As noted earlier, the airport traffic control tower recorded a total of 12,381 aircraft operations in 2014. Based on the tower's 14-hour per day (6am to 8pm) operating schedule, tower management estimates their aircraft operations count reflects approximately 95 percent of airport traffic.

The Pendleton airport traffic control tower recorded 5,633 general aviation operations in 2014. Based on the 95 percent assumption noted above, approximately 297 additional general aviation operations would occur when the tower is closed, increasing total general aviation operations to 5,930. OANG reports that approximately 12.5 percent (360 operations) of their current helicopter activity involves night training when the tower is closed. A review of Seaport Airlines current (March 2015) flight schedule indicates that 11 of 44 (25%) weekly arrivals/departures at Eastern Oregon Regional Airport occur when the tower is closed, totaling 572 operations if extended over 12 months. These activity segments generate approximately 1,229 operations (+9.9%), over and above the 12,381 operations recorded in 2014.

The adjusted estimate of aircraft operations summarized below is recommended for use as the base year for updated aircraft operations forecasts:

Eastern Oregon Regional Airport Activity Summary – 2014

- Airport Traffic Control Tower Operations (6am to 8pm): 12,381
- Aircraft Operations Outside Tower Hours of Operation (8pm to 6 am): 1,229
- **Total Operations:** **13,610**

Aviation Activity Forecasts (Existing Forecasts)

Three existing aviation forecasts for Eastern Oregon Regional Airport are available to compare with current activity, recent historical trends, and the updated forecasts prepared for the master plan:

- 2002 Airport Master Plan Report
- 2007 Oregon Aviation Plan
- FAA Terminal Area Forecasts (TAF) (2014 update)

The existing forecasts have been reviewed but not modified to reflect recent events. Minor adjustments (interpolation, extrapolation) have been made to present each projection with common forecast year intervals. Although some projections may be obsolete relative to current activity (in actual numbers), the existing forecasts provide a useful gauge of future growth rates that are generally consistent with national and statewide expectations for defining general aviation activity.

Existing based aircraft and operations forecasts are summarized below and in **Tables 3-13** and **3-14.** Updated forecasts have been developed and are presented later in the chapter.

Based Aircraft Forecasts

2002 Airport Master Plan

The 2002 Airport Master Plan Report[11] forecasts project an increase from 97 to 117 (+20) based aircraft between 1999 and 2020, which reflects an average annual growth rate of 0.89 percent. The forecast has reached its mid-point and provides an opportunity to assess the accuracy of the growth assumptions. The based aircraft forecast for 2015 (interpolated) is 110, which is 39 aircraft above the current count of 71 based aircraft. The airport's current based aircraft total of 71, is 46 lower than the forecast for 2020—five years from now.

The previous master plan forecast did not anticipate the sharp reduction in based aircraft noted earlier in the FAA's TAF data. However, it is unknown whether the reduction is a true reflection of a significant loss of aircraft or simply an adjustment of based aircraft counts, which may have been estimated. Either scenario renders the forecast obsolete, although the underlying growth rate is well within the normal range accepted by FAA for most general aviation airports.

FAA Terminal Area Forecast (TAF)

The FAA TAF (January 2015 update) provides a static projection of 46 based aircraft at Eastern Oregon Regional Airport from 2014 through 2040, which represents average annual growth of 0 percent. The 2015

[11] David Evans and Associates, Mead & Hunt Inc., and Pavement Services Inc. (October 2002)

airport management count of based aircraft (71 aircraft) indicates that current levels are 54 percent above the TAF. Recently updated airport-specific information indicates that current TAF based aircraft forecasts do not provide a reliable projection of future demand.

TABLE 3-13: EXISTING BASED AIRCRAFT FORECASTS – EASTERN OREGON REGIONAL AIRPORT

EXISTING FORECASTS	2000	2005	2010	2015	2020	2025	2030	2035
2002 Airport Master Plan Update (.88% AAR 1999-2020)	97[1]	103	108	110[2]	117	-	-	-
2007 Oregon Aviation Plan (1.08% AAR 2005-2025)	-	108	114	118	126[2]	134	-	-
FAA Terminal Area Forecast (Jan. 2015) (0% AAR 2014-2040)	97	108	39	46	46	46	46	46

1. 1999 forecast base year
2. Interpolated between forecast years

On a regional level, the 2013-2040 Terminal Area Forecast projects the number of based aircraft (general aviation) in the Northwest-Mountain Region to increase at an annual average rate of 0.96 percent through 2040.

2007 Oregon Aviation Plan (OAP)

The 2007 Oregon Aviation Plan contains based aircraft forecasts for Oregon's public use airports for the 2005-2025 timeframe. For Eastern Oregon Regional Airport, the OAP projects-based aircraft to increase from 108 to 134 (+26) between 2005 and 2025, which represents average annual growth of 1.08 percent. The current based aircraft total of 71 aircraft is well below the 2015 OAP forecast of 118 aircraft (-51 aircraft) and is tracking well below the projected levels for 2025. As with the master plan forecast described above, the OAP does not provide an accurate projection of future demand.

Aircraft Operations Forecasts

2002 Airport Master Plan

The 2002 Airport Master Plan Report projected annual aircraft operations increasing from 34,537 to 56,309 between 1999 and 2020, which reflects an average annual growth rate of 2.36 percent. The control tower operations count for 2014 (12,381) is less than 25 percent of the master plan operations forecast for 2015, which effectively renders the master plan forecast obsolete.

FAA Terminal Area Forecast (TAF)

The FAA TAF (January 2015 update) projects aircraft operations at Eastern Oregon Regional Airport increasing from 12,541 to 13,039 between 2014 and 2040, which represents average annual growth of 0.15 percent over the 26-year period. Despite the significant discrepancy in the TAF based aircraft data, the aircraft operations forecast appears to be reasonable and provides a valid comparison with other forecasts.

On a regional level, the 2013-2040 Terminal Area Forecast projects itinerant operations (commercial, GA, military) in the Northwest-Mountain Region increasing at an annual average rate of 1.1 percent through 2040.

2007 Oregon Aviation Plan (OAP)

The 2007 Oregon Aviation Plan forecast projects annual aircraft operations at Eastern Oregon Regional Airport increasing from 26,091 to 29,836 between 2005 and 2025, which represents average annual growth of 0.67 percent. The control tower operations count for 2014 (12,381) is less than 50 percent of the OAP operations forecast for 2015, which effectively renders the forecast invalid.

TABLE 3-14: EXISTING OPERATIONS FORECASTS – EASTERN OREGON REGIONAL AIRPORT)

EXISTING FORECASTS	2000	2005	2010	2015	2020	2025	2030	2035
2002 Airport Master Plan Update (2.36% AAR 1999-2020)	34,537[1]	47,653	50,614	53,386[2]	56,309	-	-	-
2007 Oregon Aviation Plan (0.67% AAR 2005-2025)	-	26,091	24,777	26,691	28,443[2]	29,836	-	-
FAA Terminal Area Forecast (Jan. 2015) (0.15% AAR 2014-2040)	36,957	26,091	13,128	12,350	12,485	12,620	12,759	13,039

1. 1999 forecast base year
2. Interpolated between forecast years

Updated General Aviation Forecasts

Based Aircraft

Updated general aviation-based aircraft forecasts at Eastern Oregon Regional Airport have been prepared based on a review of recent socioeconomic data, existing aviation activity forecasts, and current conditions. The significant decline (-27 percent) in based aircraft at the airport since the last master plan was prepared in 2002 is reflected in FAA data and current airport management counts. The Oregon Army National Guard (OANG) currently has 10 aircraft based at their facility, including six helicopters and four unmanned aerial vehicles (UAV). OANG indicates there are no current plans to increase their aircraft fleet. For planning purposes, a static projection of 10 military aircraft will be added to the recommended general aviation-based aircraft forecast through the planning period.

The accuracy of historical based aircraft counts cannot be verified and therefore should be viewed with some degree of skepticism. Many airports have difficulty in maintaining consistent, accurate counts of based aircraft due to a variety of factors. Reporting has improved in recent years through the development of the FAA's www.basedaircraft.com webpage, although outdated entries are relatively common.

Assuming the based aircraft data are relatively accurate, the trend may reflect a combination of factors such as general economic conditions, competition from other airports, availability of hangar space, fixed base operator (FBO) services, and fuel or storage leasing costs. The general sense of local airport officials is the recent decline in activity has bottomed out and activity will begin to increase as services are improved, business expands, and new tenants use the airport. Based on this assumption, the current general aviation-based aircraft count of 61 represents the baseline to project future activity in a range of modest-to-moderate growth scenarios.

Several projections were developed based on common market share techniques and population-based demand. Given the wide range of growth rates of the projections, a mid-range (mean) projection is the recommended based aircraft forecast. The updated general aviation-based aircraft forecasts are presented in **Table 3-15**.

Eastern Oregon Regional Airport: Umatilla County Population

The ratio of general aviation-based aircraft to county population has fluctuated in recent years from approximately 0.78 to 1.4 aircraft per 1,000 residents. Based on the 2014 Umatilla County population (78,340) and the January 2015 count of 61 general aviation-based aircraft, the current based aircraft to county population ratio is 0.78.

The Oregon Office of Economic Analysis (OEA) 2010-2050 population forecast for Umatilla County (see Table 3-6) served as the basis for this projection. Projections were developed based on either *constant or decreasing* based aircraft to population ratios.

Constant Population to Based Aircraft Ratio – This projection maintains the current 0.78 based aircraft per 1,000 Umatilla County resident ratio through 2035. This projection assumes based aircraft at Eastern Oregon Regional Airport will grow at the same rate as county population. General aviation-based aircraft increase from 61 to 77 based aircraft by 2035, which represents an average annual increase of **1.17 percent**.

Declining Population to Based Aircraft Ratio – This projection gradually reduces the based aircraft per 1,000 Umatilla County residents from 0.78 to 0.70 through 2035. This projection assumes based aircraft at the Airport will grow at a slower rate than county population. This methodology results in general aviation-based aircraft increasing from 61 to 69 by 2035, which represents an average annual increase of **0.62 percent**.

U.S. Active General Aviation Fleet Market Share

In 2014, Eastern Oregon Regional Airport accounted for approximately 0.031 percent of the U.S. active general aviation fleet, down from 0.047 percent in 1999. The FAA Aerospace Forecast 2015-2035 projects the active general aviation fleet will grow at an average annual rate of 0.4 percent between 2014 and 2035, increasing from 198,860 aircraft in 2014 to 214,260 in 2035. The modest net increase of 15,400 aircraft over 21 years reflects considerable fleet attrition as increasing numbers of small aircraft produced 30 to 50 years ago are removed from service. Projections were developed for Eastern Oregon Regional Airport based on *maintaining constant, increasing or decreasing* market share.

Maintain Share of U.S. Active General Aviation Fleet - This forecast maintains Eastern Oregon Regional Airport's current share of the U.S. active GA fleet at 0.031 percent. This projection assumes the Airport's growth in based aircraft will mirror the very modest forecast growth for the U.S. fleet over the next twenty years. Based on the low rate of growth projected nationally, it appears reasonable to assume the Airport has the ability to keep pace with the U.S. as the local market evolves and the community grows. General aviation based aircraft increase from 61 to 66 at Eastern Oregon Regional Airport by 2035, which represents an average annual increase of **0.39 percent**.

Increasing Share of U.S. Active General Aviation Fleet - This forecast gradually increases Eastern Oregon Regional Airport's current share of the U.S. active GA fleet from 0.031 to 0.040 percent. This projection assumes the Airport's growth in based aircraft will slightly outpace the very modest forecast growth for the U.S. fleet over the next twenty years. This scenario assumes a reversal of recent declines coupled with expanded airport business activities and continued growth in local and regional population and employment. General aviation based aircraft increase from 61 to 86 by 2035, which represents an average annual increase of **1.65 percent**.

Decreasing Share of U.S. Active General Aviation Fleet - This forecast gradually reduces the Airport's current share of the U.S. active GA fleet from 0.031 to 0.027 percent, continuing the declining trend experienced over the last fifteen years. The projection results in a small decrease from 61 to 58 general aviation based aircraft at the Airport by 2035, which represents an average annual decline of **0.25 percent.** The lower growth projection reflects a combination of factors, including competition from other airports within the local airport service area and a lowered ability to generate demand for facilities and services.

Oregon Aviation Plan Market Share

The 2007 Oregon Aviation Plan provides forecasts of Oregon's general aviation based aircraft fleet for the 2005-2025 time period. Oregon's GA fleet was projected to increase from 4,875 aircraft in 2005 to 6,225 aircraft in 2025, which represents an average annual increase of **1.23 percent**. The OAP forecast was extrapolated to 2035 to coincide with the current master plan horizon. It should be noted the OAP forecast

was prepared prior to the onset of the recent economic recession and requires updating. However, the annual growth rates contained in the forecast are comparable to other accepted forecasts and the projection provides a valid upper range growth scenario.

Eastern Oregon Regional Airport accounted for approximately 2.2 percent of Oregon's general aviation-based aircraft fleet in 2005. Based on the OAP forecast for 2015, the airport's current market share is approximately 1.1 percent. Projections were developed for Eastern Oregon Regional Airport based on *maintaining and increasing* market share within the state.

Maintain Share of Oregon General Aviation Aircraft Fleet- This forecast maintains the Airport's current 1.1 percent share of the Oregon's GA fleet through the twenty-year planning period. This projection assumes the Airport's growth in based aircraft will keep pace with projected statewide forecast growth during the period. General aviation-based aircraft increase from 61 to 77 at Eastern Oregon Regional Airport by 2035, representing an average annual increase of **1.23 percent**.

Increasing Share of Oregon General Aviation Fleet- This forecast gradually increases the Airport's current share of the Oregon's general aviation aircraft fleet from 1.1 to 1.5 percent. This projection assumes the Airport's growth in based aircraft will outpace projected statewide forecast growth during the period. General aviation-based aircraft increase from 61 to 103 at Eastern Oregon Regional Airport by 2035, which represents an average annual increase of **1.5 percent**.

Decreasing Share of Oregon General Aviation Fleet- This forecast gradually reduces the Airport's current share of Oregon's GA fleet from 1.1 to 0.75 percent, continuing the declining trend experienced over the last fifteen years. This projection results in a decrease from 61 to 53 general aviation-based aircraft by 2035, which represents an average annual decline of **0.7 percent.** The lower growth projection reflects a combination of factors, including competition from other airports within the local airport service area and an inability to generate demand for facilities and services.

General Aviation Based Aircraft Forecast Summary

The forecasts described in this section provide a wide array of growth scenarios—ranging from modest decline to moderate growth. Although the decline in general aviation-based aircraft at Eastern Oregon Regional Airport appears to be relatively consistent with the declining levels of general aviation aircraft operations, there is no evidence to indicate that the downward trend will continue in light of otherwise positive economic indicators. For this reason, a mid-range projection was developed that represents the mean of the updated based aircraft forecasts. The "composite" forecast results in an increase from 61 to 74 general aviation-based aircraft by 2035, which represents an average annual increase of **0.97 percent.**

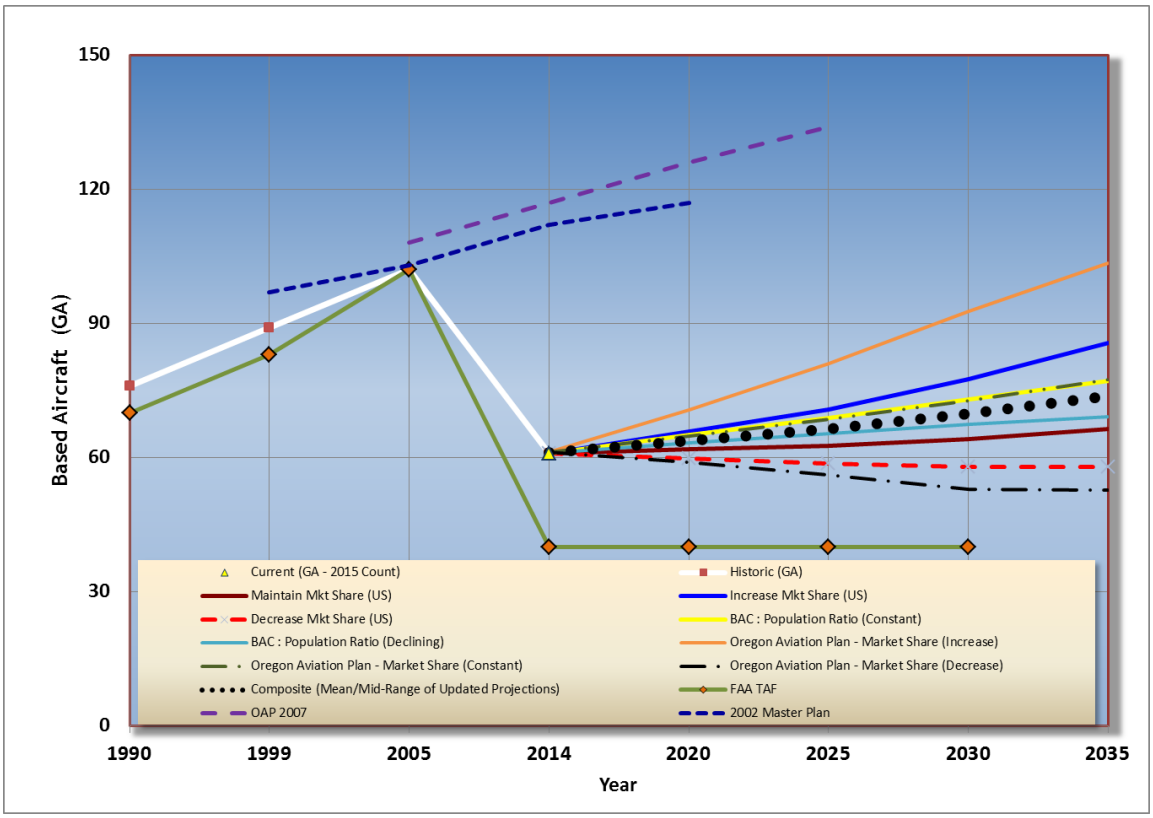
A **Mid-Range "Composite" Based Aircraft** projection is recommended as the preferred forecast for use in the airport master plan. This projection assumes the Airport will be able to arrest recent declines in aircraft and sustain modest growth consistent with growth anticipated in the local and regional economy. The projection assumes the ongoing efforts of the City of Pendleton to effectively and proactively manage all aspects of airport facilities and business operations will provide a desirable environment that will contribute to attracting and retaining based aircraft and airport businesses catering to general aviation.

Table 3-15 summarizes the based aircraft forecasts. **Figure 3-4** presents a graphic depiction of the based aircraft forecasts.

TABLE 3-15: GA AIRCRAFT FORECASTS – EASTERN OREGON REGIONAL AIRPORT

	2014/15 (ACTUAL)	2020	2025	2030	2035
Market Share of U.S. Active GA Aircraft					
Decreasing Market Share (-0.25 %AAR)	61	60	59	58	58
Constant Market Share (0.38% AAR)	61	62	63	64	66
Increasing Market Share (1.65% AAR)	61	66	71	78	86
Aircraft Per 1,000 Residents (Umatilla County)					
Declining Ratio (-0.25 %AAR)	61	63	65	67	69
Constant Ratio (0.38% AAR)	61	65	69	73	77
Market Share of Oregon GA Aircraft					
Decreasing Market Share (-0.70 %AAR)	61	59	56	53	53
Constant Market Share (1.17% AAR)	61	65	68	73	77
Increasing Market Share (2.65% AAR)	61	71	81	93	103
Composite Projection Mid-Range (Mean) (Recommended) (0.97% AAR)	**61**	**64**	**66**	**70**	**74**

FIGURE 3-4: GA BASED AIRCRAFT FORECASTS – EASTERN OREGON REGIONAL AIRPORT



Based Aircraft Fleet Mix

The airport's current mix of based aircraft is primarily made up of single engine aircraft, but includes a diverse mix of aircraft types, including helicopters and unmanned aerial vehicles (UAV). The based aircraft fleet mix during the planning period is expected to remain predominantly single-engine piston aircraft and helicopters, with a growing number of multi-engine piston aircraft, turbine aircraft, and light sport aircraft. It is anticipated that the majority of the non-military unmanned aerial systems/vehicles (UAS/UAV) will be associated with testing and training operations at the UAS test range and will not be permanently based at the airport.

Table 3-16 summarizes the projected based aircraft fleet mix for the planning period. The table separates civilian and military aircraft to illustrate the individual segments. **Figures 3-5A and 3-5B** depict the current (2015) and long term (2035) distribution of based aircraft by type.

TABLE 3-16: EASTERN OREGON REGIONAL AIRPORT FORECAST BASED AIRCRAFT FLEET MIX

ACTIVITY	2015	2020	2025	2030	2035
Civilian Aircraft					
Single Engine Piston	39	40	40	41	42
Multi-Engine Piston	2	2	2	2	3
Turboprop	1	1	1	2	3
Business Jet	0	0	1	1	1
Ultralight/LSA	5	6	6	7	8
Helicopter	14	15	15	16	16
UAS/UAV	0	0	1	1	1
Subtotal – Civilian Aircraft	61	64	66	70	74
Military Aircraft					
Helicopter	6	6	6	6	6
UAS/UAV	4	4	4	4	4
Subtotal – Military Aircraft	10	10	10	10	10
Total Based Aircraft	71	74	76	80	84

FIGURE 3-5A: EASTERN OREGON REGIONAL AIRPORT – BASED A/C FLEET MIX (JAN 2015)

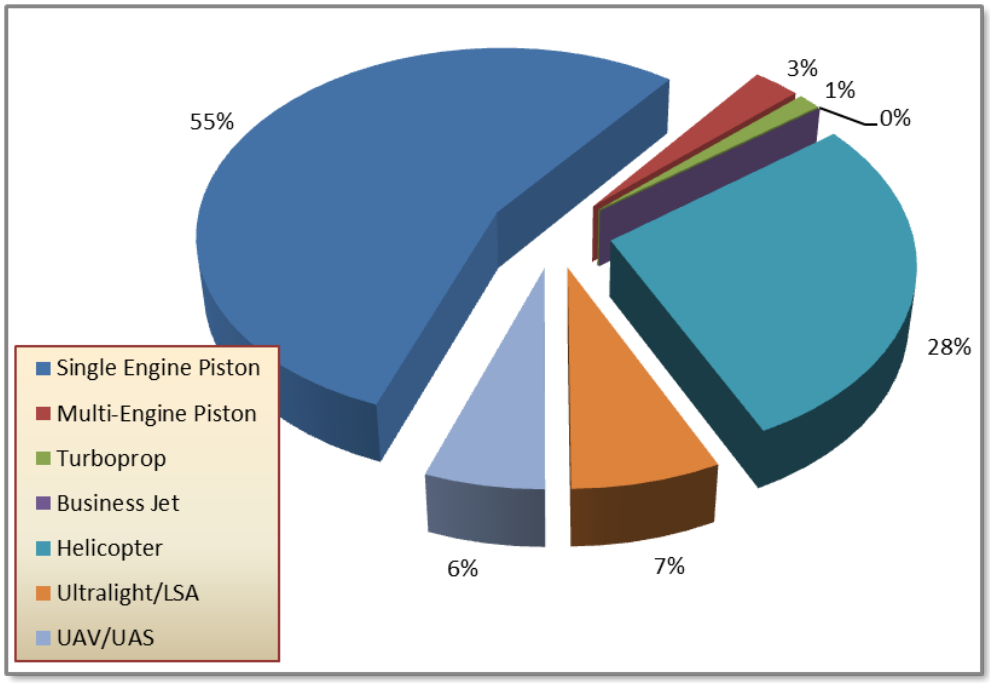
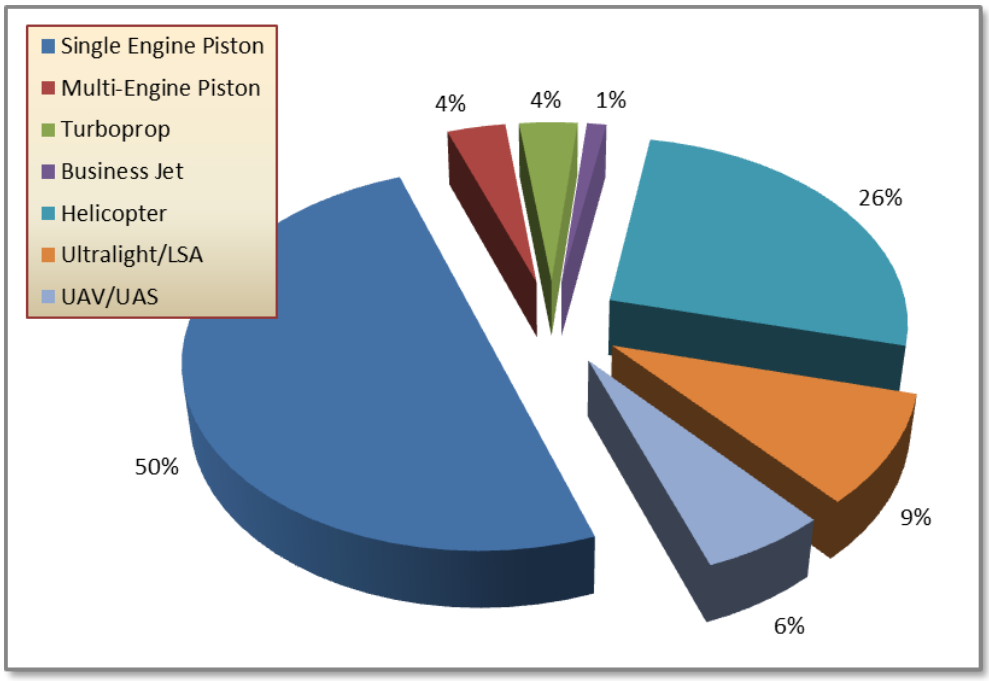


FIGURE 3-5B: EASTERN OREGON REGIONAL AIRPORT – FORECAST BASED A/C FLEET MIX (2035)



Aircraft Operations

Updated general aviation (GA) aircraft operations projections have been developed for comparison with existing forecasts in order to identify a selected forecast for the master plan. The updated operations forecasts use the previously described 2014 airport traffic control tower counts that were adjusted to capture activity that occurs when the control tower is closed.

The GA operations forecasts were developed by applying ratios of operations to based aircraft to reflect activity generated by locally-based and transient aircraft. A second GA operations forecast was developed using the average annual growth rate experienced at Oregon's ten towered airports between 2010 and 2014.

Table 3-17 summarizes the general aviation aircraft operations forecasts. Operations Per Based Aircraft (OPBA) Projections

The 2014 adjusted GA operations total for Eastern Oregon Regional Airport was 5,930, with a total of 61 GA based aircraft (97 operations per based aircraft). This level of activity is relatively low, as the common range of activity at many general aviation airports ranges from 200 to 450 operations per based aircraft.

The 2002 master plan assumed a ratio of 350 operations per based aircraft in its general aviation operations forecast. This assumption was based on historical FAA TAF data (1990-1999) that averaged 334 operations per based aircraft. Many airports experienced significant declines in aircraft utilization during the recent economic recession. As economic conditions have improved, aircraft utilization has begun to slowly

recover at most airports. This trend suggests the potential exists for the aircraft operations ratios at Eastern Oregon Regional Airport to improve over time. A continued decline in activity ratios below current levels deviates significantly from industry norms and does not appear to be sustainable based on facility capabilities and local market factors.

OPBA Forecast (Constant Ratio)

This projection maintains the 97 operations-per-based aircraft ratios through the twenty-year planning period reflected in the adjusted 2014 ATCT counts. The projection assumes aircraft utilization will remain at current levels as the airport maintains its competitive position in the service area. Future growth in aircraft operations is driven primarily by a net increase in based aircraft and retention of the current user base. The forecast is compatible with current airfield capabilities and the aircraft operational fleet mix would not change significantly. The projection results in general aviation aircraft operations increasing at average annual growth rate of **0.90 percent** between 2014 and 2035.

OPBA Forecast (Increasing Ratio 1)

This projection assumes a gradual increase from 97 to 140 operations per based aircraft through the planning period. The projection assumes aircraft utilization will gradually increase above current levels as the airport captures a larger share of transient aviation activity within the service area and locally based aircraft increase flight activity. The increase in aircraft utilization reflects the underlying strength of the local economy, the ability to attract increased transient aircraft, and the market potential for fixed base operator (FBO) services. The projection results in general aviation aircraft operations increasing at average annual growth rate of **2.67 percent** between 2014 and 2035.

OPBA Forecast (Increasing Ratio 2)

This projection assumes a slightly steeper increase from 97 to 200 operations per based aircraft through the planning period. The projection assumes the airport is able to capitalize on regional market opportunities noted in the previous projection and effectively compete with other airports in its service area. The projection results in general aviation aircraft operations increasing at average annual growth rate of **2.67 percent** between 2014 and 2035.

Oregon Towered Airports – Composite Growth Rate (GA Operations) 2010 -2014

A review of recent general aviation activity at Oregon's ten towered airports[12] was conducted to gauge the region's performance as the recent economic recession ended and overall economic conditions improved. The group of towered airports recorded 533,089 general aviation operations in 2014, up 6.5 percent above 2010 levels. The four-year growth results in an average annual growth rate of 1.59 percent. A projection was developed for Eastern Oregon Regional Airport by applying the **1.59 percent** growth rate to the 2014 base year operations through the planning period.

GA Operations Summary

The **OPBA – Increasing Ratio 1** projection is recommended as the preferred GA aircraft operations forecast. Similar to the recommended based aircraft forecast, this projection assumes the Airport will be able to arrest recent declines in activity and sustain modest growth consistent with growth anticipated in the local and regional economy.

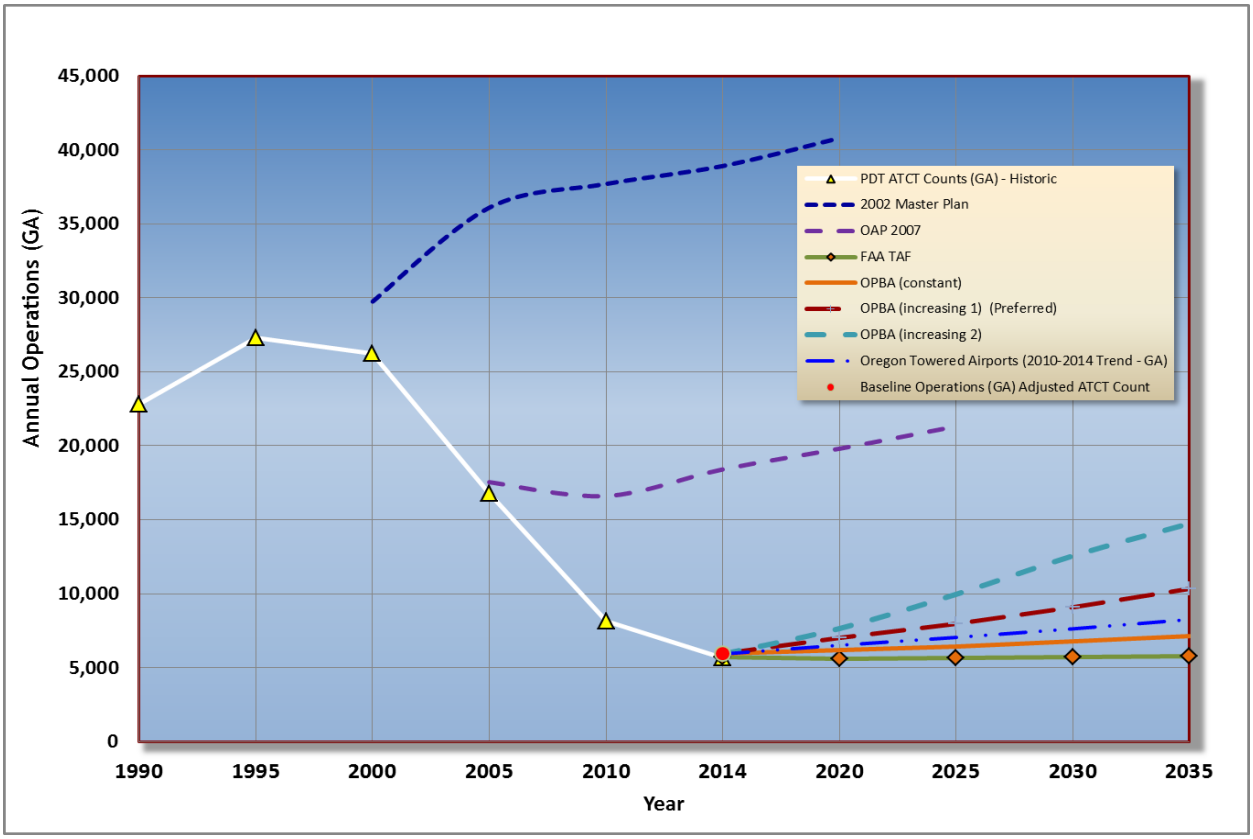
Figure 3-6 depicts the general aviation aircraft forecasts.

TABLE 3-17: GA AIRCRAFT FORECASTS – EASTERN OREGON REGIONAL AIRPORT

	2014/15 (ACTUAL)	2020	2025	2030	2035
OPBA (Constant Ratio) (0.90% AAR)	5,930	6,186	6,446	6,770	7,151
OPBA (Increasing Ratio 1) (2.76% AAR) – Recommended	**5,930**	**7,015**	**7,974**	**9,073**	**10,321**
OPBA (Increasing Ratio 2) (4.43% AAR)	5,930	7,652	9,968	12,562	14,744
Oregon Towered Airport (2010-2014) Composite Growth – GA Operations (1.59% AAR)	5,930	6,519	7,054	7,633	8,259
FAA TAF (-0.71% AAR)	5,732	5,586	5,646	5,710	5,775

[12] EUG, HIO, LMT, MFR,OTH,PDT,PDX,RDM,SLE, and TTD; ATADS Report

FIGURE 3-6: EASTERN OREGON REGIONAL AIRPORT GENERAL AVIATION OPERATIONS FORECAST



Instrument Flight Activity

Flight activity data for aircraft operating under instrument flight rules in the national airspace system is tracked by FlightAware, a company that developed live flight tracking services for commercial and general aviation. Instrument flight plan data for 2014 was acquired to help gauge both instrument activity and to provide verification of business class aircraft operating (commonly operating under IFR flight plans) at Eastern Oregon Regional Airport. The data captures all civil aircraft filing instrument flight plans listing Eastern Oregon Regional Airport either as the originating airport or the destination airport. Military aircraft are not included in the FAA instrument flight plan data. Based on current traffic estimates, instrument operations currently account for about 26 percent of total tower operations in 2014. **Table 3-18** summarizes the 2014 instrument flight plan activity at Eastern Oregon Regional Airport.

TABLE 3-18: INSTRUMENT OPERATIONS – EASTERN OREGON REGIONAL AIRPORT (2014)

ARC	REPRESENTATIVE AIRCRAFT	2014[1]
A-I	Cessna 182/Beechcraft Baron 55/TBM700	171
B-I	Beechcraft Baron 58/Beechcraft King Air 90/Cessna Citation Jet (CJ1)	224
A-II	Cessna Caravan/Pilatus PC12	2,712
B-II	Cessna Citation Bravo/Beechcraft King Air 200/Falcon 50	81
A-III	Douglas DC-3	0
B-III	ATR72/DH8A	66
C-I	Hawker HS125, Learjet 31	0
C-II	Bombardier Challenger	32
C-IV	Lockheed C130	0
D-I	Learjet 35	10
D-II	Gulfstream IV, V	14
--	Blocked (assumed to be 70% B-I/B-II Jet and 30% C-I/D-I/D-II Jet)	14
--	Helicopter	3
	Total Instrument Operations	3,327

Source: PDT FlightAware Data from 12/30/2013 to 1/1/2015

Local and Itinerant Operations

Aircraft operations consist of aircraft takeoffs and landings, which are classified as local or itinerant. Local operations are conducted in the vicinity of an airport and include flights that begin and end at the airport. These include local area flight training, touch and go operations, flightseeing, glider operations, and other flights that do not involve a landing at another airport. Itinerant operations include flights between airports, including cross-country flights. Itinerant operations reflect specific travel between multiple points, often associated with business and personal travel.

The airport traffic control tower operations count for 2014 was 26 percent local and 74 percent itinerant. The FAA TAF provides a similar traffic distribution (29 percent local/71 percent itinerant) for current and forecast operations. The 2002 airport master plan assumed 33/67 percent local/itinerant split in its forecast. A 27 percent local and 73 percent itinerant split, which is an average of the ATCT and TAF data is applied to the updated operations forecast. Local and itinerant data for each forecast year are summarized in **Table 3-19**.

TABLE 3-19: GENERAL AVIATION LOCAL/ITINERANT OPERATIONS

GENERAL AVIATION OPERATIONS	2014/15 (ACTUAL)	2020	2025	2030	2035
Total Operations	5,930	7,015	7,974	9,073	10,321
Local Operations	1,541	1,894	2,153	2,450	2,787
Itinerant Operations	4,388	5,121	5,821	6,623	7,534

Military Operations

Eastern Oregon Regional Airport's military operations are primarily conducted by the Oregon Army National Guard (OANG), which currently operates a fleet of six Chinook CH-47 helicopters and four unmanned aerial vehicles (UAV). The airport also accommodates a small amount of transient helicopter and fixed wing aircraft activity. Historical military operations data at Eastern Oregon Regional Airport are listed in **Table 3-20**.

OANG officials indicate that their 2014 flight hour breakdown was 84 percent helicopter and 16 percent UAV. OANG indicates that 100 percent of their UAV activity occurs during the operating hours of the air traffic control tower (ATCT), since UAVs are not currently authorized to fly between sunset and sunrise. OANG estimates that 25 percent of their helicopter operations occur at night, and about half of those (12.5 percent) occur when the ATCT is closed. Based on this assessment, approximately 360 additional military helicopter operations occurred at Eastern Oregon Regional Airport in 2014 when the ATCT was closed. The combined total of tower and non-tower military operations at Eastern Oregon Regional Airport in 2014 is estimated to be 3,162. It is noted that aircraft operations recorded by ATCT are by category of user (air carrier, air taxi, general aviation, and military) and do not identify aircraft types (fixed wing, helicopter, UAV, etc.).

OANG indicates that there is no expectation of significant growth in military activity at Eastern Oregon Regional Airport. However, funding may be received to develop facilities to support their current unmanned aerial systems (UAS) program. OANG reports that UAS flight hours over the last two years averaged approximately 130 hours per year. Based on ATCT records, it is estimated that 280 military UAV operations occurred at the airport in 2014.

For forecasting purposes, it is assumed that current levels of military helicopter activity will be maintained through the planning period. Based on the relatively new and growing industry developing around unmanned aerial systems/vehicles (UAV/UAS), and the established use of this technology by the military, moderate growth (5% annual growth) in military UAS/UAV activity at Eastern Oregon Regional Airport is assumed through the planning period. **Table 3-18** summarizes forecast military activity at Eastern Oregon Regional Airport.

TABLE 3-20: EASTERN OREGON REGIONAL AIRPORT – MILITARY OPERATIONS FORECAST

ACTIVITY	2014	2020	2025	2030	2035
Helicopter	2,882	2,900	2,900	2,900	2,900
UAS/UAV	280	380	480	610	780
Total	**3,162**	**3,280**	**3,380**	**3,510**	**3,680**

UAS Operations

Eastern Oregon Regional Airport's unmanned aerial system (UAS) activity includes civilian and military components. As noted earlier, the Oregon Army National Guard (OANG) currently generates approximately 280 annual UAS operations at the airport. Civilian UAS at the airport is at its earliest development stage and has not yet generated significant flight activity. However, civilian UAS activity is directly driven by customer demand that is expected to fluctuate widely. The addition of one or two customers with a limited number of active flying days per year has the potential of generating several hundred UAS operations annually. Major shifts in activity could occur at any time, which makes estimating current "baseline" activity challenging. For forecasting purposes, current "baseline" civilian UAS activity at Eastern Oregon Regional Airport is estimated up to 500 annual operations.

The following assessment of UAS activity at Eastern Oregon Regional Airport was prepared by Peak 3, Inc., the UAS range manager for the City of Pendleton:

> Predicted growth of Unmanned Aircraft Systems (UAS) flight operations and associated airport infrastructure at KPDT is uncertain at this time. The domestic Unmanned Aircraft industry is restricted by yet-to-be written and implemented FAA regulations governing the use of UAS in the National Airspace System (NAS).
>
> The Pendleton UAS Range is part of the Pan-Pacific UAS Test Range Complex, one of six FAA designated Test Sites established as a result of the FAA Modernization and Reform Act of 2012. The intent of the Pendleton Test Range is to provide the FAA with testing data to assist them in the development of regulations for integration of Manned and Unmanned Aircraft into the NAS.
>
> The UAS regulatory environment is changing rapidly and this state of uncertainty directly affects the commercial industry's ability to conduct UAS operations for commercial applications. The selection of the six Test Sites in December 2013 established a foundational process to achieve FAA flight approval for selective UAS but these requirements have significantly evolved over the past year. As an example, since Jan 2014, the FAA also added additional avenues for commercial operations through the Section 333 exemption process, an additional requirement to obtain aircraft registration (N Numbers) which increases configuration control requirements, selective

companies were allowed to commercially operate as "trusted partners" (CNN, Precision Hawk and BNSF Railroad), and a small UAS (sUAS) proposed rule (NPRM) to allow for flight operations using UAS less than 55 pounds and flying up to 400 feet. As such, the Test Site environment and market have evolved drastically and the landscape continues to change daily.

While dependent on the regulatory environment, we expect the growth rate of UAS at KPDT to have minimal impact on overall numbers over the next five years.

Despite the uncertainty associated with civilian UAS development, the airport master plan requires at a minimum, order-of-magnitude projections of UAS activity to support future facility planning. It is recognized that any future estimates of activity at this early stage of development are merely placeholders and that actual activity could deviate significantly within the planning period. It appears that the majority of UAS activity at Eastern Oregon Regional Airport will be associated with operator (pilot) training and systems research, development and flight testing. A unique characteristic of the UAS/UAV sector is the ability for the aircraft to operate for extended periods. The capabilities of the aircraft combined with the primary mission requirements result in a relatively low ratio of takeoffs and landings per flight hour, compared to conventional aircraft.

Two UAS/UAV forecast scenarios were developed that reflect the uncertainties noted above:

The ***Baseline UAS Projection*** assumes the current baseline of 500 annual civilian UAS operations will be maintained through the twenty-year planning period. The projection recognizes fluctuations may occur within the civilian UAS segment, but the projection provides a reasonable gauge of activity potential. The military UAS activity described earlier is well established and not subject to the same uncertainties as the civilian segment.

The **Growth** ***UAS Projection*** assumes the current baseline of 500 annual civilian UAS operations will be maintained to 2020 then activity will increase at an annual rate of 10 percent through 2035. The projection recognizes the significant potential of the civilian UAS market and the unique role of the Pendleton UAS Test Range and Eastern Oregon Regional Airport as a center for this activity. Total UAS activity at the airport includes the civilian noted here and the military UAS activity presented previously in **Table 3-20**.

Table 3-21 summarizes forecast UAS activity at Eastern Oregon Regional Airport.

TABLE 3-21: EASTERN OREGON REGIONAL AIRPORT – UAS OPERATIONS FORECAST

ACTIVITY	2014	2020	2025	2030	2035
Baseline UAS Projection					
Civilian	500	500	500	500	500
Military	280	380	480	610	780
Total	**780**	**880**	**980**	**1,110**	**1,280**
Growth UAS Projection					
Civilian	500	500	800	1,300	2,100
Military	280	380	480	610	780
Total	**780**	**880**	**1,280**	**1,910**	**2,880**

Peaking Characteristics

Peak activity levels translate into facility requirements for runways, taxiways, apron space, and passenger terminal facilities. There are three primary times of peak activity, which include monthly, daily, and hourly activity.

- Peak Month – the calendar month in which peak operations or enplanements occur.
- Design Day – the average day in the peak month, obtained by dividing the peak month activity by the number of days in that month.
- Busy Day – the busy day in a typical week during the peak month.
- Design Hour – the peak hour within the design day.
- Busy Hour – the peak hour within the busy day.

The peaking characteristics for commercial passenger service reflects the modest current and forecast activity consistent with limited flight frequency and relatively low passenger volumes. The forecasts anticipate an average of one commercial departure per day, with two departures assumed one day per week. In any given peak hour, commercial activity would typically include one arrival and one departure. The scheduled commercial passenger activity generates relatively constant monthly operations throughout the year, with the peak month estimated at 9 percent of annual activity. Based on a review of airport traffic control tower records, peak month activity generated by general aviation, air cargo and military operations averages 11 percent of annual activity, which typically occurs during the summer months.

Table 3-22 summarizes peaking activity at Eastern Oregon Regional Airport.

TABLE 3-22: EASTERN OREGON REGIONAL AIRPORT – PEAKING ACTIVITY

ACTIVITY	2014	2020	2025	2030	2035
Aircraft Operations (All Activity Segments)					
Annual Operations	12,911	13,215	14,374	15,653	17,131
Peak Month (11%)	1,480	1,495	1,625	1,760	1,935
Busy Day	69	70	76	83	91
Busy Hour	14	14	15	17	18
Design Day	49	50	54	59	65
Design Hour	10	10	11	12	13
Commerical Passenger Activity					
Annual Operations	2,214	930	930	890	840
Peak Month (9%)	198	84	84	80	76
Design Day	7	3	3	3	3
Design Hour	2	2	2	2	2
Annual Enplanements	4,174	4,600	5,000	5,400	5,900
Peak Month (11%)	458	506	550	594	649
Design Day	15	17	18	20	22
TPHP *	30	34	36	40	44

Notes
Peaking numbers are rounded
Enplanements, passenger air taxi/commuter operations, and other air taxi/commuter operations data from Table 3-20 Commercial Air Service Forecast
General aviation operations data from Table 3-17: GA Aircraft Forecasts
Military operations data from Table 3-18: Military Operations Forecasts

Design Aircraft

The selection of design standards for airfield facilities is based on the characteristics of the aircraft expected to use the airport on a regular basis. The **design aircraft** is defined as the most demanding aircraft type operating at the airport with a minimum of 500 annual itinerant operations, as described in the FAA *Substantial Use Threshold*:

"Substantial Use Threshold- Federally funded projects require that critical design airplanes 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. Under unusual circumstances, adjustments may be made to the 500 total annual itinerant operations threshold after considering the circumstances of a particular airport. Two examples are airports with demonstrated seasonal traffic variations, or airports situated in isolated or remote areas that have special needs."

The FAA groups aircraft into five categories (A through E) based on their approach speeds. Aircraft Approach Categories A and B include small propeller aircraft, many small or medium business jet aircraft, and some larger aircraft with approach speeds of less than 121 knots (nautical miles per hour). Categories C, D, and E consist of the remaining business jets and larger jet and propeller aircraft generally associated with commercial and military use. These larger aircraft typically have approach speeds of 121 knots or more. The FAA also establishes six airplane design groups (I-VI), based on the wingspan and tail height of the aircraft. The categories range from Airplane Design Group (ADG) I, for aircraft with wingspans of less than 49 feet, to ADG VI for the largest commercial and military aircraft.

The combination of airplane design group and aircraft approach speed for the design aircraft dictates the Airport Reference Code (ARC). The ARC is used to define applicable airfield design standards. Aircraft with a maximum gross takeoff weight greater than 12,500 pounds are classified as "large aircraft" by the FAA; aircraft of 12,500 pounds or less are classified as "small aircraft." The FAA further defines airfield components through Runway Design Code (RDC) and Taxiway Design Group (TDG) designations. A list of typical general aviation and business aviation aircraft and their respective design categories is presented in **Table 3-23. Figure 3-7** illustrates representative aircraft in various design groups.

The 2002 airport master plan identified the Canadair Regional Jet (CRJ), operated by Horizon Air, as the design aircraft for Eastern Oregon Regional Airport, based on runway length requirements. The deHavilland/Bombardier Dash 8 was identified as the largest design aircraft based on wingspan. Both aircraft were identified as Airport Reference Code (ARC) C-III aircraft.

The current design aircraft at Eastern Oregon Regional Airport is the Cessna Caravan, a single-engine turboprop aircraft. The Cessna Caravan 208 is an Airport Reference Code (ARC) A-II aircraft. The future design aircraft for Eastern Oregon Regional Airport is a Saab 340, multi-engine turboprop aircraft based on the selected forecast. The Saab 340 is an ARC B-II aircraft.

TABLE 3-23: AIRCRAFT DESIGN CATEGORIES

AIRCRAFT	AIRCRAFT APPROACH CATEGORY	AIRPLANE DESIGN GROUP	MAXIMUM GROSS TAKEOFF WEIGHT (LBS)
Cessna 182 (Skylane)	A	I	3,100
Cirrus Design SR22	A	I	3,400
Cessna 206 (Stationair)	A	I	3,614
Beechcraft Bonanza A36	A	I	3,650
Socata/Aerospatiale TBM 700	A	I	6,579
Beechcraft Baron 58	B	I	5,500
Cessna 340	B	I	5,990
Cessna Citation Mustang	B	I	8,645
Embraer Phenom 100	B	I	10,472
Cessna Citation CJ1+	B	I	10,700
Beech King Air C90	B	I	11,800
Beechcraft 400A/Premier I	B	I	16,100
Piper Malibu (PA-46)	A	II	4,340
Cessna Caravan 675	A	II	8,000
Pilatus PC-12	A	II	10,450
Cessna Citation CJ2+	B	II	12,500
Cessna Citation II	B	II	13,300
Beech King Air 350	B	II	15,000
Cessna Citation Bravo	B	II	15,000
Cessna Citation CJ4	B	II	16,950
Embraer Phenom 300	B	II	17,529
Cessna Citation XLS+	B	II	20,200
Dassault Falcon 20	B	II	28,660
Bombardier Learjet 55	C	I	21,500
Raytheon/Hawker 800XP	C	II	28,000
Gulfstream 200	C	II	34,450
Bombardier Challenger 300	C	II	37,500
Bombardier Global Express 500	C	III	92,750
Bombardier Q400	C	III	65,200
Learjet 35A/36A	D	I	18,300
Gulfstream G450	D	II	73,900
Gulfstream G650	D	III	99,600

Source: AC 150/5300-13, as amended; aircraft manufacturer data.

A-I

12,500 lbs. or less (small)

Beech Baron 55
Beech Bonanza
Cessna 182
Piper Archer
Piper Seneca

B-I

12,500 lbs. or less (small)

Beech Baron 58
Beech King Air 100
Cessna 402
Cessna 421
Piper Navajo
Piper Cheyenne
Cessna Citation I

A-II, B-II

12,500 lbs. or less (small)

Super King Air 200
Pilatus PC-12
DHC Twin Otter
Cessna Caravan
King Air C90

B-II

Greater than 12,500 lbs.

Super King Air 300, 350
Beech 1900
Cessna Citation Excel
Falcon 20, 50
Falcon 200, 900
Citation II, Bravo XLS+
Citation CJ3

A-III, B-III

Greater than 12,500 lbs.

DHC Dash 7
DHC Dash 8
Q-300, Q-400
DC-3
Convair 580
Fairchild F-27
ATR 72
ATP

C-I, D-I

Lear 25, 35, 55, 60
Israeli Westwind
HS 125-700

C-II, D-II

Gulfstream II, III, IV
Canadair 600
Canadair Regional Jet
Lockheed JetStar
Citation X
Citation Sovereign
Hawker 800 XP

C-III, D-III

Boeing Business Jet
Gulfstream 650
B 737-300 Series
MD-80, DC-9
Fokker 70, 100
A319, A320
Gulfstream V
Global Express

C-IV, D-IV

B-757
B-767
DC - 8-70
DC - 10
MD - 11
L 1011

D-V

B - 747 Series
B - 777

AIRPORT REFERENCE CODES (ARC)
FIGURE 3.7

EASTERN OREGON REGIONAL AIRPORT
AIRPORT MASTER PLAN

CENTURY WEST ENGINEERING

Forecast Summary

The summary of forecast data is provided in **Tables 3-24 and 3-25**. As with any long-term facility demand forecast, it is recommended that long-term development reserves be protected to accommodate demand that may exceed current projections. For planning purposes, a reserve capable of accommodating a doubling of the 20-year preferred forecast demand should be adequate to accommodate unforeseen facility needs during the current planning period. However, should demand significantly deviate from the airport's recent historical trend, updated forecasts should be prepared to ensure that adequate facility planning is maintained.

TABLE 3-24: EASTERN OREGON REGIONAL AIRPORT – SUMMARY OF FORECAST DATA

DESCRIPTION	HISTORICAL	FORECAST			
	2014	2020	2025	2030	2035
Based Aircraft					
Single-Engine Piston	39	40	40	41	42
Multi-Engine Piston	2	2	2	2	3
Turboprop	1	1	1	2	3
Jet	0	0	1	1	1
Ultralight	5	6	6	7	8
Helicopter (Civilian)	14	15	15	16	16
UAS/UAV (Civilian)	0	0	1	1	1
Military (Rotorcraft)	6	6	6	6	6
Military (UAS/UAV)	4	4	4	4	4
Total Based Aircraft	**71**	**74**	**76**	**80**	**84**
Annual Aircraft Operations					
Air Carrier	6	0	0	0	0
Air Taxi/Commuter	3,813	2,920	3,020	3,070	3,130
General Aviation (excl. UAS/UAV)	5,430	6,515	7,474	8,573	9,821
Military (excl. UAS/UAV)	2,882	2,900	2,900	2,900	2,900
UAS/UAV	780	880	980	1,110	1,280
Total Operations	**12,911**	**13,215**	**14,374**	**15,653**	**17,131**
Operations per Based Aircraft (GA)	**102**	**116**	**128**	**138**	**150**
Annual Instrument Operations					
Total Instrument Operations	3,327	3,436	3,737	4,070	4,454
Design Family Aircraft Operations					
A-II Turboprop	2,800	3,000	3,200	3,400	3,600
B-II Turboprop	19	1,000	1,040	990	960
B-I Jet	22	30	60	80	100
B-II Jet	62	80	110	140	200
C&D–I Jet	10	20	30	40	50
C&D-II Jet	50	60	80	100	120
C&D-III Jet	0	10	10	20	20
C-IV Turboprop (C-130)	150	160	180	200	220
B-IV Jet (C-17)	8	12	18	24	36
Design Aircraft	A/B-II Turboprop	B-II Turboprop	B-II Turboprop	B-II Turboprop	B-II Turboprop
Current Design Aircraft: Cessna Caravan 208 (Single Engine Turboprop) ARC A-II Future Design Aircraft: Saab 340 (Multi-Engine Turboprop) ARC B-II					

TABLE 3-25: EASTERN OREGON REGIONAL AIRPORT – SUMMARY OF FORECAST COMMERICAL ACTIVITY

DESCRIPTION	HISTORICAL	FORECAST			
	2014	2020	2025	2030	2035
Annual Passengers					
Enplaned Passengers	4,174	4,600	5,000	5,400	5,900
Annual Departures	1,107	465	465	445	420
Cargo					
Total Operations	1,024	1,040	1,040	1,040	1,040
Total Enplaned Cargo (Tons)	129	150	165	180	200
Total Deplaned Cargo (Tons)	183	210	235	260	290

Airfield Capacity

Airfield capacity is determined by calculating the airport's annual service volume. Annual service volume (ASV) is a measure of estimated airport capacity and delay used for long-term planning. ASV, as defined in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay, provides a reasonable estimate of an airport's operational capacity. The ratio between demand and capacity helps define a timeline to address potential runway capacity constraints before they reach a critical point. If average delay becomes excessive (greater than 3 minutes per aircraft), significant congestion can occur on a regular basis, which significantly reduces the efficient movement of air traffic. ASV is calculated based on the runway and taxiway configuration, percent of VFR/IFR traffic, aircraft mix, lighting, instrumentation, the availability of terminal radar coverage and the level of air traffic control at an airport.

Factors that affect airfield capacity Include: weather conditions; airfield geometry; runway usage; aircraft fleet mix; percentage of touch-and-go operations; percentage of arrivals versus departures; airspace; etc.

Weather Conditions

Weather plays a vital role in the capacity of the runway system as a large percentage of aircraft delays are attributable to inclement weather.

Two weather conditions affect airport operations, Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). VMC allows a pilot to operate the aircraft in visual conditions as long as they can maintain established cloud and visibility separation requirements. These requirements vary based on the airspace one is flying in. For EORA, which is Class D, visual operations require at least 3 statute miles of visibility. In addition, aircraft must remain no closer than 500 feet below, 1,000 feet above, and 2,000 feet horizontal distance from clouds. IMC describes weather conditions in which pilots are required to fly the aircraft solely by reference to instruments rather than visually. Airports are considered to be in IMC when the overall visibility is less than 3 statute miles and clouds are below a

1,000-foot ceiling. When an airport is in IMC, arrivals are normally limited to a specific runway that can accommodate instrument only approaches. This can include precision instrument approaches (those providing both horizontal and vertical guidance) and non-precision instrument approaches (those providing only vertical guidance).

Runways 7-25 and 11-29 can each accommodate visual operations during VMC. Runway 25 also has precision instrument approach capability while all Runways have non-precision instrument approach capability.

Wind Coverage

Wind affects runway system capacity, since it can have an impact on the operation of small, general aviation aircraft. Large, commercial service aircraft generally are not as susceptible to crosswinds as are the general aviation aircraft. Most general aviation aircraft are not permitted to take off or land if crosswinds exceed the aircraft manufacturer's specifications. Runways should therefore be oriented in the direction of the prevailing winds to provide maximum lift for takeoff. FAA criteria specify that the runway(s) orientation should provide at least 95% wind coverage. Wind roses constructed from historical weather observations and climatology data are used to calculate the percentage of wind coverage offered by individual or groups of runways. The current runway configuration at EORA provides greater than 95 percent wind coverage for all aircraft during all weather and IMC conditions.

Arrivals and Departures

The percentage of arrivals versus departures can affect an airport's overall capacity since a higher number of departures can typically be accommodated in a given period of time than arrivals.

Touch and Go Operations

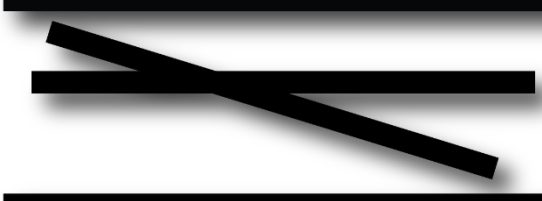
Touch and Go operations are primarily performed for pilot training by small, single- and twin-engine general aviation aircraft. These operations consist of an aircraft performing an approach to a runway, briefly touching down on the runway then immediately applying full throttle to depart the runway. Runways can accommodate a greater number of touch and go operations than any other type of operation. Therefore, the numbers of touch and go operations will impact an airport's overall operational capacity. The greater the numbers of touch and go operations, generally the greater the overall capacity of a particular runway or runway system. Touch and go operations at EORA comprise less than 20 percent of total airport operations and are not expected change significantly during the study period.

Annual Service Volume (ASV)

The initial step in developing Demand/Capacity Analysis is to conduct a preliminary assessment of the forecast demand levels relative to the airfield capacity. This analysis determines whether demand is approaching the airfield's capacity or Annual Service Volume (ASV) and whether a detailed capacity calculation is warranted. Calculating the ASV incorporates the Runway Use Configuration and Fleet Mix among many other variables.

Chapter 2 of the Airport Capacity and Delay Advisory Circular (AC 150/5060-5) details the procedure for calculating capacity and delay for long range planning. This circular provides a variety of typical runway configurations at airports in the United States. The first step in calculating the ASV is to select the configuration that most closely reflects the airfield configuration at the study airport. As discussed in the Inventory chapter, EORA has two active runways; Runway 7-25 is the primary runway equipped with both precision and non-precision instrument approaches. Runway 11-29 is a crosswind runway with non-precision instrument approach capability. The runway use diagrams in AC 150/5060-5 assume there is at least one runway equipped with a precision instrument approach, which is the case at EORA. The runway use configuration in the capacity and delay advisory circular that best fits EORA's runway layout is Diagram Number 9 as illustrated on **Table 3-26** below.

TABLE 3-26: EASTERN OREGON REGIONAL AIRPORT – RUNWAY USE DIAGRAM NUMBER 9

Runway Configuration	Mix Index	Hourly Capacity Ops/Hour		Annual Service Volume
	% (C + 3D)	VFR	IFR	Ops/Year
	0 to 20	98	59	230,000
	21 to 50	77	57	200,000
	51 to 80	77	56	215,000
	81 to 120	76	59	225,000
	121 to 180	72	60	265,000

Source: FAA AC 150/5060-5, 2016

The second component needed to calculate the ASV is the fleet mix or mix index. This is the percentage of aircraft operations by multi-engine aircraft in Aircraft Class C (maximum certificated takeoff weights between 12,500 pounds and 300,000 pounds) and Aircraft Class D (maximum certificated takeoff weights greater than 300,000 pounds). The formula for determining aircraft mix is the percentage of Class C aircraft plus three times the percentage of Class D aircraft or % (C+3D). The larger and heavier Class D aircraft have a greater impact on airfield capacity because the wake turbulence they generate can affect trailing aircraft, which requires increased separation during operations; increased separation reduces capacity.

Table 3-27 presents the breakdown of the Aircraft Classifications used in determining wake turbulence standards and the Aircraft Mix Index. Aircraft mix (or Mix Index) is the relative percentage of operations conducted by each of the four classes of aircraft (A, B, C, and D). The (C+3D) Mix Index at EORA is less than 20 percent of total activity.

TABLE 3-27: EASTERN OREGON REGIONAL AIRPORT - AIRCRAFT CLASSIFICATIONS

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

Sources: FAA Advisory Circular 150/5060-5, Airport Capacity and Delay (with changes), and Century West Analysis

For long-term planning purposes, the FAA estimates the annual capacity (ASV) for EORA is approximately 230,000 operations; hourly capacity is estimated to be 98 operations during visual flight rules (VFR) conditions and 59 operations during instrument flight rules (IFR) conditions. Although these estimates assume optimal conditions (airport traffic control, radar, etc.), they provide a reasonable basis for approximating existing and future capacity:

Existing Capacity: 12,911 Annual Operations / 230,000 ASV = 5.6% (demand/capacity ratio)

Future Capacity: 17,131 Annual Operations / 230,000 ASV = 7.4% (demand/capacity ratio)

The average delay per aircraft would be expected to remain below three minutes throughout the planning period based on these ratios. The FAA recommends that airports proceed with planning to provide additional capacity when 60 percent of ASV is reached. The updated aviation activity forecasts indicate both annual and peak hour activity is projected to remain well below the 60 percent threshold during the planning period.