Aviation Activity Forecast Update 2008

King County International Airport/ Boeing Field

SEATTLE, WASHINGTON

Barnard Dunkelberg & Company

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December 2008

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Barnard Dunkelberg & Company
Cherry Street Building
1616 East 15th Street
Tulsa, Oklahoma 74120
Phone Number. 918 585 8844
FAX Number. 918 585 8857

Contents

Tables

Illustrations

Forecasts of Aviation Activity

INTRODUCTION.

Reasonable estimates of future aviation use are essential for analyzing existing airport facilities and identifying future needs and requirements of the facilities. For King County International Airport (KCIA)/Boeing Field, this involves the development of a set of forecasts that define the potential of future aviation demand. Forecasting, by its very nature, is not exact, but it does establish some general parameters for development and provides a defined rationale for various development activities as demands increase. The amount and kind of aviation activity occurring at an airport are dependent upon many factors, but are usually reflective of the services available to aircraft operators, the local/regional demand for commercial passenger services, 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.

This report is intended to update the Aviation Activity Forecasts developed by the Airport in 2003 and specifically to be used in comparison to the FAA's official view of anticipated activity at the airport as expressed in the 2007 Terminal Area Forecast (TAF). For ease of access, a copy of the 2007 KCIA TAF is provided in the appendix of this report.

Aviation activity forecasting generally commences by utilizing the present time as an initial point, supplemented with historical trends obtained from previous years' activity and recorded information. This data has evolved from a comprehensive examination of historical airport records provided by airport staff, the *King County International Airport/Boeing Field Aviation Activity Forecasts Update (2003),* FAA Form 5010-1 data, *FAA Terminal Area Forecasts (December 2007)*, the *FAA Aerospace Forecasts Fiscal Years 2008-2025,* and the *Puget Sound Regional Council (PSRC) Regional Airport System Plan (2001).* These documents were assembled in different years, making the base year data quite variable, and emphasizing the need for establishing a well-defined and well-documented set of historical information from which to project future aviation activity trends.

Several forecasting elements are pertinent to the airport planning efforts at KCIA. These include passenger activity, operations by air carrier-type aircraft, operations by commuter airline/air taxi-type aircraft, operations by general aviation aircraft, operations by military aircraft and the type of aircraft operations (fleet mix). To enable a procedural review of the forecast evaluation, the following sections will examine each of the above mentioned forecasting categories.

Prior to an examination of current and future activity levels at the Airport, there are several general conditions and assumptions that should be noted which help to form the basis or foundation for the development of the forecasts contained herein. More specific assumptions related to specific market segments are provided in the various forecast sections on the following pages.

- **Airport/Community Location and Proximity.** KCIA is situated approximately four miles south of the Seattle Central Business District (CBD) and about five miles north of Seattle-Tacoma International Airport (Sea-Tac). A portion of KCIA property is located within the City of Seattle, with the remainder being located within the City of Tukwilla. The Airport serves as an economic magnet for the region and the state, not only as a center for aviation activity, but also as a significant employment center that supports thousands of jobs. Regional vehicular access to the Airport is provided by Interstate 5 (I-5), along with State Road 99 (SR99), and major surface streets including Airport Way South and East Marginal Way.

- **Regional Socioeconomic Conditions.** Historically, the existing socioeconomic conditions of a particular region impact the aviation activity within that area. The two primary socioeconomic indicators, which are often analyzed when forecasting aviation activity, are population and employment statistics. According to the latest population data, the total population increase from 1990 to 2007 for the City of Seattle was 15 percent, while King County experienced a total population growth of 23 percent and the Puget Sound Region experienced a population growth of 29 percent.

Projected population increases include:

City of Seattle (US Census and PSRC):
1990 – 516,332 residents
2000 – 536,374 residents
2007 – 594,210 residents
2010 – 586,365 residents (projected)
2020 – 631,724 residents (projected)
2030 – 672,441 residents (projected)
Average Annual Projected Growth Rate (2007-2030) – 0.57%

King County (US Census and State Office of Financial Management)
1990 – 1,507,319 residents
2000 – 1,737,034 residents
2007 – 1,859,284 residents
2018 – 2,081,131 residents (projected)
2028 – 2,235,995 residents (projected)
Average Annual Projected Growth Rate (2007-2030) – 0.88%

Puget Sound Region, comprised of King, Kitsap, Pierce and Snohomish counties (US Census and PSRC)
1990 – 2,748,895 residents
2000 – 3,275,847 residents
2007 – 3,546,079 residents
2020 – 4,148,693 residents (projected)
2030 – 4,544,179 residents (projected)
Average Annual Projected Growth Rate (2007-2030) – 1.22%

The PSRC estimates that total employment for the City of Seattle, King County, and the Puget Sound region for the year 2000 was 540,419 jobs, 1,196,043 jobs and 1,765,043 jobs, respectively. Employment is projected to increase to 708,348 jobs, 1,664,780 jobs and 2,497,678 jobs, respectively by 2030. This represents an average annual growth rate of 1.04 percent, 1.31 percent and 1.40 percent. In addition, as referenced by the US Census Bureau, the estimated per capita income in 2007 for the City of Seattle was $36,648, for King County was $35,863, and for the State of Washington was $27,346.

- **Community Support.** KCIA generally benefits from the support of the surrounding cities and county governments, as well as local industry and residents. The airport is recognized as a vital regional asset, which contributes to the stability and the future of the area's economy. The support for the airport is tempered over the concern of aircraft noise from both the residents near the airport and the representatives they elect. The overall position of the county is one of continued growth and development, with special focus on the impetus that the airport provides to maintain and attract additional economic and aviation-related development to the region.

  Additionally, many of the surrounding communities benefit from the close proximity of a regional general/industrial aviation facility and, in turn, provide an economic base which can attract additional industrial/business development to the airport.

- **Facilities Potential.** KCIA currently serves a vital service role to the economy of the Puget Sound Region and the State of Washington. Its location near downtown Seattle is significant; however, it is also one of only a handful of airport facilities within the regional service area with adequate runway length to accommodate the operation of air carrier and air cargo aircraft. In addition, the airport accommodates the operation of large business jet and charter aircraft that need runway length and other support facilities that are not available at many of the region's general aviation airports.

- **Negative or Neutral Factors.** As a general comment, the Airport has very few negative factors and is in an enviable position, due to its many positive features and conditions. However, there are some broad factors that can have a negative or neutralizing impact on the Airport, and the aviation industry, and these are considered in the planning process.

  From a national perspective, one negative factor is the current state of the national economy including fluctuating oil prices, contributing to higher aircraft operating costs. The economic condition of many of the hub-and-spoke "legacy" airlines is also of concern. This is being offset to a great degree by the positive economic conditions being experienced by the low-cost carriers.

The overall condition of the general aviation industry in the United States has been a negative factor for several years. Beginning in 1978, many sectors of the general aviation industry have been in recession. 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. Factors including the rising expense of owning and operating an aircraft (i.e., costs of insurance, fuel, and maintenance), increases in airspace restrictions affecting fair-weather flying, reductions in personal leisure time, and shifts in personal preference as to how leisure time is spent have tended to restrict the single engine light aircraft segment of the industry, in particular.

- **General Aviation Positive Influences.** There are also a number of bright spots having a positive impact in certain segments of the general aviation industry. They include the passage of the General Aviation Revitalization Act (GARA) of 1994 and the recent FAA Sport Pilot and Light Sport Aircraft Rules. The GARA legislation has caused renewed interest and optimism among U.S. aircraft manufacturers, who are either re-entering the single engine aircraft market after several years' absence, or are increasing future production schedules to meet expected renewed demand. Response to the Sport Pilot and Light Sport Aircraft rule, the growth in the amateur-built aircraft market, and the strength of the used aircraft market, all indicate that demand for inexpensive personal aircraft is still relatively strong.

  In addition, it must be noted that the market for, and utilization of, larger general aviation business-use aircraft has continued to be strong. This is a particularly significant factor for an airport such as KCIA, which has facilities to accommodate even the largest business jets and a centralized location in the heart of the Seattle metropolitan area.

Historical Airport Activity Summary

A tabulation of historical aviation activity since 1998 at King County International Airport/Boeing Field is presented in the following, entitled *HISTORICAL AVIATION ACTIVITY, 1998-2007*. This table presents the number of passenger enplanements, along with the number of aircraft operations (an operation is defined as either a take-off or a landing) in five categories, which include: air carrier, air taxi, general aviation, military, and total operations. It is important to note that information provided by airport staff for calendar year 2007 will be used as the baseline data for all projections in this report.

Table 1
HISTORICAL AVIATION ACTIVITY, 1998-2007

Year	Enplane-ments	Itinerant Air Carrier Ops[1]	Itinerant Air Taxi[1]	Itinerant GA Ops[1]	Itinerant Military Ops[1]	Total Itinerant Ops[1]	Local GA Ops[1]	Local Military Ops[1]	Total Local Ops[1]	Total Ops[1]
1998	12,592[2]	11,659	44,279	166,674	2,014	224,626	120,259	235	120,494	345,120
1999	11,536[2]	11,331	46,433	159,208	2,096	219,068	107,250	320	107,570	326,638
2000	10,582[2]	11,338	45,636	184,298	1,633	242,905	122,631	325	122,956	365,861
2001	10,555[2]	9,800	46,718	155,678	1,473	213,669	77,372	385	77,757	291,426
2002	10,069[2]	9,279	49,494	145,862	2,406	207,041	78,909	294	79,203	286,244
2003	16,220[2]	9,091	53,344	151,043	2,145	215,623	94,766	462	95,228	310,851
2004	28,458[2]	10,404	58,994	135,865	1,417	206,680	92,116	263	92,379	299,059
2005	23,016[2]	9,667	63,092	163,652	1,379	211,090	89,014	374	89,388	300,478
2006	24,860[3]	9,790	62,060	134,117	1,669	207,636	91,278	879	92,157	299,793
2007	27,479[3]	10,662	64,237	126,522	1,732	203,153	96,342	689	97,031	300,184

Sources: *1. KCIA airport staff based on Airport Traffic Control Tower (ATCT) Reports. 2. Air Carrier Airport Information System (ACAIS). 3. KCIA airport staff.*

- **Passenger Enplanements.** The passenger enplanement numbers listed in the previous table include passenger boardings on scheduled commercial flights departing KCIA, along with charters and non-scheduled commercial flights where data was available to airport staff. Currently, the primary scheduled commercial service operations at KCIA are conducted by Kenmore Air Express (who utilizes Cessna Caravan aircraft) and Seaport Airlines (who utilizes Pilatus PC-12 aircraft). The charter/non-scheduled commercial flights are

conducted with a variety of aircraft ranging in size from Boeing 727s and 737s, to single-engine piston aircraft. The majority of the passengers on the charter flights using the passenger terminal area at KCIA are accounted for by airport staff; however, many of the charter aircraft make use the FBO facilities for passenger loading and many of these passengers are not included in the "official" enplanement counts. Many of the charter enplanements that are not counted are related to collegiate and professional sports teams. There are also a number of charter enplanements related to federal immigration and prisoner transfers that are not counted.

- **Air Carrier Aircraft Operations**. As counted by airport traffic control tower (ATCT) personnel, operations in this category include all aircraft capable of carrying over sixty passengers that are being operated for commercial purposes, including those aircraft used for cargo purposes, such as wide-body aircraft utilized by UPS, and using a three letter company designator (regardless of whether or not they actually are being utilized for passenger service). For the most part, the air carrier category of operations at KCIA is made up of aircraft operated by the cargo carriers, charter carriers, and The Boeing Company.

- **Air Taxi Aircraft Operations**. Operations in this category are comprised of aircraft capable of seating less than 60 passengers, that are being utilized for commercial purposes (passenger service, air freight service, med-evac, etc.), or which use a three letter company designator or "Tango". Also included in this category are commuter airline activities.

- **General Aviation Operations.** The last decade has been difficult for the general aviation industry, with the number of general aviation operations remaining constant or declining at many airports. General aviation operations are typically closely tied to local and regional economic conditions, along with reflecting changing use patterns at specific airports (e.g., the number of business flights being conducted at an airport, the number of pleasure-use aircraft based at an airport, the amount of flight training being conducted at an airport, etc.). All of these factors are contributing to the complex general aviation operational conditions at KCIA and the resulting operational number fluctuations are apparent in the historical data provided in the table above.

"*Everything that is not included in one of the other three categories*", is perhaps the best way to describe the types of aircraft operations that are included in

the general aviation category. At KCIA, the types of aircraft in the general aviation category range from large business jets (as large as B-757s), to small single-engine training aircraft.

- **Military Operations.** The number of military operations occurring at the Airport has been variable since the late 1990s, with the total number in any given year representing a small percentage of the total aircraft operations conducted at KCIA. Military activity at the airport is conducted by a wide variety of aircraft, including helicopter. The Airborne Warning and Control System (AWACS) aircraft that operate in and out of the Airport for installation and testing of equipment are also included in the military operations category.

Historical Based Aircraft Summary

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

A historical summary of the annual number of reported based aircraft is provided in the following table entitled *HISTORICAL BASED AIRCRAFT, 2003-2007*. The data was compiled from estimates by airport staff. There is an estimated 500 aircraft currently based at the Airport, of which 264 are single engine piston and turboprop, 95 multi-engine piston and turboprop, 82 jet aircraft, 41 helicopters and 18 military aircraft. The historical trend in based aircraft types has been one towards more turbine-powered (larger) aircraft with less piston-powered (smaller) aircraft.

Table 2
HISTORICAL BASED AIRCRAFT, 2003-2007

Year	Total
2003	482
2004	471
2005	472
2006	491
2007	500

Source: *KCIA airport staff.*

Passenger Enplanement Forecast

Because of its strategic location near the geographic center of the Seattle metropolitan area, KCIA will continue to function as a center for business and tourist related travel activity; thus, there will continue to be demand related to commercial passenger use. However, the close proximity of Seattle-Tacoma International Airport will continue to limit demand for commercial passenger service activity at KCIA. It is also important to note that King County, which owns the Airport, has recently discouraged commercial service proposals from major airlines using large aircraft; however, the Airport continues to support new and improved service by regional air carriers. As stated previously, passenger activity at the Airport is primarily attributed to the two commuter/regional airlines and to charter aircraft operations.

Historically, the recorded enplanement numbers at KCIA have fluctuated between 23,000 and 28,000 since 2004. Again, it should be noted that much of the charter activity at the Airport is conducted using FBO facilities and, therefore, the passengers on those flights are not counted in the airport staffs "official" tabulations. Much of this "uncounted" charter activity is related to professional and college sports teams. The Airport estimates that, on average, 15,000 to 20,000 of these uncounted charter enplanements occur annually.

Another consideration is that the regional airline commercial passenger market is expanding much more rapidly than that which would be realized because of population increases. The *FAA Aerospace Forecast Fiscal Years 2008-2025* indicates that regional/ commuter passenger enplanements are expected to increase at an annual rate of 3.8 percent. The recent addition of SeaPort Airlines could also have a positive impact on enplanement growth as this airline is specifically targeting the business traveler who would otherwise drive to and from Portland, Oregon. Because of its strategic location and excellent facilities, use of KCIA by regional commercial passenger service airlines will continue and is expected to increase in the future.

Various passenger enplanement forecast scenarios are presented in the following table entitled *PASSENGER ENPLANEMENTS FORECAST, 2007-2027.* Enplanement forecasts presented in the 2003 *King County International/Boeing Field Aviation Activity Forecast Update* (2003 Forecast Update) and those developed as part of the FAA's *Terminal Area Forecast* are included for comparison purposes.

The various comparison forecasts and scenarios include:

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA passenger enplanement forecast data for calendar years 2007 through 2025 using 2006 base year data.

- **Trend Projection**. A trend projection is presented based on a regression formula using historic annual enplanements at the Airport from 2004 to 2007.

- **2003 Forecast Update**. The 2003 *King County International Airport/Boeing Field Aviation Activity Forecast Update* provided a forecast for passenger enplanements using the second half of 2002 and the first half of 2003 as the base year data.

- **Scenario 1.** This forecast scenario utilizes an annual growth rate of 1.22 percent, which is the estimated annual population growth rate for the Puget Sound region through the year 2030. This scenario is based on the assumption that enplanements at KCIA will grow at approximately the same rate as that which is forecast for the regional population.

- **Scenario 2.** As presented in the PSRC *2001 Regional Airport System Plan,* this forecast scenario utilizes the forecast growth rate per year for enplanements in the entire region (2.61 percent annually). The percentage was obtained by calculating the average percentage increase per year from the data provided for the entire region for the forecast period (1998 through 2020). In other words, using the RASP regional enplanement forecast as a basis, this scenario indicates that the airport will maintain its existing regional market share (increasing at 2.61 percent per year).

- **Scenario 3.** This scenario utilizes the average annual growth rate forecast in the FAA's *Aerospace Forecasts Fiscal Years 2008-2025* for regional/commuter airline enplanements as a basis. This report forecasts regional/commuter airline enplanements to increase at 1.0 percent in 2008, 3.5 percent in 2009 and 3.8 percent per year through 2025. In other words, using the FAA's forecast as a basis, this scenario indicates that the Airport will maintain its existing share of the national regional/commuter passenger enplanement market. ***Scenario 3 is the recommended forecast scenario.*** This scenario recognizes that the two

commuter airlines currently serving the Airport, Kenmore Air Express and SeaPort Airlines, have a stable and growing business base. Summarizing, because of its strategic location near Seattle's Central Business District and the potential for service related to business travelers, sports teams, leisure travelers (including the cruise ship industry); regional airline and charter activity is expected to increase. Figure 1 provides a graphic comparison of the recommended forecasts scenarios to the TAF. FAA recommends that forecasts remain within 10% of the TAF for the first 5 years of the forecast period and 15% for the remaining years. The TAF allowable range is also shown on Figure 1.

Table 3

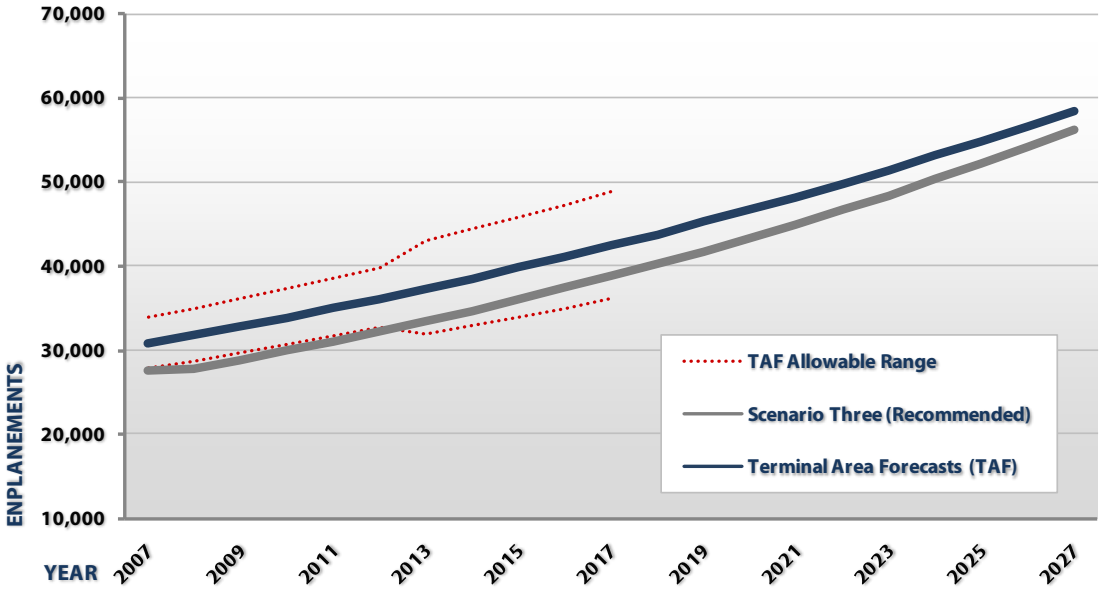
PASSENGER ENPLANEMENTS FORECAST, 2007-2027

Year	FAA TAF	Trend Projection[2]	2003 Forecast Update	Scenario One 1.22%	Scenario Two 2.61%	Scenario Three[4] 3.80% (Recommended)
2007	30,852	30,852	12,521	27,479[1]	27,479[1]	27,479[1]
2008	31,849	30,830	13,222	27,814	28,196	27,754
2009	32,879	32,062	13,963	28,154	28,932	28,725
2010	33,943	33,294	14,745	28,497	29,687	29,817
2011	35,043	34,526	15,570	28,845	30,462	30,950
2012	36,178	35,759	16,442	29,197	31,257	32,126
2017	42,438	41,920	21,591	31,022	35,555	38,712
2022	49,786	48,082	28,353	32,961	40,443	46,647
2027	58,400[3]	54,243	--	35,021	46,004	56,210

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. Trend based on TAF reported enplanements from 2004 to 2007. 3. 2027 FAA TAF figure based on extrapolated growth projection. 4. Recommended forecast scenario.*

Figure 1

PASSENGER ENPLANEMENTS FORECAST, 2007-2027



Air Carrier Operations Forecast

The next step in the forecasting process is to project the demand for air carrier-type aircraft operations. As stated previously, the air carrier category of operations at KCIA is made up of aircraft operated by cargo carriers, charter carriers, and The Boeing Company. The process of forecasting air carrier aircraft operations normally involves an evaluation of passenger aircraft types (existing and future), along with expected average seating capacities, and load factors. These statistics are then used to calculate a quantity of aircraft operations that are needed to accommodate forecast enplanement demand. Because the number of commercial passenger aircraft is relatively small, compared to the number of cargo and manufacturing operations at KCIA, as well as the fact that no information is available on historic charter aircraft seating capacity and load factors, the "normal" forecast analysis is not possible or meaningful for KCIA; thus, more generalized methods are utilized.

The operation projections for air carrier-type aircraft are provided in the following table entitled *AIR CARRIER OPERATIONS FORECAST, 2007-2027.* The various comparison forecasts and forecast scenarios include:

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA Air Carrier aircraft operations forecast data for calendar years 2007 through 2025 using 2006 base year data.

- **Trend**. A trend projection is presented that is based on the use of a regression formula using historic annual Air Carrier aircraft operations data at the Airport from 2003 to 2007.

- **2003 Forecasts Update**. The 2003 *Aviation Activity Forecast Update* provided a forecast for air carrier-type aircraft operations using second half 2002 and first half 2003 as base year data.

- **Scenario 1.** This forecast scenario utilizes an annual growth rate of 1.22 percent, which is the estimated annual population growth rate for the Puget Sound Region through the year 2030. This scenario is based on the assumption that Air Carrier Operations at KCIA will grow at approximately the same rate as that which is forecast for the regional population.

- **Scenario 2.** This scenario utilizes the annual growth rate forecast in the FAA's *Aerospace Forecasts Fiscal Years 2008-2025* for air carrier aircraft activity as a basis. This report projects air carrier aircraft activity to increase by 1.1 percent

in 2008, 2.6 percent in 2009 and 2.3 percent per year through 2025. In other words, using the FAA's forecast as a basis, this scenario indicates that the Airport will maintain its existing share of the national air carrier aircraft operations market. ***Scenario 2 is the recommended forecast scenario*** in that it recognizes that the number of air carrier aircraft operation is likely to continue to increase moderately due to increasing demand related to air cargo activity and air charter activity. The number of Boeing Company aircraft operations at KCIA is also forecast to continue to grow at a moderate rate, primarily driven by delivery activity related to the B-737 and flight test activity related to newer models (e.g. the B-747-8 Freighter, the B-777 Freighter, and B-787). For a more detailed breakdown of operations within the Air Carrier category, please refer to the operations by *Operations by Aircraft Type* section that appears later in this report. Figure 2 provides a graphic depiction of the recommended forecast scenario compared to the TAF and the TAF's allowable range (see page 11 for further explanation).

It is also important to note that air cargo is an important component of the activity conducted at the Airport. In 2007, the landed weight of air cargo aircraft using the Airport totaled over 805 million pounds. Nationally, it is expected that the air cargo business will grow significantly in the future (the FAA's *Aerospace Forecasts Fiscal Years 2008-2015* indicates that domestic revenue ton miles will increase by 2.8 percent in 2008, 6.1 percent in 2009 and 5.1 percent per year through 2025). Therefore, demand related to air cargo activity at KCIA will almost certainly remain strong. For a more detailed breakdown of enplaned and deplaned air cargo, please refer to the *Air Cargo Activity Forecast* section that appears later in this report.

Overall, it is expected that the air carrier aircraft operational demand will grow only at a modest level due to the close proximity of Seattle-Tacoma International Airport, which will remain the primary commercial passenger service airport serving the region, and the recent decisions by King County to discourage air service proposals from major airlines. It should also be noted that the aircraft operational numbers exhibited in the FAA TAF column are relatively similar in magnitude to those exhibited in the Scenario 1 and Scenario 2 columns.

Table 4

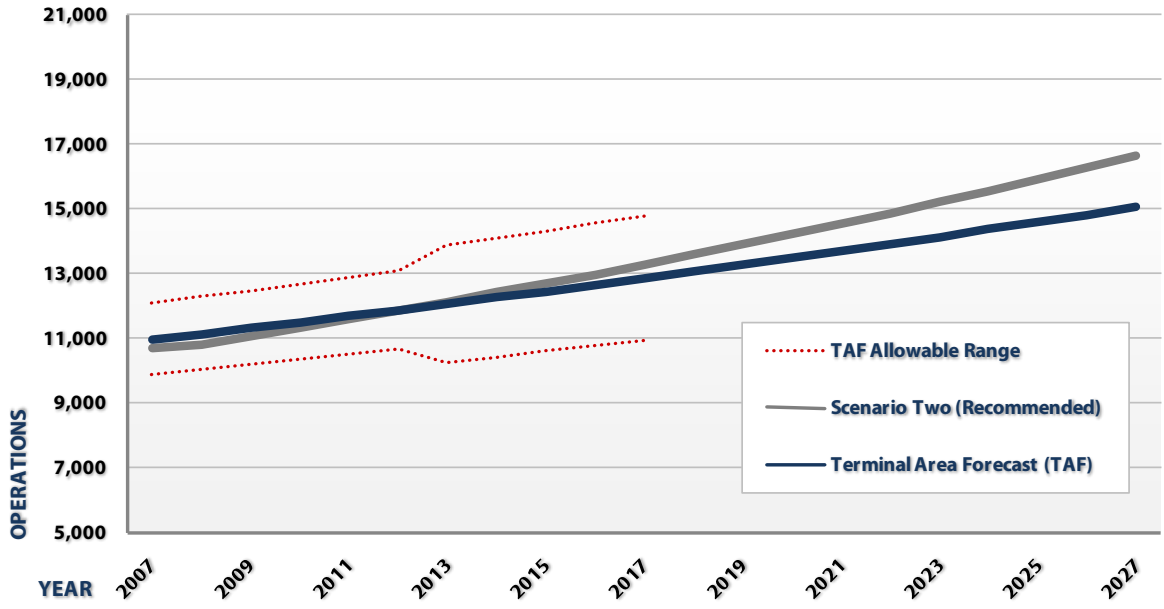
AIR CARRIER OPERATIONS FORECAST, 2007-2027

Year	FAA TAF	Trend Projection[2]	2003 Forecast Update	Scenario One 1.22%	Scenario Two[4] 2.3% (Recommended)
2007	10,976	10,662[1]	10,656	10,662[1]	10,662[1]
2008	11,152	10,681	10,968	10,792	10,779
2009	11,330	10,934	11,281	10,924	11,060
2010	11,510	11,187	11,594	11,057	11,314
2011	11,695	11,440	11,906	11,192	11,574
2012	11,884	11,692	12,219	11,328	11,840
2017	12,863	12,956	13,782	12,037	13,266
2022	13,925	14,220	15,345	12,789	14,863
2027	15,075[3]	15,484	--	13,588	16,653

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. Trend based on historical air carrier operations from2003 to 2007. 3. 2027 FAA TAF figure based on extrapolated growth projection. 4. Recommended forecast scenario.*

Figure 2

AIR CARRIER OPERATIONS FORECAST, 2007-2027



Air Taxi Operations Forecast

The air taxi category of operations at KCIA is made up of aircraft operated by cargo carriers (with aircraft capable of seating less than 30 passengers), scheduled commuter passenger airline activity, med-evac aircraft and charter aircraft. As with the air carrier aircraft operations forecast, the process of forecasting air taxi aircraft operations normally involves an evaluation of passenger aircraft types (existing and future), along with expected average seating capacities and load factors, that results in a calculated quantity of aircraft operations needed to accommodate forecast enplanement demand. Because the number of passenger aircraft is relatively small, compared to the number of cargo, med-evac, and charters; the "normal" forecast analysis is not possible or meaningful for KCIA and more generalized methods are utilized.

The operation projections for air taxi-type aircraft are provided in the following table entitled *AIR TAXI OPERATIONS FORECAST, 2007-2027.* The various comparison forecasts and forecast scenarios include:

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA Air Taxi aircraft operations forecast data for calendar years 2007 through 2025 using 2006 base year data.

- **Trend**. A trend projection is presented that is based on the use of a regression formula using historic annual Air Taxi aircraft operations data at the Airport from 2003 to 2007.

- **2003 Forecasts Update**. The 2003 *Aviation Activity Forecast Update* provided a forecast for air taxi-type aircraft operations using second half 2002 and first half 2003 as base year data.

- **Scenario 1.** This forecast scenario utilizes the average growth rate of 1.22 percent, which is the estimated annual population growth rate for the Puget Sound Region through the year 2030. This scenario is based on the assumption that air taxi operations at KCIA will grow at approximately the same growth rate at which is forecast for the regional population.

- **Scenario 2.** This scenario utilizes the annual growth rate forecast in the FAA's *Aerospace Forecasts Fiscal Years 2008-2025* for air taxi aircraft activity as a basis. This report projects air taxi aircraft activity to decrease by 1.4 percent in 2008, then increase by 2.7 percent per year through 2025. In other words, using the FAA's forecast as a basis, this scenario indicates that the Airport will

maintain its existing share of the national air carrier aircraft operations market. ***Scenario 2 is the recommended forecast scenario*** in that it recognizes that air taxi-type aircraft operations will remain a significant component of the total aircraft operations because of the amount of air cargo, charter, and med-evac activity occurring at the Airport. This scenario recognizes that the number of air taxi aircraft operations is likely to increase moderately during the next 20 years. It should also be noted that the aircraft operational number exhibited in FAA TAF column for 2027 is almost identical to the number exhibited in the recommended scenario in 2027. Figure 3 provides a graphic depiction of the recommended forecast scenario compared to the TAF and the TAF's allowable range (see page 11 for further explanation).

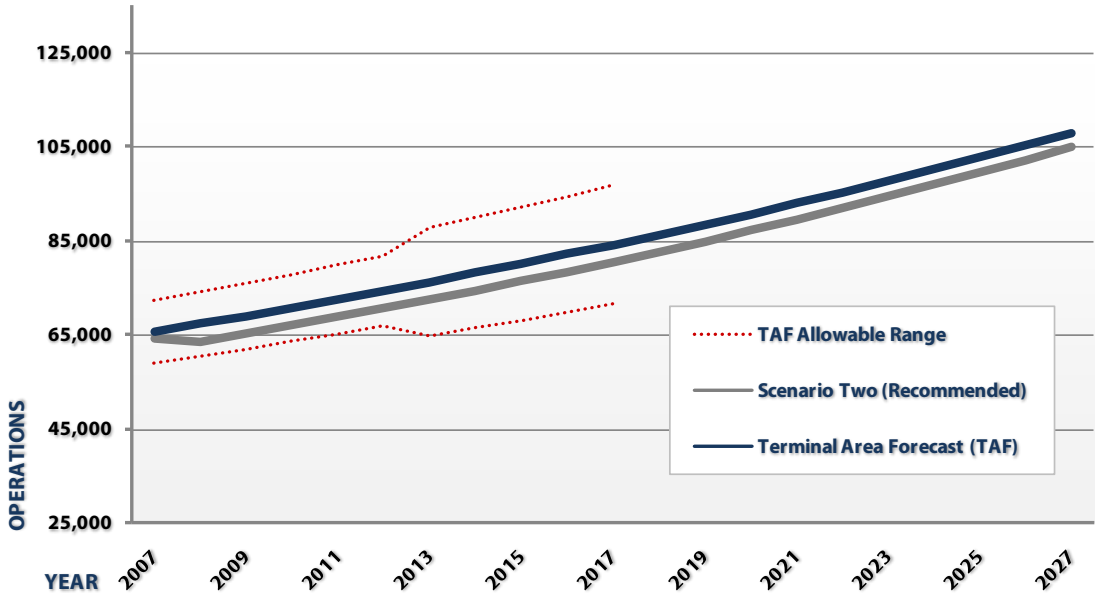
Table 5

AIR TAXI OPERATIONS FORECAST, 2007-2027

Year	FAA TAF	Trend Projection[2]	2003 Forecast Update	Scenario One 1.22%	Scenario Two[4] 2.7% (Recommended)
2007	65,613	64,237[1]	55,942[1]	64,237[1]	64,237[1]
2008	67,263	67,801	57,225	65,021	63,338
2009	68,953	70,286	58,507	65,814	65,048
2010	70,685	72,771	59,790	66,617	66,804
2011	72,461	75,257	61,073	67,430	68,608
2012	76,148	77,742	62,356	68,252	70,461
2017	84,094	90,168	68,769	72,518	80,500
2022	95,205	102,594	75,783	77,051	91,971
2027	107,782[3]	115,020	--	81,868	105,076

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. Trend based on historical air carrier operations from2003 to 2007. 3. 2027 FAA TAF figure based on extrapolated growth projection. 4. Recommended forecast scenario.*

Figure 3
AIR TAXI OPERATIONS FORECAST, 2007-2027



General Aviation Operations Forecast

General aviation operations at KCIA have historically been affected, to some degree, by fluctuations in the national economy, but more specifically by the economic conditions of the region, along with national trends in general aviation. With more of the general aviation fleet being utilized for business purposes than it was ten years ago, the economy should have somewhat less of an effect upon overall general aviation activity.

On a national basis, FAA forecasts indicate that general aviation activity at towered airports is expected to increase at a rate of 0.9 percent in 2008, 2.3 percent in 2009 and 1.3 percent per year through 2025.is expected to increase at an annual rate of approximately 1.5 until the year 2014.

KCIA is a facility that has national and international roles, along with its strong regional role. As a result, it is expected that it will continue to attract a great deal of business-related turbine powered general aviation aircraft use. This factor indicates that business/corporate activity at the Airport should grow at a more rapid rate than that which is forecast nationally. It should also be taken into consideration that the Airport is perceived to be an expensive location to operate a business that caters to smaller general aviation aircraft owners and operators (i.e., flight training,

aircraft storage, aircraft repair/maintenance, etc.). Due to the lack of appropriate development area at the Airport, it will be difficult to build a significant number of new storage hangars in the future, which may tend to limit the number of based aircraft as well as minimize the potential for a significant increase in the number of flight operations by smaller general aviation aircraft.

The operation projections for general aviation aircraft are provided in the following table entitled *GENERAL AVIATION AIRCRAFT OPERATIONS FORECAST, 2007-2027.* The various comparison forecasts and forecast scenarios include:

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA general aviation aircraft operations forecast data for calendar years 2007 through 2025 using 2006 base year data.

- **Trend**. A trend projection is presented that is based on use of a regression formula using historic annual general aviation aircraft operations data at the Airport from 2005 to 2007.

- **2003 Forecasts Update**. The 2003 *Aviation Activity Forecast Update* provided a forecast for general aviation aircraft operations using second half 2002 and first half 2003 as base year data.

- **Scenario 1.** This forecast scenario utilizes the average growth rate of 1.22 percent, which is the estimated annual population growth rate for the Puget Sound Region through the year 2030. This scenario is based on the assumption that general aviation operations at KCIA will grow at approximately the same growth rate at which is forecast for the regional population.

- **Scenario 2.** This scenario utilizes the annual growth rate forecast in the FAA's *Aerospace Forecasts Fiscal Years 2005-2025* for general aviation aircraft operations as a basis. This report forecasts national general aviation operations to increase at a rate of 0.9 percent in 2009, 2.3 percent in 2009 and 1.3 percent per year through 2025. This forecast scenario is based on the assumption that general aviation operations at KCIA will grow at the same rate as that which is forecast nationally for general aviation operations at towered airports (i.e., maintain its present national market share).

- **Scenario 3.** As presented in the PSRC *2001 Regional Airport System Plan,* this forecast scenario utilizes the forecast growth rate per year for general aviation operations in the entire region (0.51% annually). The percentage was obtained by calculating the average percentage increase per year from the data provided for general aviation operations expected for the entire Puget Sound region for the forecast period (1998 through 2020). In other words, using the RASP regional forecast as a basis, this scenario indicates that the Airport will maintain its existing regional general aviation operations market share. ***Scenario 3 is the recommended forecast scenario*** in that it recognizes the positive growth attributes associated with the Airport and business/corporate aviation activity, along with the negative attributes which may be associated with increased use by smaller general aircraft operators. Figure 4 provides a graphic depiction of the recommended forecast scenario compared to the TAF and the TAF's allowable range (see page 11 for further explanation).

  It is also important to note the Airport has historically supported close to 400,000 annual operations by general aviation aircraft. Therefore, a forecast of just of less than 250,000 general aviation operations at the end of the 20-year planning period will not dictate the need for significant capacity enhancements.

Table 6

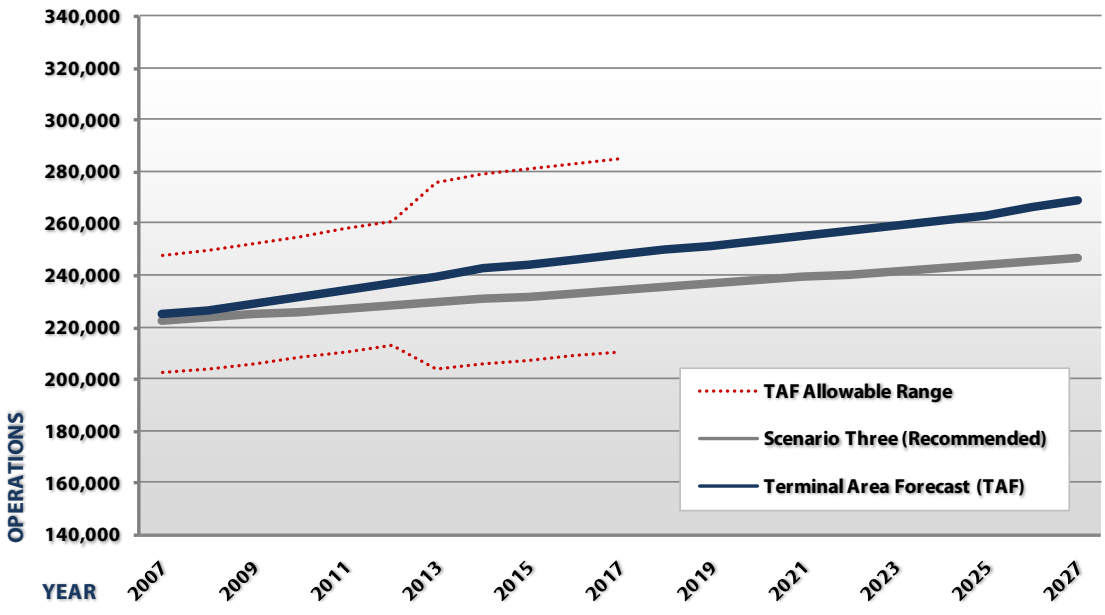
GENERAL AVIATION AIRCRAFT OPERATIONS FORECAST, 2007-2027

Year	FAA TAF	Trend Projection[2]	2003 Forecast Update	Scenario One 1.22%	Scenario Two 1.30%	Scenario Three[4] 0.51% (Recommended)
2007	225,034	225,034	241,114	222,864[1]	222,864[1]	222,864[1]
2008	226,542	224,686	242,344	225,583	224,870	224,001
2009	229,082	225,642	243,580	228,335	225,387	225,143
2010	231,670	226,598	244,822	231,121	228,317	226,291
2011	234,281	227,554	246,071	233,940	231,285	227,445
2012	236,942	228,510	247,326	236,794	234,292	228,605
2017	247,729	233,290	253,697	251,596	249,922	234,494
2022	256,970	238,070	260,232	267,322	266,595	240,535
2027	268,832[3]	242,850	--	284,032	284,380	246,732

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. Trend based on TAF reported general aviation operations from 2005 to 2007. 3. 2027 FAA TAF figure based on extrapolated growth projection. 4. Recommended forecast scenario.*

Figure 4

GENERAL AVIATION AIRCRAFT OPERATIONS FORECAST, 2007-2027



Military Operations Forecast

Military operations at KCIA are conducted by a variety of aircraft types; however, in comparison to total operational activity, the number of military activity at the Airport has historically been relatively small. However, in consideration of the activity at the Airport conducted with AWACs aircraft, military activity is a critical operational component. Among the functions of the Flight Test Division located at the Boeing Company's KCIA facilities are the research and test functions associated with the AWACs aircraft (the B-707/E-3 aircraft and the B-737 Wedgetail aircraft). All AWACs testing for the United States military, the fleet of the North Atlantic Treaty Organization (NATO), and other nations occurs at KCIA due to the unique facilities available through the Boeing Company. No other location within the United States currently exists (or is planned) to provide this type of testing, and no other U.S. company is capable of providing this testing capability.

It is expected that military activity at KCIA will continue in the future, although it is not expected to increase significantly over the 2007 level. The various comparison forecasts and forecast scenarios include:

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA general aviation aircraft operations forecast data for calendar years 2007 through 2025 using 2006 base year data. The TAF's forecast for Year 2007 through year 2025 remained un-changed from 2006.

- **2003 Forecasts Update**. The 2003 *Aviation Activity Forecast Update* provided a forecast for general aviation aircraft operations using second half 2002 and first half 2003 as base year data.

- **Scenario One.** This scenario is a reflection of the number of military operations reported by airport staff for 2007. ***Scenario One is the recommended scenario*** and indicates that the number of military operations at the Airport is expected to remain approximately the same through the end of the 20-year planning period.

Table 7

MILITARY OPERATIONS FORECAST, 2007-2027

Year	FAA TAF	2003 Forecast Update	Scenario One[3] (Recommended)
2007	2,512	3,000	2,421[1]
2008	2,512	3,000	2,421
2009	2,512	3,000	2,421
2010	2,512	3,000	2,421
2011	2,512	3,000	2,421
2012	2,512	3,000	2,421
2017	2,512	3,000	2,421
2022	2,512	3,000	2,421
2027	2,512[2]	3,000	2,421

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. 2027 FAA TAF figure based on extrapolated trend projection. 3. Recommended forecast scenario.*

Air Cargo Activity Forecast

Historically, air mail and air freight activity has been closely associated with the Gross Domestic Product (GDP). National factors and trends that potentially stimulate demand for air cargo include increased market opportunities through open skies agreements, decreased costs from global airline alliances, and increased business volumes attributable to e-commerce. Other factors and trends potentially limiting growth of air cargo include increased use of e-mail and instant messaging applications which allow for document attachments, decreased costs of sending documents via facsimile, and the increased cost to airlines in meeting environmental and security restrictions.

Perhaps the most influential component on the air cargo industry is the security directives emanating from the terrorists attacks of September 2001. Directives since that time have strengthened security standards for transporting cargo on passenger flights (i.e., no USPS package weighing more than 13 ounces can be shipped on a passenger aircraft), and required air cargo carriers to conduct random inspections of cargo. These restrictions are anticipated to remain in place for the near future and, in fact, may become more stringent.

Air cargo activity at King County International Airport/Boeing Field is generally counted in the general aviation Air Taxi category. Currently, UPS, Air Transport International, LLC, ABX Air Inc. (under contract to DHL), Ameriflight and Airpac Airlines conduct the majority of cargo aircraft operations at the Airport; however, a number of smaller carriers also provide this service.

In 2007, there was approximately 284,290,686 pounds of freight and mail (enplaned and deplaned) which passed through the Airport. It is anticipated that the number of air cargo aircraft operations will grow at a similar rate as forecast for air carrier and air taxi aircraft operations. Also, based on a trend line projection of historical air freight from 2003 to 2007, it is projected that total pounds of air freight passing through the Airport will continue to increase to a total of 391,592,312 pounds by 2027.

Table 8

AIR CARGO FORECAST, 2007-2027 (in pounds)

Year	Enplaned Air Cargo	Deplaned Air Cargo
2007	131,941,307[1]	152,349,379[1]
2012	134,572,762	172,765,392
2017	140,966,990	194,455,883
2022	147,361,219	216,146,374
2027	153,755,447	237,836,865

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual.*

Operations Forecast By Aircraft Type

With the total number of aircraft operations forecast for each use group, the next step in the forecasting process is to detail the various types of aircraft that will operate at the Airport. The following table, entitled *SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2007-2027,* presents that detail.

Table 9

SUMMARY OF OPERATIONS BY AIRCRAFT TYPE, 2007-2027

Operations by Type	2007[1]	2012	2017	2022	2027
Air Carrier Aircraft	*10,662*	*11,840*	*13,266*	*14,863*	*16,653*
Manufacturing	2,879	3,197	3,582	4,013	4,496
Air Cargo	5,757	6,394	7,164	8,026	8,993
Charter	2,026	2,250	2,521	2,824	3,164
Air Taxi Aircraft	*64,237*	*70,461*	*80,500*	*91,971*	*105,076*
Single Engine Piston	26,980	28,537	31,395	34,489	37,827
Multi-Engine Piston	3,212	3,523	4,025	4,599	5,254
Turboprop	19,271	21,138	24,150	27,591	22,066
Business Jet	9,636	11,626	14,490	17,934	22,066
Helicopter	5,139	5,637	6,440	7,358	8,406
General Aviation Aircraft	*222,864*	*228,605*	*234,494*	*240,535*	*246,732*
Single Engine Piston	133,718	133,734	133,662	133,497	133,235
Multi-Engine Piston	26,744	25,147	23,449	21,648	19,739
Turboprop	11,143	13,716	16,415	19,243	22,206
Business Jet	33,430	37,720	42,209	46,904	51,814
Helicopter	17,829	18,288	18,760	19,243	19,739
Military Aircraft	*2,421*	*2,421*	*2,421*	*2,421*	*2,421*
AWACS[2]	169	169	169	169	169
Variety of Types	2,252	2,252	2,252	2,252	2,252
TOTAL ANNUAL OPERATIONS	**300,184**	**313,327**	**330,681**	**349,790**	**370,882**

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual. 2. Airborne Warning and Control System military aircraft.*

Local and Itinerant Operations Forecast

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 an airport. According to airport records, itinerant operations constituted approximately 68 percent of the total operations at the Airport. This existing percentage of itinerant activity can be attributed to the fact that, with respect to general aviation, the Airport accommodates a significant number of business- and tourist-related aircraft operations and currently experiences a limited amount of general aviation flight training activity.

Air traffic control tower data indicates that local operations constituted 32 percent of the general aviation operations at the Airport in 2007. As can be seen in the following table, entitled *SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2007-2027,* KCIA is expected to remain a center for business related itinerant general aviation operations; therefore the percentage of local aircraft operations will remain relatively low when compared with other airports that have significant general aviation use.

Table 10

SUMMARY OF LOCAL AND ITINERANT OPERATIONS, 2007-2027

Year	Local	Itinerant	Total
2007[1]	96,059 (32%)	204,125 (68%)	300,184 (100%)
2012	97,131 (31%)	216,196 (69%)	313,327 (100%)
2017	99,204 (30%)	231,477 (70%)	330,681 (100%)
2022	101,439 (29%)	248,351 (71%	349,790 (100%)
2027	103,847 (28%)	267,035 (72%)	370,882 (100%)

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual.*

Peak Period Forecast

An additional element of assessing airport usage and determining various requirements necessitated by capacity and demand considerations is the determination of peak period activities. Actual ATCT records for the base year (2007), along with statistics regarding operations at airports with similar activity and operational characteristics, have been utilized to formulate peak period forecasts. The projection of peak period operational activity is depicted in the following table entitled *PEAK PERIOD AIRCRAFT OPERATIONS, 2007-2027*. The Peak Month Aircraft Operations in the base year was July 2007 according to air traffic control tower reports. The relationship, expressed as a percentage, between the number operations in July 2007 and the total number of operations in the base year has been used to estimate peak month operations throughout the planning period. The Average Day of the Peak Month was estimated by dividing the peak month operations by 31. Peak Hour/Average Day Ratio was established by examining operations at other airports with similar activity and operational characteristics, as well as utilizing typical ratios provided in FAA AC 150/5070-6A, *Airport Master Plans*.

Table 11

PEAK PERIOD AIRCRAFT OPERATIONS, 2007-2027

Year	Annual Aircraft Operations	Peak Month Aircraft Operations	Ave. Day of Peak Month	Peak Hour / Ave. Day Ratio	Ave. Peak Hour Aircraft Operations
2007[1]	300,184	29,718	959	9.0%	86
2012	313,327	31,019	1,001	8.7%	87
2017	330,681	32,737	1,056	8.5%	90
2022	349,790	34,629	1,117	8.2%	92
2027	370,882	36,717	1,184	8.0%	95

Source: *BARNARD DUNKELBERG & COMPANY. Forecast based on Methodology from FAA AC 150/5070-6A, Airport Master Plans and FAA AC 150/5060-5, Airport Capacity and Delay.*
1. Actual.

General Aviation Based Aircraft Forecast

The number of general aviation aircraft that can be expected to base at an airport facility is dependent on several factors, such as airport communication practices, available facilities, airport operators' services, airport proximity and access, and similar considerations. In an effort to plan for the proper number and size of future aircraft storage areas, it is important to forecast the number of general aviation based aircraft.

There is also a direct relationship, in many cases, between general aviation operations and based aircraft levels. Because, historically, these two elements have followed similar growth patterns, they are frequently compared. In other words, the relationship of these two functions is examined in terms of the number of annual operations per based aircraft (OPBA). Such a review and resultant calculation can establish a trend for both based aircraft and annual operations. Scenario Two in the following table includes a based aircraft forecast that assumes the existing level of general aviation operations per based aircraft will be maintained over the 20-year planning period.

Although there is significant demand by aircraft owners to base their aircraft at KCIA, the Airport has reached near capacity with respect to areas where additional aircraft storage facilities can be built. In addition, the perceived high cost of rental facilities at the Airport is also sometimes cited by aircraft owners as a negative factor. That being said, the King County recognizes the needs of small general aviation aircraft owners and will continue to support the construction of new general aviation storage facilities.

The following table, entitled *GENERAL AVIATION BASED AIRCRAFT FORECAST, 2007-2027,* presents a number of based aircraft forecast scenarios for the 20-year period.

- **FAA TAF**. FAA's *Terminal Area Forecast (TAF) Detail Report* (published December 2007). The TAF provided KCIA based aircraft forecast data for calendar years 2007 through 2025 using 2006 base year data.

- **Trend Projection**. A trend projection is presented that is based on use of a regression formula using historic based aircraft data at the Airport from 2003 to 2007.

- **2003 Forecasts Update**. The 2003 *Aviation Activity Forecast Update* provided a forecast for general aviation aircraft operations using second half 2002 and first half 2003 as base year data.

- **Scenario 1.** This scenario utilizes the annual growth rate forecast in the FAA's *Aerospace Forecasts Fiscal Years 2008-2025* for based aircraft as a basis. This report forecasts based aircraft to increase nationally at a rate of 1.3 percent per year through 2025. This forecast scenario is based on the assumption that based aircraft at KCIA will grow at the same rate as that which is forecast nationally for general aviation operations at towered airports (i.e., maintain its present national market share).

- **Scenario 2.** This scenario utilizes the calculated 2007 general aviation Operations per Based Aircraft (OPBA) rate of 446 and assumes that this OPBA rate will remain constant throughout the planning period.

- **Scenario 3.** This scenario is based on the assumption that new hangar projects (7777 Site and North Terminal Site) will attract at least 25 new corporate aircraft to base at KCIA in the next couple years. For the rest of the planning period, based aircraft are forecast to increase at the general aviation growth rate presented in the PSRC *2001 Regional Airport System Plan,* of 0.51 percent per year. ***Scenario 3 is the recommended forecast scenario*** as this scenario recognizes the significant growth attributes related to both the 7777 Site and the North Terminal Site hangar projects, along with the negative attributes which may limit additional small aircraft operators from deciding to base an aircraft at KCIA. It is also important to note that the Airport has recently completed a Redevelopment Analysis that has identified and reserved various landside areas for both T-hangar and multi-use redevelopment. Figure 5 provides a graphic depiction of the recommended forecast scenario compared to the TAF and the TAF's allowable range (see page 11 for further explanation).

Table 12

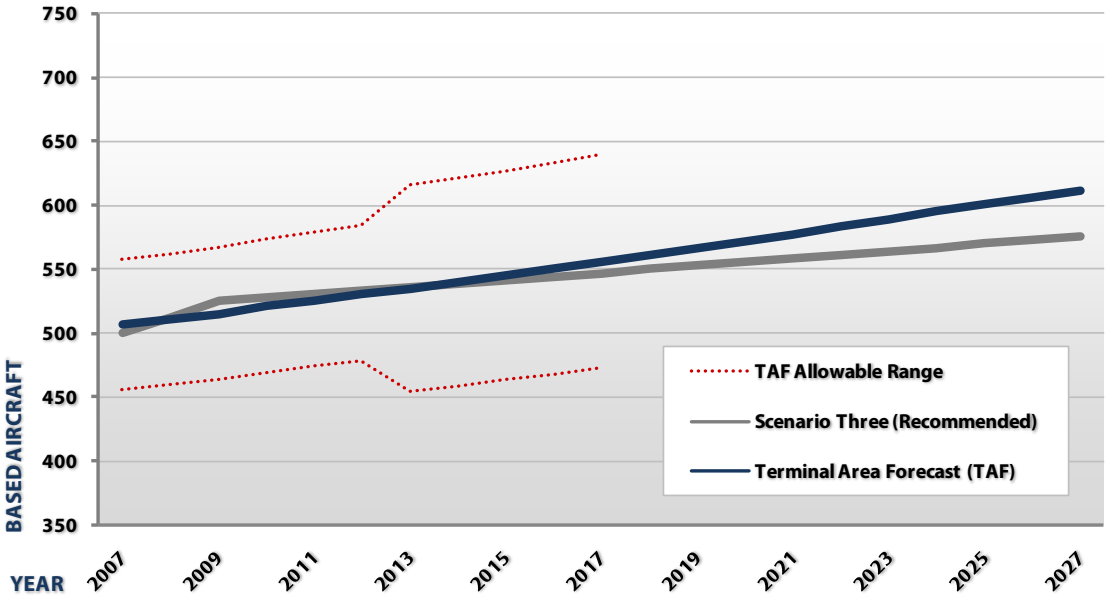
GENERAL AVIATION BASED AIRCRAFT FORECAST , 2007-2027

Year	FAA TAF	Trend Projection[2]	2003 Forecast Update	Scenario One (1.3%)	Scenario Two (446 OPBA)[3]	Scenario Three (0.51%)[4] (Recommended)
2007	507	500[1]	455	500[1]	500[1]	500[1]
2008	511	505	458	507	502	512
2009	515	516	461	513	505	525
2010	521	527	464	520	507	528
2011	526	538	467	527	510	530
2012	531	560	470	533	513	533
2017	556	604	485	569	526	547
2022	583	659	500	607	539	561
2027	611	714	--	647	553	575

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual 2. Trend based on historical air carrier operations from2003 to 2007. 3. The 2007 reported general aviation operations of 222,864 results in 446 operations per based aircraft (OPBA).*

4. Recommended Forecast.

Figure 5
GENERAL AVIATION BASED AIRCRAFT FORECAST , 2007-2027



The number of based aircraft at KCIA is expected to increase by 15 percent during the 20-year planning period. The mix of based aircraft for incremental periods throughout the planning period is shown in the following table entitled *GENERAL AVIATION BASED AIRCRAFT FLEET MIX, 2007-2027*. The percentage of total based turboprop and business jet aircraft is expected to increase while the percentage of single and multi-engine piston aircraft is expected to decrease. This is in line, first of all, with overall trends in general aviation, but even more importantly, parallels the industrial, economic development, and growth expectations and projections characteristic of the community. By the end of the planning period, single-engine and multi-engine aircraft are anticipated to comprise approximately 48 percent and 15 percent respectively of the total based aircraft at KCIA, with 12 percent being business jets, and approximately 21 percent being turboprop aircraft.

Table 13

GENERAL AVIATION BASED AIRCRAFT FLEET MIX, 2007-2027

Aircraft Type	2007[1]	2012	2017	2022	2027
Single Engine Piston	264 *(52.8%)*	275 *(51.6%)*	275 *(50.4%)*	276 *(49.2%)*	276 *(48.0%)*
Multi-Engine Piston	95 *(19.0%)*	96 *(18.0%)*	93 *(17.0%)*	90 *(16.0%)*	86 *(15.0%)*
Turboprop	82 *(16.4%)*	94 *(17.6%)*	103 *(18.8%)*	112 *(20.0%)*	122 *(21.2%)*
Business Jet	41 (8.2%)	49 (9.2%)	56 (10.2%)	63 (11.2%)	70 (12.2%)
Helicopter	18 *(3.6%)*	19 *(3.6%)*	20 *(3.6%)*	20 *(3.6%)*	21 *(3.6%)*
Total	**500** ***(100%)***	**533** ***(100%)***	**547** ***(100%)***	**561** ***(100%)***	**575** ***(100%)***

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual*

Summary

The following tables summarize the forecasts of aviation activity that have been presented in this report. The forecasts of aviation activity are an important part of the information base that will be used to develop future plans for the Airport and formulate implementation decisions relating to airport development. The instrument operations forecast in the following table entitled, *SUMMARY OF AVIATION ACTIVITY FORECASTS, 2007-2027* uses FAA TAF data for the base year and forecast years and results in an average annual growth rate of approximately two percent per year.

Table 14

SUMMARY OF AVIATION ACTIVITY FORECASTS, 2007-2027

	2007[1]	2012	2017	2022	2027
Operations					
Air Carrier	10,662	11,840	13,266	14,863	16,653
Air Taxi	64,237	70,461	80,500	91,971	105,076
General Aviation	222,864	228,605	234,494	240,535	246,732
Military	2,421	2,421	2,421	2,421	2,421
TOTAL OPERATIONS	***300,184***	***313,327***	***330,681***	***349,790***	***370,882***
Local Operations	97,019	97,131	99,204	101,439	103,847
Itinerant Operations	203,104	216,196	231,477	248,351	267,035
Instrument Operations	*77,975*	*85,707*	*93,980*	*102,172*	*109,920*
Passenger Enplanements					
TOTAL ENPLANEMENTS	***27,479***	***32,126***	***38,712***	***46,647***	***56,210***
General Aviation Based Aircraft					
Single Engine Piston	264	275	275	276	276
Multi-Engine Piston	95	96	93	90	86
Turboprop	82	94	103	112	122
Business Jet	41	49	56	63	70
Helicopter	18	19	20	20	21
TOTAL BASED AIRCRAFT	***500***	***533***	***547***	***561***	***575***

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual.*

Table 15

SUMMARY OF AIRPORT PLANNING FORECASTS, 2007-2022 (FAA FORMAT)

						Average Annual Compound Growth Rate			
	2007[1]	Construction Plus 1	2012	2017	2022	Construction Plus 1	2012	2017	2022
Passenger Enplanements									
Total	27,479	27,754	32,126	38,712	46,647	1.0%	3.2%	3.5%	3.6%
Operations – Itinerant									
Air Carrier	10,662	10,779	11,840	13,266	14,863	1.1%	2.1%	2.2%	2.2%
Commuter/Air Taxi	64,237	63,338	70,461	80,500	91,971	-1.4%	1.9%	2.3%	2.4%
TOTAL COMMERCIAL OPERATIONS	***74,899***	***74,117***	***82,301***	***93,766***	***106,834***	***-1.0%***	***1.9%***	***2.3%***	***2.4%***
General Aviation	151,548	153,321	157,737	164,152	170,780	1.2%	0.8%	0.8%	0.8%
Military	1,646	1,646	1,670	1,695	1,719	0.0%	0.3%	0.3%	0.3%
Operations – Local									
General Aviation	71,316	71,680	70,868	70,342	69,755	0.5%	-0.1%	-0.1%	-0.1%
Military	775	775	751	726	702	0.0%	-0.6%	-0.7%	-0.7%
TOTAL OPERATIONS	***300,184***	***301,539***	***313,327***	***330,681***	***349,700***	***0.5%***	***0.9%***	***1.0%***	***1.0%***
Instrument Operations	*77,975*	*79,521*	*85,707*	*93,980*	*102,172*	*2.0%*	*1.9%*	*1.9%*	*1.8%*
Peak Hour Operations	*95*	*97*	*96*	*93*	*90*	*0.0%*	*0.2%*	*0.5%*	*0.5%*
Cargo/Mail (tons)	*76,175*	*77,706*	*86,383*	*97,228*	*108,073*	*2.0%*	*2.5%*	*2.5%*	*2.4%*
Based Aircraft									
Single Engine	264	270	275	275	276	2.3%	0.8%	0.4%	0.3%
Multi-Engine	95	97	96	93	90	2.1%	0.2%	-0.2%	-0.4%
Turboprop	82	84	94	103	112	2.4%	2.8%	2.3%	2.1%
Jet Engine	41	42	49	56	63	2.4%	3.6%	3.2%	2.9%
Helicopter	18	19	19	20	20	5.6%	1.1%	1.1%	0.7%
TOTAL BASED AIRCRAFT	***500***	***512***	***533***	***547***	***561***	***2.4%***	***1.3%***	***0.9%***	***0.8%***

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual.*

Comparison with FAA's Terminal Area Forecast and Conclusions

As summarized in the following table, the forecasts prepared in this *Aviation Activity Forecasts Update* report are very similar to the numbers formulated by the FAA in the 2007 Terminal Area Forecast. This similarity in forecast numbers is not only seen in the total enplanement and aircraft operations numbers provide in the following table entitled *COMPARISON OF AVIATION ACTIVITY FORECASTS & TAF FORECAST, 2007-2027*, it is also evident in the comparison of specific aircraft operational components provided in Tables 4, 5, 6 and 7. In fact, the numbers are so similar that no reconciliation is recommended. However, the confirmation of the TAF forecast numbers provided by this *Aviation Activity Forecasts Update* report should be coordinated with FAA.

Table 16

COMPARISON OF AVIATION ACTIVITY FORECASTS & TAF FORECASTS, 2007-2022 (FAA FORMAT)

Operations	Airport Forecast	TAF	AF/TAF % Difference
PASSENGER ENPLANEMENTS			
Base Year	27,479[1]	30,852	-10.9%
2012	32,126	36,178	-11.2%
2017	38,712	42,438	-8.8%
2022	46,647	49,786	-6.3%
COMMERCIAL OPERATIONS			
Base Year	74,899[1]	76,589	-2.2%
2012	82,301	88,032	-6.5%
2017	93,766	96,957	-3.3%
2022	106,834	109,130	-2.1%
TOTAL OPERATIONS			
Base Year	300,184[1]	304,135	-1.3%
2012	313,327	325,619	-3.8%
2017	330,681	647,198	-4.8%
2022	349,790	368,612	-5.1%

Source: *BARNARD DUNKELBERG & COMPANY. 1. Actual.*

It is also recommended that King County should use this forecast report to provide detailed background information as future facility requirement needs and priorities are established through capital improvement programming. It is recognized that this forecast report is not intended to establish facility needs project priorities; however, it would be a missed opportunity

if it did not recognize potential needs related to observed and projected demand and the input received during the report's preparation.

Forecast demand conclusions and observations:

- No input was received regarding the need for improved runway facilities at the airport; although, it is recognized that maintaining the existing facilities is critical.

- The amount of regional commercial passenger activity and charter passenger activity at the airport is expected to increase.

- The airport is currently a hub for domestic air cargo activity. This role will continue in the future and increased demand will manifest itself with increased needs for air cargo facilities, especially aircraft parking positions.

- The airport will remain a center for air carrier aircraft industrial maintenance and manufacturing activities (civil and military).

- The airport will continue to be a center for general aviation activity. Additional general aviation storage and maintenance facilities for all types of general aviation aircraft are in high demand. Land for the development of additional general aviation facilities at the airport is extremely limited.

- It is expected that the large aircraft business-use segment will continue to be a major growth component at KCIA.

In conclusion, the estimates of future aviation-use provided in this report are essential for the continued analysis of future facility needs and requirements at King County International Airport/Boeing Field. Future aviation activity will almost certainly not follow these forecast predictions exactly, but the forecasts do establish some general parameters for understanding potential capital improvement needs as demands increase.

Appendix

2007 TERMINAL AREA FORECAST.