PORT OF ASTORIA

Astoria Regional Airport

Master Plan Update

B. Forecasts of Aviation Activity

B Forecasts of Aviation Activity

INTRODUCTION. Forecasting is a key element in the master planning process. The forecasts are essential for analyzing existing airport facilities and identifying future needs and requirements for these facilities. Forecasting, by its very nature, is not exact, but it does establish some general parameters for development and, when soundly established, provides a defined rationale for various development activities as demands increase. The amount and kind of aviation activities occurring at an airport are dependent upon many factors, but are usually reflective of the services available to aircraft operators, the meteorological conditions under which the Airport operates (daily and seasonally), the businesses located on the Airport or within the community the Airport serves, and the general economic conditions prevalent within the surrounding area.

Forecasting generally commences by obtaining accurate historical and existing data. Utilizing the present time as an initial point, certain quantifiable facts and trends can be identified, along with many intangible factors, which will affect the aviation activity forecasts. This has evolved from a comprehensive examination of historical airport records and recent planning documents relative to the Airport (i.e., the 2004 FAA *Terminal Area Forecasts,* the 1993 *Astoria Regional Airport Master Plan*, and the FAA *Aerospace Forecasts, Fiscal Years 2004-2015*). These documents were assembled in different years, making the data quite variable and emphasizing the need for establishing a well-defined and well-documented set of base information from which to develop forecasts of aviation activity.

Prior to an examination of current and future activity levels at the Airport, several conditions and assumptions should be noted that form the basis or foundation for the development of the forecasts contained here. These variables represent a variety of physical, operational, and socioeconomic considerations, and to varying degrees relate to and affect aviation activity at Astoria Regional Airport.

Weather Conditions

The most current and complete set of weather data available for Astoria Regional Airport was obtained and analyzed. With the exception of a few days annually, poor weather conditions do not adversely affect the Airport. VFR meteorological conditions are experienced, on average, 89.5% of the time annually. Therefore, aircraft can operate at the Airport on a regular basis throughout the year, with only limited interruption due to weather. The following chapter will examine the potential positive impacts of improved approach capabilities at the Airport.

Socioeconomic Conditions

Historically, the socioeconomic conditions of a particular area directly affect aviation activity within that region. It is usually helpful to incorporate an analysis of local and regional socioeconomic data into the forecast for future aviation demands at an airport. Typically, the most often analyzed indicators are population, employment, and income. Socioeconomic data was obtained from recognized sources, including local, regional, state, and Federal planning organizations.

Population. Astoria Regional Airport is located within the City of Warrenton, and serves the regions of Northwest Oregon and Southwest Washington State. Warrenton, and its surrounding cities (including Astoria, Cannon Beach, Geahart, Seaside, the Long Beach Peninsula and unincorporated Clatsop County) have demonstrated continued population growth from 1990 through 1999.

The following table, entitled *POPULATION INFORMATION, 1990 to 2020,* provides a summary of the population information for Clatsop County and the largest municipalities within the County. The area has recently experienced an influx of retired individuals who come to enjoy the many recreational opportunities surrounded by a mild marine climate and environment. Additionally, the region is home to many home-based entrepreneurs.

Table B1
POPULATION INFORMATION, 1990 to 2020

	2000	2010 Forecast	2020 Forecast	Average Annual Percentage Increase over 20 yr period[1]
Clatsop County	35,630	38,376	41,788	0.86%
Astoria	9,813	10,649	11,826	1.03%
Cannon Beach	1,588	1,707	1,859	0.85%
Geahart	995	1,151	1,254	1.30%
Seaside	5,900	6,546	7,337	1.22%
Warrenton	4,096	4,813	5,741	2.01%
Unincorporated	13,238	13,510	13,771	0.20%

Source: Clatsop County Department of Community Development Community Profile 2004. *1. Per Year (2000-2020).*

Employment. According to the Oregon Employment Department, the total civilian labor force for Clatsop County was 18,669 in December 2004, of which 17,454 people were employed (resulting in an unemployment rate of 6.5%). This compares to a national unemployment rate of 5.1%, and a State of Oregon unemployment rate of 6.5% (5.4% and 6.8% respectively, adjusted seasonally.)

Clatsop County, along with its neighboring counties (Columbia and Tillamook) experiences significant seasonal unemployment fluctuations. Unemployment rates are highest in the winter when tourism is low, and construction and natural-resource extraction is more difficult.

Clatsop County's industry is resource-based, although the area is working to diversify. Major employers include Georgia Pacific, Columbia Memorial Hospital, Providence Seaside Hospital, Job Corp., Weyerhaeuser (Willamette Industries was acquired by Weyerhaeuser in 2002), State of Oregon, US Coast Guard, Fred Meyer, Safeway, Clatsop County Government, and the Astoria School District.

Income. The Clatsop County Department of Community Development Profile indicates the 2001 Per Capita Income for Clatsop County was $24,664 (11th out of Oregon's 36 counties). The US and Oregon Per Capita Income in 2001 was $30,413 and $28,222 respectively.

Community Support

Astoria Regional Airport benefits from the support of the City and county governments, as well as local industry and citizens. The Airport is recognized as a vital infrastructure asset that contributes to the stability and future expansion of the area's economy. Additionally, the communities in Northwest Oregon and Southwestern Washington benefit from a quality airport facility. These communities provide an economic base that can attract additional aviation activity, as well as industrial/business development to the Airport.

Regulatory Climate

For purposes of forecasting in this Master Plan Update, it is assumed that the regulatory climate regarding the general aviation industry will not change dramatically. Specifically, it is assumed that noise and emissions requirements on business aircraft will remain within the bounds prescribed by current rules and regulations. It is also assumed that the general aviation community will not be subject to new user-fees, that access to airports and airspace will not be limited, and that general aviation airports will not be subject to security restrictions that are currently imposed on air carrier airports.

Negative or Neutral Factors

Prior to the development of aviation activity forecasts, several factors that have an influence, either positive or negative, in the planning process should be considered. As a general comment, the Astoria Regional Airport has very few negative factors and is in an enviable position due to its many positive features and conditions. However, some broad factors can have a negative impact on the Airport, and aviation in general, and these are considered in the planning process.

The first issue is the overall condition of the general aviation industry in the United States. Beginning in 1978, many sectors of the general aviation industry have been in recession, and the FAA has identified several factors that precipitated this downturn, including economic recessions, fuel crises, the termination of the GI Bill, and the repeal of the investment tax credit.

However, a number of bright spots are having a positive impact in certain segments of the general aviation industry. These include the passage of the General Aviation Revitalization Act (GARA) of 1994. This legislation has caused renewed interest and optimism among US aircraft manufacturers, who either are reentering the single engine aircraft market after several years' absence, or are increasing future production schedules to meet expected renewed demand. The growth in the amateur-built aircraft market, and the strength of the used aircraft market, indicate that demand for inexpensive personal aircraft is still relatively strong.

The FAA's efforts to aid general aviation revitalization include streamlining the certification process for new entry-level aircraft and implementing measures to provide regulatory relief and reduce user costs (i.e., reduced rules, improving the delivery of FAA services by decreasing excess layers of management, and the elimination of unneeded programs and processes). Moreover, groups such as the Aircraft Owners & Pilots Association (AOPA) are sponsoring programs that aggressively promote the benefits of general aviation and learning to fly.

On a more recent note, since the 9/11 terrorist attacks, Temporary Flight Restrictions (TFRs) and the lingering concerns of some regarding the use of general aviation aircraft in potential future acts of terrorism, have had an added short-term negative impact on the industry. On the positive side for GA, heightened airport security has had a dramatic impact on the "nuisance factor" of commercial air travel; as a result, some travelers have turned to general aviation as a more efficient means of air travel.

Historical and Existing Activity Summary

A tabulation of Astoria Regional Airport's historical aviation activity since 1990 is presented in Table B2, entitled *HISTORICAL AVIATION ACTIVITY, 1990-2004.* This table presents the number of enplaned passengers and four categories of aircraft operations (an operation is defined as either a take-off or a landing), including commercial service (air carrier), air taxi, general aviation, military, and total operations. An acoustical counter (funded by the Oregon Department of Aviation) was located at the Airport from 1992 through 2003. In general, the historical aircraft operation numbers provided in the TAF were similar to those provided by the Acoustical Counter, and therefore data from the TAF was used as the basis for the following table. Additionally, officials from the Oregon Department of Aviation have indicated that there was an error within the program between 1998 and 2002, and therefore the total number of aircraft operations the program counted is considered suspect.

Table B2
HISTORICAL AVIATION ACTIVITY, 1990-2004

Year	Passenger Enplanements	Air Carrier Operations	Air Taxi Operations	General Aviation Operations	Military Operations	Total Aircraft Operations
1990	0	0	3,100	32,100	6,000	41,200
1991	0	0	3,100	32,100	11,660	46,860
1992	0	0	0	43,000	0	43,000
1993	1,728	90	3,100	32,100	11,660	48,678
1994	4,344	50	3,100	32,100	11,660	51,254
1995	6,461	60	3,100	32,100	20,000	61,721
1996	2,576	50	2,600	40,000	0	45,226
1997	1,631	50	2,600	40,337	0	44,618
1998	2,775	0	2,650	40,635	0	46,060
1999	784	0	2,650	40,939	0	43,373
2000	0	0	2,650	41,243	0	43,893
2001	0	0	2,650	40,723	0	43,373
2002	0	0	2,650	41,028	0	43,678
2003	0	0	2,650	41,335	0	43,985
2004[1]	0	0	--- [2]	36,050	8,240	44,290

Source: FAA *Terminal Area Forecasts* (obtained January 2005).

1. Estimated existing. Total annual operations obtained from FAA Terminal Area Forecast (TAF). Breakout by type of operation extrapolated from estimates from military operators and airport records.

2. Generally, a company or individual performing air passenger and/or cargo transportation service on a non-scheduled basis over unspecified routes is classified as an air taxi operation. For purposes of this study, air taxi operations will be included in the general aviation operations category.

Passenger Enplanements

With the exception of a few years (1993-1998), there has been no recorded commercial passenger activity at Astoria Regional Airport. Horizon Airlines ceased operations in 1995 and Harbor Air ceased operations in 1998.

Aircraft Operations

At non-towered airports, the actual number of aircraft operations is very difficult to ascertain with any degree of certainty. Often, at airports like Astoria Regional, the only sources of historical data are the FAA *Terminal Area Forecasts* or past FAA Form 5010, *Airport Master Record* data. It is important to note that this information is estimated. Often times, the historic numbers are suspect as to their accuracy. Generally, airport personnel or pilots that frequent the Airport provide operations estimates to the Oregon Department of Aeronautics and/or the FAA. The 2004 estimate of aircraft operations (general aviation and military operations) was extrapolated using estimates from airport personnel, military operators, and FBOs.

Air Taxi/Commuter Operations. Generally, a company or individual performing air passenger and/or cargo transportation service on a non-scheduled basis over unspecified routes is classified as an air taxi operation. For purposes of this study, air taxi operations will be included in the general aviation operations category.

General Aviation Operations. With the absence of an Airport Traffic Control Tower (ATCT) located on the field, accurate counting measures for general aviation aircraft are not in place. The historical data provided in the proceeding table for general aviation operations are estimates compiled by the State of Oregon and the FAA. General aviation operations are typically more directly tied to economic conditions than commercial passenger operations, and this trend is often reflected in the historical operations data for a particular airport. The amount of general aviation activity at many airports around the country has remained flat or declined since the early 1990s.

The data available for Astoria Regional Airport illustrates fluctuations in general aviation activity since 1990. As demonstrated by the numbers in the *HISTORICAL AVIATION ACTIVITY* table, general aviation activity has generally remained constant over the past few years. As economic conditions in the region and nation change in the future, fluctuations in the number of general aviation operations at the Airport will likely continue although an increasing trend is expected over the long-term.

Military Operations. The data provided in the FAA *Terminal Area Forecasts* for years 1996-2003 is likely to be incorrect due to an error in recording. Local observations by military personal indicate that military operations represent a significant portion of the total operations conducted at the Airport.

The majority of military operations can be attributed to US Coast Guard activity involving helicopters and a variety of fixed wing aircraft, as well as the ferrying of military personal to and from Salem Oregon and Camp Rilea.

Local and Itinerant Operations

Aircraft operations are placed in two categories, local and itinerant. Local operations are generally reflective of flight training and touch and go operations. The *Air Traffic Control Handbook* defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the Airport. Itinerant operations are all other aircraft operations and are more often associated with business aircraft. Historical data indicates that local operations in 2004 accounted for approximately seven percent (7%) of the total operations at the Airport.

Existing Operations by Aircraft Type

The current level of aviation activity by aircraft type is summarized in the following table entitled *EXISTING OPERATIONS BY AIRCRAFT TYPE, 2004*. Of the total annual general aviation aircraft operations, single engine aircraft are estimated to have performed approximately 60%. Approximately 14% was attributed to multi-engine aircraft, 22% was attributed to helicopters aircraft, two percent (2%) to business jet, and two percent (2%) to turbo prop activity. With respect to military operations, almost all of the operations in 2004 were conducted by helicopters, with the remaining percent of operations being fixed-wing aircraft operations of various types (C-130, Gulfstream, Falcon, etc).

Table B3
EXISTING OPERATIONS BY AIRCRAFT TYPE, 2004

Aircraft Type	Operations	Percent of Operations
General Aviation	*36,050*	*81.4 %*
Single Engine	21,385	59.3%
Multi-Engine	4,975	13.8%
Turbo Prop	712	2.0%
Business Jet	948	2.6%
Helicopter	8,030	22.3%
Military	*8,240*	*18.6%*
Helicopter	8,120	98.5%
Fixed-wing	120	1.5%
TOTAL	44,290	100.00%

Sources: Oregon Department of Aviation Acoustical Counter, airport personnel, military personnel, and the FBOs.

Operations by type were obtained from a breakdown using the 2003 Acoustical Counter located at the Airport during that year. Local observations observed more business jet activity than turbo prop activity, and those numbers have been revised upon receiving estimates from airport personnel and the FBO.

Based Aircraft

The number of aircraft that can be expected to base at any airport is dependent upon many factors, such as aircraft maintenance, storage and parking facilities, airport communication practices, services provided at the Airport, airport proximity, access, and similar factors.

Currently, there are 60 aircraft based at Astoria Regional Airport. Of this total, there are 50 single engine aircraft, six twin-engine aircraft, and four helicopters (one civilian and three US Coast Guard helicopters). A historical summary of based aircraft is provided in the following table entitled *SUMMARY OF BASED AIRCRAFT, 1990-2004*. The data was compiled from FAA records and airport tabulations.

Table B4
SUMMARY OF BASED AIRCRAFT, 1990-2004

Year	Total Based Aircraft
1990	43
1991	42
1992	42
1993	42
1994	42
1995	45
1996	45
1997	43
1998	43
1999	47
2000	47
2001	47
2002	47
2003	47
2004[1]	60

Source: FAA *Terminal Area Forecasts* (obtained January 2005).

1. Astoria Regional Airport records.

Aviation Activity Forecasts

Using the historical data and incorporating the previously stated assumptions, aviation forecasts can be developed. Several forecasting elements are pertinent to this planning effort: enplaning (boarding) passengers, commercial service operations, general aviation operations, local and itinerant operations, aircraft type, based aircraft, and peak period operations.

Passenger Enplanement Forecast and Scheduled Passenger Service Aircraft Operations Forecast

Forecasts can be utilized for various purposes, and the ultimate use of the forecast data may influence the assumptions used to develop the forecasts. For instance, if the forecasts are to be used for financial planning with the goal being to make sure the Airport can properly fund its operation and Capital Improvement Program, the assumptions that are used will tend to minimize revenue generation capabilities of the Airport. If the forecasts are to be used for facilities development planning, the assumptions will tend to maximize the operational activity expectations in order to make sure the Airport has adequate area set aside to build the facilities required to accommodate potential demand. The preferred forecast scenario may change, depending on the ultimate use of the forecast data.

Aviation activity forecasts for airports are often established using several sets of assumptions that generate different forecast scenarios. Several forecast scenarios are used in this Master Plan Update, the primary purpose of which is to provide a long-term facilities development plan for the Airport, which safely and efficiently accommodates anticipated demand. Additionally, they are used to establish an on-airport/off-airport land use compatibility program in consideration of aircraft generated noise and other environmental influences.

The forecasting of any type of future activity is as much an art as a science, particularly in the current era of airline deregulation and changing operating methodologies (legacy airline hub and spoke systems vs. low cost carrier's point-to-point systems). Any forecast represents a "best guess" or "deducted guess" at a particular point in time. It must, therefore, be revised and updated periodically to reflect new conditions and developments.

Passenger enplanement forecasts are an important part of the forecasting effort as they form the cornerstone of formulating air carrier and commuter operations projections. Scheduled commercial passenger service operations were last present at Astoria Regional Airport in 1998. Currently, Columbia Pacific Airlines is considering initiating commercial passenger service flights to Portland International Airport in the near future. They are projecting to operate a nine-passenger Piper Navajo aircraft, and will have three daily departing flights and three daily arriving flights.

The FAA *Aerospace Forecasts, Fiscal Years 2004-2015*, published in March 2004, indicates that domestic scheduled passenger service enplanements are expected to increase at a 3.5% annual rate through the year 2015. An important consideration is the fact that new commercial service will begin in the future at Astoria Regional Airport. One way to estimate existing demand for commercial passenger service is to look at historic numbers. In August 1995, Horizon Airlines enplaned almost 1,000 passengers for the month. This appears to be a reasonable estimate of the current unfulfilled demand, if an airline were to operate a reliable service with a consistent schedule and appropriate frequency of flights between Astoria Regional Airport and Portland International Airport.

The following table, entitled *PASSENGER ENPLANEMENTS AND SCHEDULED PASSENGER AIRCRAFT OPERATIONS FORECAST, 2004-2024,* projects the number of available seats, average seats per departure, boarding load factor, and scheduled passenger service aircraft operations that will be conducted at Astoria Regional Airport.

It has been assumed that the aircraft the airline will initiate service with (nine-seat Piper Navajo aircraft) would be supplanted with the gradual increased use of 19-seat aircraft, as demand increases. It is also assumed that it will take a few years (approximately five) of reliable service by a new airline to realize the estimated current demand level (1,000 enplanements per month). Following that initial growth period, passenger enplanements are forecast to increase at the FAA national growth rate of 3.5%, which is equal to the enplanements forecast nationally for commercial airlines contained in the FAA *Aerospace Forecasts, Fiscal Years 2004-2015.* This forecast reflects a steady, progressive, and realistic increase in enplanements.

Table B5
PASSENGER ENPLANEMENTS AND SCHEDULED PASSENGER AIRCRAFT OPERATIONS FORECAST, 2004-2024

Year	Passenger Enplanements	Average Number of Seats per Aircraft	Annual Number of Departures	Average Number of Daily Departures	BLF[1]	Scheduled Passenger Service Aircraft Operations
2004[2]	0	0	0	0.0	0.0%	0
2005[3]	6,376	9	1,095	3.0	64.7%	2,190
2006	7,876	9	1,355	3.7	64.6%	2,709
2007	9,376	9	1,605	4.4	64.9%	3,210
2008	10,876	9	1,853	5.1	65.2%	3,707
2009	12,376	10	1,889	5.2	65.5%	3,779
2014	14,699	13	1,688	4.6	67.0%	3,375
2019	17,456	16	1,593	4.4	68.5%	3,185
2024	20,731	19	1,559	4.3	70.0%	3,117

Source: BARNARD DUNKELBERG & COMPANY.

1. BLF – Boarding Load Factor for regional commercial service fleet from FAA Aerospace Forecasts Fiscal Years 2004-2015.
2. Estimated existing. 3. Assumes 12 months scheduled passenger service aircraft operations.

General Aviation Activity Forecast

As discussed earlier, fluctuations within the country's economic cycle historically affect general aviation operations more severely than air carrier operations. However, with more of the general aviation aircraft fleet being used for business purposes than in the past, the economy should have somewhat less of an effect upon overall general aviation activity. Because of the prevailing economic conditions in Astoria and the surrounding area, it is anticipated that itinerant traffic will become an integral part of the aviation activity at the Airport. These factors, combined with the previously mentioned General Aviation Revitalization Act legislative action, should have a positive impact on general aviation activity.

In developing the general aviation activity forecasts, several general aviation forecast scenarios and national trends were reviewed. Included in this assessment, and presented in the following table entitled *GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2004-2024*, are several general aviation operational forecasts, including the forecast contained in the 1993 Astoria

Regional Airport Master Plan (MP), the FAA *Terminal Area Forecasts* Detail Report, and three forecast scenarios developed for this study.

Several forecast scenarios were developed to appropriately reflect current general aviation operation activity and provide realistic projections for the 20-year planning period. The forecast scenarios generated for this Master Plan Update assume, for the most part, straight-line growth. While it is recognized that straight-line (consistent) growth never occurs year after year for many years, average annual growth methodologies serve intermediate and long-range planning purposes quite well. It should be noted that it is not the actual numbers that are most important, but the reasoning, assumptions, and trends that the numbers represent.

The historic correlation between socioeconomic variables (i.e., local population, employment, and per capita income) and aircraft operations at Astoria Regional Airport are not significant. With this factor in mind, the forecasting scenarios provided below do use socioeconomic historic correlations as a predicting methodology.

Scenario One. As previously mentioned, the socioeconomic conditions of a particular area can affect aviation activity. Typically, population, employment, and income are analyzed and used as a forecast scenario. Scenario One utilizes the forecast average annual population growth for the City of Astoria and the City of Warrenton is 1.03% and 2.01% from 2000-2020 (according to the Clatsop County Department of Community Development Community Profile, 2004). This forecast growth scenario uses the average of the two growth rates, corresponding to a growth rate of 1.52 percent, which is the percentage increase for Scenario One.

Scenario Two. Projects an annual average growth rate of 0.54%, which is equal to the forecast contained in the FAA *Terminal Area Forecasts* for overall general aviation activity.

Scenario Three. This scenario utilizes the annual growth rate forecast in the FAA *Aerospace Forecasts, Fiscal Years 2004-2015* for general aviation aircraft operations (1.33%) as a basis. This scenario assumes that the local, regional, and national economies continue to improve and have a positive influence on general aviation activity. This forecast scenario is based on the assumption that general aviation operations at the Airport will grow at the same rate as that which is forecast nationally for general aviation operations (i.e., maintain its present national market share). **THIS IS THE RECOMMENDED FORECAST FOR THIS STUDY**. This scenario will be used for facilities planning to assist in determining the appropriate development objectives for the Airport.

Scenario Four. This scenario utilizes the annual growth rate forecast in the FAA *Aerospace Forecasts, Fiscal Years 2004-2015* for turbojet aircraft (6.55%) as a basis.

Scenario Five. This scenario utilizes a trend analysis (regression analysis) of the 2005 FAA *Terminal Area Forecasts* from 1990 to 2004.

Table B6
GENERAL AVIATION OPERATIONS FORECAST SCENARIOS, 2004-2024

Year	TAF1	1993 MPU2	Scenario One 1.52%	Scenario Two 0.54%	Scenario Three 1.33%	Scenario Four 6.55%	Scenario Five Trend3
2004[4]	36,050	---	36,050	36,050	36,050	36,050	36,050
2005	36,355	---	36,598	36,245	36,529	38,411	38,068
2006	36,662	---	37,154	36,441	37,015	40,927	38,768
2007	36,967	50,700	37,719	36,638	37,507	43,608	39,467
2008	37,274	---	38,292	36,836	38,006	46,464	40,167
2009	37,581	---	38,874	37,035	38,511	49,507	40,867
2012	38,500	53,600	---	---	---	---	---
2014	39,113	---	41,920	38,045	41,141	67,988	44,366
2019	40,646	---	45,205	39,084	43,950	93,369	47,866
2024	---	---	48,747	40,150	46,951	128,224	51,365

Source: BARNARD DUNKELBERG & COMPANY.

--- Data not available.
1. FAA Terminal Area Forecasts (obtained January 2005). Includes Air Taxi operations. It is important to note that the TAF incorrectly included military operations conducted at Astoria Regional Airport into the general aviation category. As a result, the TAF number was obtained by subtracting the military operations (obtained using local observations and military operations data).
2. Forecast obtained from the 1993 Astoria Regional Airport Master Plan Update.
3. Trend Analysis (regression analysis) using historical general aviation operations data from 1990 to 2004.
4. Estimated existing.

Military Operations Forecast

The US Coast Guard has a presence at the Airport, primarily utilizing helicopters. While personnel who are employed at the Airport may change, it is not anticipated that Coast Guard will increase the number of aircraft based at the Airport during the planning period. No additional factors have been identified that would significantly increase the number of military operations in the future; therefore the number of military aircraft operations is projected to remain at the current level through the end of the planning period.

Operations Forecast By Aircraft Type

A further assessment of the forecasts involves the individual and collective use of the Airport by various types of aircraft. The types of aircraft expected to use the Airport assist in determining the amount and type of facilities needed to meet the aviation demand.

The following table, entitled *SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2004-2024*, depicts the approximate level of use by aircraft types that are projected to use Astoria Regional Airport. This table reflects the growing percentage of general aviation turbine-powered aircraft anticipated to operate at the Airport, and the decreasing percentage of piston-powered aircraft. This is indicative of the type of facility the Airport is expected to become and the prevailing local economic conditions. Military operations by type are expected to remain the same throughout the planning forecast.

Table B7
SUMMARY OF OPERATIONS FORECAST BY AIRCRAFT TYPE, 2004-2024

Operations by Type	2004[1]	2009	2014	2019	2024
Air Carrier	*0*	*3,779*	*3,375*	*3,185*	*3,117*
General Aviation	*36,050*	*38,511*	*41,141*	*43,950*	*46,951*
Single Engine	21,385	22,336	23,327	24,173	25,354
Multi Engine	4,975	5,392	5,842	6,593	7,137
Turbo prop	712	809	987	1,055	1,127
Business Jet	948	1,194	1,563	1,934	2,348
Helicopter	8,030	11,439	9,421	10,196	10,987
Military	*8,240*	*8,240*	*8,240*	*8,240*	*8,240*
Helicopter	8,120	8,120	8,120	8,120	8,120
Fixed Wing	120	120	120	120	120
TOTAL	44,290	50,530	52,756	55,375	58,308

Source: BARNARD DUNKELBERG & COMPANY.

1. Estimated existing.

Local and Itinerant Operations Forecast

Forecasts of operations have also been categorized accordingly into local and itinerant operations. The *Air Traffic Control Handbook* defines a local operation as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the Airport. Local operations account for three percent (3%) of all Airport operations and this percentage is expected to increase (to 15% at the end of the planning period) because of increased flight training activity, and touch and go training operations. Based on this consideration, forecasts of local and itinerant operations are shown on the following table, entitled *SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2004-2024*.

Table B8
SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2004-2024

Year	Local	Itinerant	Total
2004[1]	2,458	33,592	36,050
2009	2,696	35,815	38,511
2014	3,291	37,850	41,141
2019	3,956	39,995	43,950
2024	4,695	42,256	46,951

Source: BARNARD DUNKELBERG & COMPANY. *1. Estimated existing.*

Based Aircraft Forecast

The number of general aviation aircraft, which can be expected to base at an airport facility, is dependent on several factors, such as airport radio communications, available facilities, airport operator services, airport proximity, access, as well as aircraft basing capacity available at adjacent airports and similar considerations. General aviation operators are particularly sensitive to both the quality and location of their basing facilities, with proximity of home and work often being identified as the primary consideration in the selection of an aircraft basing location.

The following table entitled *GENERAL AVIATION BASED AIRCRAFT, 2004-2024* presents the based aircraft forecast for the 20-year planning period. The relatively large forecast increase in the first five years of the forecast period is supported by the construction of two new T-hangar facilities (20 unit's total) during the first five years of the planning period (2004-2009). After the first five years (after the construction is completed), based aircraft is forecast to increase 1.33%, which corresponds to the same increase as the selected general aviation forecast scenario.

Table B9
GENERAL AVIATION BASED AIRCRAFT FORECAST, 2004-2024

Year	Based Aircraft	Operations per Based Aircraft
2004[1]	60	601
2005	60	609
2006	65	569
2007	70	536
2008	75	507
2009	80	481
2014	85	481
2019	91	481
2024	98	481

Source: BARNARD DUNKELBERG & COMPANY. *1. Estimated existing.*

The number and type of aircraft anticipated to be based at an airport are vital components in developing a plan for the Airport. Depending on the potential market and forecast, the Airport will tailor the plan in response to anticipated demand. The mix of based aircraft for incremental periods is shown in the following table entitled *BASED AIRCRAFT FORECAST BY TYPE, 2004-2024*. The percentage of turbo prop and business jet aircraft is expected to increase as a part of the total based aircraft population at the Airport, while single engine and twin-engine based aircraft are expected to decrease slightly. This is in line, with overall national trends in general aviation, but even more importantly, parallels the regional/local expectations and projections characteristic of the general aviation fleet.

Table B10
BASED AIRCRAFT FORECAST BY TYPE, 2004-2024

Aircraft Type	2004[1]	2009	2014	2019	2024
Single Engine	50 *(83.3%)*	65 *(81.3%)*	66 *(77.2%)*	68 *(74.5%)*	74 *(75.9%)*
Twin Engine	6 *(10.0%)*	8 *(10.0%)*	9 *(10.5%)*	10 *(11.0%)*	10 *(10.3%)*
Turbo prop	0 *(0.0%)*	1 *(1.3%)*	2 *(2.3%)*	3 *(3.3%)*	3 *(3.1%)*
Business Jet	0 *(0.0%)*	1 *(1.3%)*	2 *(2.3%)*	3 *(3.3%)*	4 *(4.1%)*
Helicopter	4 *(6.7%)*	5 *(6.3%)*	6 *(7.0%)*	7 *(7.7%)*	7 *(7.2%)*
TOTAL	**60** ***(100.0%)***	**80** ***(100.0%)***	**85** ***(100.0%)***	**91** ***(100.0%)***	**98** ***(100.0%)***

Source: BARNARD DUNKELBERG & COMPANY.

1. Estimated existing..

Summary

A summary of the aviation forecasts prepared for this study is presented in the following table entitled *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2004-2024*. This information will be used in the following chapters to analyze the capacity of the Airport, develop facility requirements, and to determine future noise impacts and exposure. In other words, the aviation activity forecasts are the foundation from which plans will be developed and implementation decisions will be made. Two additional tables provide a comparison and summary in the FAA recommended format, for comparison purposes, entitled *COMPARISON OF AVIATION ACTIVITY FORECASTS & TAF FORECASTS, 2004-2019* and *SUMMARY OF AIRPORT PLANNING FORECASTS FAA FORMAT, 2004-2019.*

Table B11
SUMMARY OF AVIATION ACTIVITY FORECASTS, 2004-2024

Operations	**2004[1]**	**2009**	**2014**	**2019**	**2024**
Commercial Service	*0*	*3,779*	*3,375*	*3,185*	*3,117*
General Aviation	*36,050*	*38,511*	*41,141*	*43,950*	*46,951*
Single Engine	21,385	22,336	23,327	24,173	25,334
Twin-Engine	4,975	5,392	5,842	6,593	7,137
Turbo prop	712	809	987	1,055	1,127
Business Jet	948	1,194	1,563	1,934	2,348
Helicopter	8,030	11,439	9,421	10,196	10,987
Military	*8,240*	*8,240*	*8,240*	*8,240*	*8,240*
Helicopter	8,120	8,120	8,120	8,120	8,120
Fixed Wing	120	120	120	120	120
Total Aircraft Operations	44,290	50,530	52,756	55,375	58,308
Local Operations	2,458	2,696	3,291	3,956	4,695
Itinerant Operations	33,592	35,815	37,850	39,995	42,256
Passenger Enplanements	0	12,376	14,699	17,456	20,731
Based Aircraft By Type					
Single Engine	50	65	66	68	74
Twin-Engine	6	8	9	10	10
Turbo prop	0	1	2	3	3
Business Jet	0	1	2	3	4
Helicopter	4	5	6	7	7
Total Based Aircraft	60	80	85	91	98

Source: BARNARD DUNKELBERG & COMPANY. *1. Estimated existing.*

Table B12
COMPARISON OF AVIATION ACTIVITY FORECASTS & TAF FORECASTS, 2004-2019

Operations	Airport Forecast	TAF1	AF/TAF % Difference
Passenger Enplanements			
2004	0	0	0.0%
2009	12,376	0	0.0%
2014	14,699	0	0.0%
2019	17,456	0	0.0%
Commercial Operations			
2004	0	0	0.0%
2009	3,779	0	0.0%
2014	3,375	0	0.0%
2019	3,185	0	0.0%
Total Operations			
2004	44,290	44,290	0.0%
2009	50,530	45,821	10.3%
2014	52,756	47,353	11.4%
2019	55,375	48,886	13.3%

Source: BARNARD DUNKELBERG & COMPANY. *1. FAA Terminal Area Forecasts (obtained January 2005).*

Table B13
SUMMARY OF AIRPORT PLANNING FORECASTS FAA FORMAT, 2004-2019

	Forecast Levels and Growth Rates				Average Annual Compound Growth Rate		
	2004	2009	2014	2019	Base Year to 2009	Base Year to 2014	Base Year to 2019
Passenger Enplanements							
Air Carrier	0	0	0	0	*0.0%*	*0.0%*	*0.0%*
Commuter	0	12,376	14,699	17,456	*0.0%*	*0.0%*	*0.0%*
Total Enplanements	**0**	**12,376**	**14,699**	**17,456**	***0.0%***	***0.0%***	***0.0%***
Aircraft Operations							
Itinerant							
Air Carrier[1]	0	0	0	0	*0.0%*	*0.0%*	*0.0%*
Commuter/Air Taxi	0	3,779	3,375	3,185	*0.0%*	*0.0%*	*0.0%*
Total Commercial Operations	0	3,779	3,375	3,185	*0.0%*	*0.0%*	*0.0%*
General Aviation	33,592	35,815	37,850	39,995	*1.3%*	*1.2%*	*1.2%*
Military	8,240	8,240	8,240	8,240	*0.0%*	*0.0%*	*0.0%*
Local							
General Aviation	2,458	2,696	3,291	3,956	*1.9%*	*3.0%*	*3.2%*
Military	0	0	0	0	*0.0%*	*0.0%*	*0.0%*
Total Operations	**44,290**	**50,530**	**52,756**	**55,375**	***2.7%***	***1.8%***	***1.5%***
Total GA Operations	*36,050*	*38,511*	*41,141*	*43,950*	*1.3%*	*1.3%*	*1. 3%*
Instrument Operations	0	0	0	0	*0.0%*	*0.0%*	*0.0%*
Peak Hour Operations	143	163	170	179	*2.7%*	*1.7%*	*1.5%*
Cargo Enplaned/ Deplaned Tons	0	0	0	0	*0.0%*	*0.0%*	*0.0%*

Table B13 - *Continued*
SUMMARY OF AIRPORT PLANNING FORECASTS FAA FORMAT, 2004-2019

	Forecast Levels and Growth Rates				Average Annual Compound Growth Rate		
	2004	2009	2014	2019	Base Year to 2009	Base Year to 2014	Base Year to 2019
Based Aircraft							
Single Engine	50	65	66	68	2. 0%	5.4%	2.8%
Twin Engine	6	8	9	10	3.0%	5.9%	4.1%
Turbo Prop	0	1	2	3	3.0%	3.0%	3.0%
Business Jet	0	1	2	3	3.0%	3.0%	3.0%
Helicopter	4	5	6	7	0.0%	0.0%	0.0%
Total Based Aircraft	60	80	85	91	5.9%	3.5%	2.8%
Average Aircraft size (seats)							
Air Carrier	0	0	0	0	---	---	---
Commuter	0	10	13	16	---	---	---
Average Enplaning Load Factor							
Air Carrier	0.0	0.0	0.0	0.0	---	---	---
Commuter	0.0	65.5	67.0	68.5	---	---	---
OPBA	601	481	481	481	---	---	---

Source: BARNARD DUNKELBERG & COMPANY.

--- Data not available.
OPBA – Operations per based aircraft.
1. Assumes 12 months scheduled passenger service aircraft operations.