

Forecasts of Aviation Activity
for the
PIEDMONT TRIAD INTERNATIONAL AIRPORT
FAR PART 150 STUDY

PIEDMONT TRIAD INTERNATIONAL AIRPORT
GREENSBORO, NORTH CAROLINA

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URS

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SECTION 1.0

FORECASTS OF AVIATION ACTIVITY

1.1 INTRODUCTION

This section describes the forecast of future aviation activity at the Piedmont Triad International Airport (PTIA) at Greensboro, North Carolina for the forecasting period 2006 through 2020. These forecasts were developed in January 2005 as integral and supporting elements of the ongoing Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study and were reviewed and refined in May 2006. Similar projections of future aircraft operations were previously developed by others as part of the 1998 Airport Master Plan Update.

The forecasts of aviation activity developed for the FAR Part 150 study are based upon reasonable assumptions concerning future passenger enplanement levels, type and frequency of aircraft operations, number of nighttime operations, and changes in operational fleet mix that are anticipated to occur at PTIA throughout the 15-year forecast period.

As part of the FAR Part 150 study, this forecast update presents two horizon forecast years (2006 and 2014). These years were selected to represent the anticipated submittal date (2006) of the noise exposure map (NEM) and noise compatibility program (NCP) to the Federal Aviation Administration (FAA), and the full development and operation of the FedEx Mid-Atlantic Hub operations at the airport in the year 2014.

The forecast of aircraft operations, aircraft operating fleet mix, and day/night operational split was updated to document current and anticipated air travel market conditions at PTIA and to reflect the planned start-up of FedEx Mid-Atlantic Hub operations at the airport in the year 2009. Accordingly, these forecasts reflect the planned increase of approximately 9,800 annual aircraft operations that will be generated by FedEx after the opening of the Mid-Atlantic Hub beginning in 2009. Forecasts of passenger enplanements, itinerant non-FedEx cargo airline operations, commercial air carrier operations, and general aviation aircraft operations were also developed. For the purposes of this forecasting effort, all future military operations were held constant throughout the entire forecast period.

The assumptions presented in this forecast update are based on the review of historical activity at the national, regional, state, and local levels combined with application of professional experience (i.e., qualitative decisions) and particular insight and knowledge of existing and planned development at PTIA. During the research phase of this forecast, input was solicited and received from various study participants that included representatives of PTIA, the local Airport Traffic Control Tower (ATCT), Piedmont Hawthorne (PTIA's Fixed Base Operator), the FAA's Division of Aviation Policy and Plans (APO) and FedEx.

It should be noted that forecasting of aviation activity at the airport level is not an exact science. As fluctuations in the national or regional economy occur, market-driven factors may serve to significantly influence the actual expansion or contraction of aviation activity, particularly at an individual airport. Since deregulation of the airline industry in the late 1970s, airlines are free to enter and exit service markets based solely on economic decisions. For this and other reasons that are typically beyond the immediate control of the airport, this forecast of aviation activity is based on reasonable and prudent assumptions. These assumptions, however, include uncertainties that by the nature of the industry increase toward the end of the forecast period. To illustrate one such example within the timeframe of the development of this aviation activity forecast: PTIA has experienced the withdrawal and initiation of scheduled air service by several airlines and the paradigm air travel industry transition to an increased use of smaller regional jet airlines. The direct influence of the shifts in commercial air travel such as the increasing use of the regional jet, the emergence of new technologies, the changing strategy of economic business air travel and changes in work and recreational practices may all serve to affect aviation activity at PTIA. For these reasons, the forecast should be periodically compared with actual airport activity levels and airport plans and policies should be revised or amended accordingly.

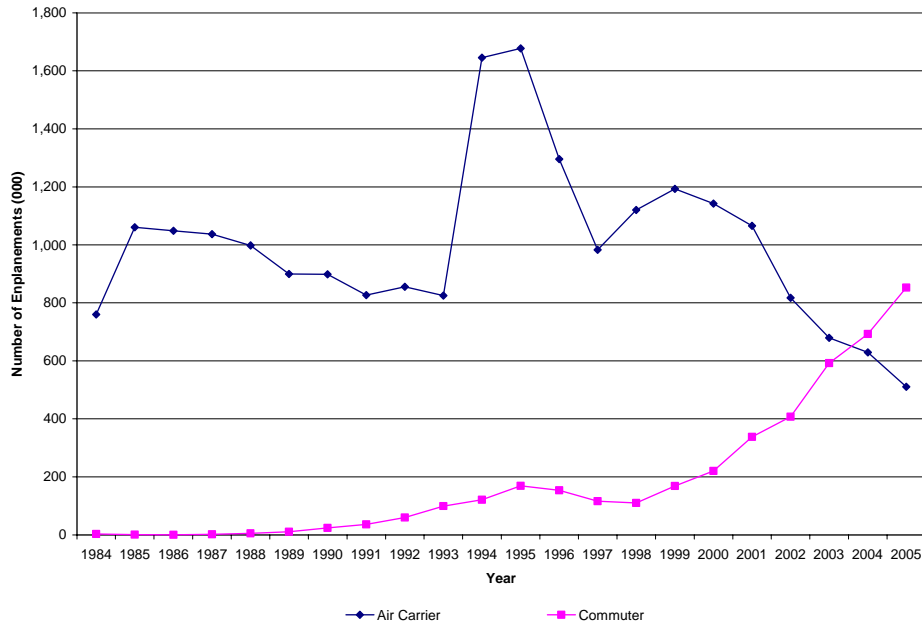
1.2 HISTORICAL/CURRENT PTIA AVIATION ACTIVITY

1.2.1 AIR CARRIER AND REGIONAL COMMUTER PASSENGER ENPLANEMENTS

During the 22-year period 1984 through 2005, the number of annual passenger enplanements at PTIA fluctuated from approximately 763,000 in 1984 to almost 1,850,000 in 1995. From 1997 through most of 2001, there was a steady increase in total passenger enplanements. This trend ended with the events of September 11th, 2001, after which passenger enplanements decreased 13 percent from just over 1,400,000 in 2001 to approximately 1,225,000 in 2002. Since 2002, passenger enplanements have increased at an average annual rate of 3.6 percent, to approximately 1,363,300 in 2005.

The 22-year historical levels of commercial passenger enplanements at PTIA are shown on **Figure 1.2-1** and listed in **Table 1.2-1**.

**FIGURE 1.2-1
HISTORICAL ENPLANEMENTS
BY AIR CARRIER AND COMMUTER AIRLINES
Piedmont Triad International Airport**



**TABLE 1.2-1
HISTORICAL PASSENGER ENPLANEMENTS
BY AIR CARRIER AND COMMUTER AIRLINES
Piedmont Triad International Airport**

Year	Air Carrier	Commuter	Total
1984	759,602	3,703	763,305
1985	1,060,468	1,299	1,061,767
1986	1,048,171	677	1,048,848
1987	1,036,647	2,514	1,039,161
1988	998,056	5,223	1,003,279
1989	899,990	10,830	910,820
1990	898,512	24,323	922,835
1991	826,808	36,686	863,494
1992	855,402	60,070	915,472
1993	825,357	99,710	925,067
1994	1,644,980	121,228	1,766,208
1995	1,677,349	169,594	1,846,943
1996	1,295,729	153,885	1,449,614
1997	982,825	116,364	1,099,189
1998	1,120,280	110,313	1,230,593
1999	1,192,868	168,807	1,361,675
2000	1,142,180	220,092	1,362,272
2001	1,065,389	338,183	1,403,572
2002	817,600	407,604	1,225,204
2003	679,259	591,982	1,271,241
2004	629,261	692,851	1,322,112
2005	510,310	852,942	1,363,252

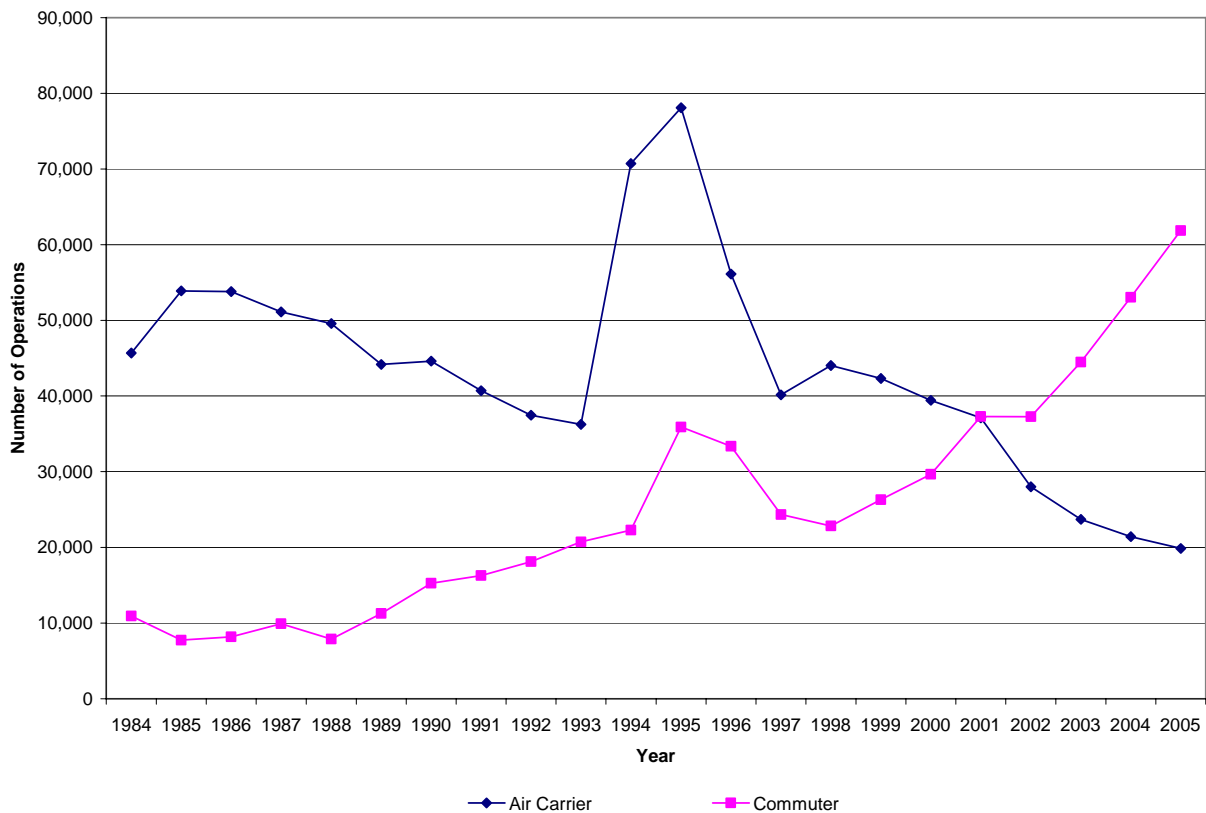
Sources: FAA Draft 2006 TAF for PTIA, May 16, 2006.

1.2.2 AIR CARRIER AND REGIONAL COMMUTER ACTIVITY

During the 1984 to 2005 time period, the number of total annual PTIA air carrier and commuter operations ranged from just over 56,600 in 1984 to approximately 114,000 in 1995. The overall number of aircraft operations fluctuated over this 22-year period, primarily for reasons stated earlier, and there has been a noticeable change in the relative share of operations by large air carrier aircraft and the smaller regional/commuter aircraft. The relative proportional share of operations between the two respective types of aircraft reversed in 2001, with the number of small regional/commuter operations exceeding the total number of large air carrier aircraft operations. This trend has continued through 2005 and is anticipated to stabilize sometime in the near future, as the overall demand for air travel within the region increases throughout the remainder of 2006 and through the 2020 forecast period.

The 22-year historical levels of PTIA commercial aircraft operations are shown on **Figure 1.2-2** and listed in **Table 1.2-2**.

FIGURE 1.2-2
HISTORICAL AIR CARRIER AND COMMUTER OPERATIONS
Piedmont Triad International Airport



**TABLE 1.2-2
HISTORICAL AIRCRAFT OPERATIONS
Piedmont Triad International Airport**

Year	Itinerant Operations					Local Operations			Total
	Air Carrier	Commuter	General Aviation	Military	Total	General Aviation	Military	Total	
1984	45,686	10,942	65,819	1,024	123,471	24,347	291	24,638	148,109
1985	53,881	7,762	64,938	1,006	127,587	23,094	400	23,494	151,081
1986	53,816	8,191	61,994	1,461	125,462	22,926	774	23,700	149,162
1987	51,126	9,907	67,762	1,325	130,120	18,851	799	19,650	149,770
1988	49,572	7,888	65,367	1,188	124,015	16,794	631	17,425	141,440
1989	44,183	11,270	62,267	1,213	118,933	23,239	1,071	24,310	143,243
1990	44,599	15,267	64,974	1,065	125,905	24,692	648	25,340	151,245
1991	40,705	16,269	59,042	966	116,982	19,507	786	20,293	137,275
1992	37,459	18,125	53,920	1,360	110,864	17,849	1,313	19,162	130,026
1993	36,242	20,732	54,169	1,241	112,384	12,969	1,093	14,062	126,446
1994	70,704	22,302	53,579	1,217	147,802	8,667	932	9,599	157,401
1995	78,077	35,920	52,872	971	167,840	4,966	453	5,419	173,259
1996	56,126	33,375	48,648	734	138,883	4,412	366	4,778	143,661
1997	40,153	24,349	51,469	578	116,549	3,885	513	4,398	120,947
1998	44,026	22,848	50,585	726	118,185	6,986	332	7,318	125,503
1999	42,323	26,318	50,549	460	119,650	12,325	314	12,639	132,289
2000	39,449	29,659	48,877	469	118,454	18,510	562	19,072	137,526
2001	37,111	37,288	46,539	594	121,532	16,413	662	17,075	138,607
2002	28,014	37,258	46,479	723	112,474	9,917	418	10,335	122,809
2003	23,714	44,503	40,811	574	109,602	7,932	303	8,235	117,837
2004	21,421	53,052	42,485	765	117,723	7,243	511	7,754	125,477
2005	19,863	61,862	41,002	640	123,367	10,486	418	10,904	134,271

Source: FAA Draft 2006 TAF for PTIA, May 16, 2006.

1.2.3 AIR CARRIER AND REGIONAL/COMMUTER FLEET AND SIZE

In response to the events of September 11, 2001 and national economic conditions, the nation's airlines adjusted fleet utilizations and reduced capacity. This was primarily accomplished by removing certain aircraft from the operating fleet mix. In some cases, airlines were forced to make hard economic decisions that resulted in the accelerated retirement of older, less efficient aircraft. Although this airline capacity has increased from the low levels flown in the months immediately following the terrorist attacks, capacity has yet to return to pre-September 11th levels. The impacts imposed by the events of September 11th on the regional/commuter carriers were relatively short primarily because of the restructuring and downsizing of the large air carriers. This downsizing has had a net positive effect on the large air carriers because it allowed them to "right-size" the active fleet, adjust capacity in response to changing demand levels, cut costs, and maintain a presence in the markets transferred to their smaller code share partners.

Today, there are noticeable and distinct trends emerging in the commercial airline industry that are born directly out of the effects of the September 11th attacks. First is the restructuring and downsizing of airline fleets within the traditional airlines and network carriers. Second is the rapid rate of growth within the low-cost carrier airline sector. Finally, the phenomenal growth among regional/commuter carriers has occurred as a direct outcome of the downsizing of the larger air carriers. The outcome of these actions has resulted in a pronounced change in the number, size, and utilization of aircraft serving Small Hub Origination and Destination (O&D) market airports that are similar in size to PTIA.

Other natural changes have also occurred within the airline industry that are the result of the emergence of smaller cabin class jet aircraft (“regional jets”) offering 50, 70, and 90 seats. This change represents a paradigm shift in aircraft utilization and further represents fundamental changes in how the airline industry attains and maintains increased levels of operating efficiency, particularly in the post September 11, 2001 airline industry. These smaller regional jets predominately serve the commuter service market and are either complementing or entirely supplanting the smaller 19- to 33-seat turboprop aircraft. Using the regional jet, mainline airlines and/or smaller regional carriers can offer longer non-stop distances between city-pairs with shorter flight times and with amenities similar to that of a larger class of passenger jet aircraft. The primary advantage of the regional jet over the traditional smaller turboprop-driven aircraft is the ability to operate at faster cruise speeds, higher en-route altitudes with less cabin noise, and greater comfort. These distinct physical differences and perceived differences in safety have contributed to the popularity and increased demand for this new genre of regional jet aircraft.

1.2.4 AIRLINE SERVICE DEVELOPMENTS AT PTIA

A review of current scheduled activity at PTIA reveals a shift in the type of aircraft available for use by air travelers. From inspection of historical trends, it is clear that there has been a decrease in the number of large air carrier operations (jet aircraft with over 60 seats) and a corresponding increase in the number of regional/commuter aircraft operations at PTIA having between 70 and 90 seats. This shift in aircraft size and associated reduction of inherent airline seat capacity serves to further erode the traditional use of smaller piston and turboprop aircraft that were traditionally operated by the regional/commuter operators. The overall effect of these changes is evident in the FAA's *Aerospace Forecast for Fiscal Years 2006-2017* in which it was noted that the average number of available seats per aircraft will decline by approximately 1.4 seats in 2006. This is primarily caused by the “legacy” carriers replacing their wide-body and larger aircraft with smaller, narrow-body planes. Additionally, the FAA anticipates that the demand for 70-90 seat aircraft will continue to increase, which furthers the decline in the overall number of seats per aircraft. It is interesting to also note that as the average number of seats available is projected to decrease, the average passenger trip length is anticipated to increase by almost 3 miles in 2006.

1.2.5 CURRENT PTIA SCHEDULED AIRLINE SERVICE

Inspection of FAA T-100 data for the year 2005 (hereafter referred to as the forecast “Base Year”) indicates that scheduled air service was offered by 19 airlines providing scheduled service to 22 non-stop destinations. T-100 data consists of information provided to the FAA and the U.S. Department of Transportation by U.S. carriers operating within the U.S. and its territories. This information includes, but is not limited to, origin and destination airports, enplaned passenger levels, available capacity, and arrival and departure times. These airlines used a mixture of air carrier and commuter aircraft in city-pair markets having non-stop distances ranging from 72 to 868 nautical miles. A listing of each airline, city-pair, and non-stop distance from PTIA is shown in **Table 1.2-3**. Based on FAA T-100 data for the 2005 12-month calendar year, the three predominant airlines at PTIA were as follows: Chautauqua (24 percent), Comair (16 percent), and Delta (9 percent). The ranking of each airline by total enplanements were as follows: Delta (20 percent), Chautauqua (19.6 percent), and Comair (12 percent). The relative ranking of each airline by total operations and passenger enplanements is shown in **Table 1.2-4**.

1.2.6 AIR CARGO ACTIVITY

Base year PTIA operational records indicate five cargo carriers provided scheduled air cargo service. Approximately 80 percent of the air cargo operations occur on air carrier type aircraft, with the remaining 20 percent occurring on commuter type or smaller single-engine transport type aircraft. Based on PTIA Landing Fee Reports for the 2005 12-month calendar year, the rankings of the cargo carriers, as a percentage of cargo operations, were as follows: FedEx (59 percent), UPS (17 percent), Airborne, and Tradewinds (14 percent each). FedEx operations consist of FedEx aircraft, accounting for 38 percent of PTIA cargo operations, and Mountain Air Cargo Feeder Service, accounting for 21 percent of PTIA cargo operations.

Over the past 11-year period, the total number of annual PTIA air cargo aircraft operations fluctuated from a low of approximately 3,100 operations in 1997 to over 9,700 operations in 1998. Over the same period, the number of total annual PTIA air cargo tonnage fluctuated from 85,700 tons (enplaned and deplaned) in 2001 to over 148,300 tons in 1998.

The 11-year historical levels of enplaned air cargo operations at PTIA, from 1995 to 2005, are listed in **Table 1.2-5**.

**TABLE 1.2-3
2005 AIR CARRIER AND COMMUTER AIRLINE CITY-PAIRS
Piedmont Triad International Airport**

Airline	City Code	Airport Name	Distance	INM Stage Length
Air Wisconsin (UAL)	CLT	Charlotte/Douglas International Airport	72	1
	DCA	Washington-Reagan International Airport	215	1
	IAD	Washington Dulles International Airport	208	1
	ORD	Chicago-O'Hare International Airport	513	2
	PHL	Philadelphia International Airport	317	1
American	DFW	Dallas-Fort Worth International Airport	868	2
American Eagle (AA)	DFW	Dallas-Fort Worth International Airport	868	2
	MIA	Miami International Airport	617	2
Atlantic Southeast (DL)	ATL	Atlanta Hartsfield International Airport	266	1
	CVG	Cincinnati-Northern Kentucky International Airport	287	1
	MCO	Orlando International Airport	464	1
	TPA	Tampa International Airport	504	2
Chautauqua (DL)	CVG	Cincinnati-Northern Kentucky International Airport	287	1
	FLL	Fort Lauderdale International Airport	600	2
	MCO	Orlando International Airport	464	1
	TPA	Tampa International Airport	504	2
Chautauqua (UAL)	IAD	Washington Dulles International Airport	208	1
	ORD	Chicago-O'Hare International Airport	513	2
Chautauqua (USAir)	BOS	Boston-Logan International Airport	560	2
	CLT	Charlotte/Douglas International Airport	72	1
	DCA	Washington-Reagan International Airport	215	1
	LGA	New York-LaGuardia Airport	400	1
	PHL	Philadelphia International Airport	317	1
Comair (DL)	ATL	Atlanta Hartsfield International Airport	266	1
	BOS	Boston-Logan International Airport	560	2
	CVG	Cincinnati-Northern Kentucky International Airport	286	1
	FLL	Fort Lauderdale International Airport	600	2
	JFK	John F. Kennedy International Airport	400	1
	LGA	New York-LaGuardia Airport	400	1
	MCO	Orlando International Airport	464	1
Continental	EWR	Newark International Airport	387	1
	IAH	Houston Intercontinental Airport	857	2
Delta	ATL	Atlanta Hartsfield International Airport	266	1
	CVG	Cincinnati-Northern Kentucky International Airport	286	1
Express Jet (CO)	EWR	Newark International Airport	387	1
	IAH	Houston Intercontinental Airport	857	2
Independence Air	IAD	Washington Dulles International Airport	208	1
	MCO	Orlando International Airport	464	1
	TPA	Tampa International Airport	504	2
Mesa (UAL)	IAD	Washington Dulles International Airport	208	1
	ORD	Chicago-O'Hare International Airport	513	2
Mesa (USAir)	CLT	Charlotte/Douglas International Airport	72	1
	DCA	Washington-Reagan International Airport	215	1
	PHL	Philadelphia International Airport	317	1
Mesaba (NW)	DTW	Detroit Metropolitan Wayne County Airport	400	1
Northwest	DTW	Detroit Metropolitan Wayne County Airport	400	1

TABLE 1.2-3 (CONTINUED)
2005 AIR CARRIER AND COMMUTER AIRLINE CITY-PAIRS
Piedmont Triad International Airport

Airline	City Code	Airport Name	Distance	INM Stage Length
PSA (USAir)	CLT	Charlotte/Douglas International Airport	72	1
	DCA	Washington-Reagan International Airport	215	1
	LGA	New York-LaGuardia Airport	400	1
	PHL	Philadelphia International Airport	317	1
	PIT	Pittsburgh International Airport	264	1
Piedmont (USAir)	CLT	Charlotte/Douglas International Airport	72	1
	PIT	Pittsburgh International Airport	264	1
Pinnacle (NW)	DTW	Detroit Metropolitan Wayne County Airport	400	1
	MEM	Memphis International Airport	495	1
	MSP	Minneapolis-St. Paul International Airport	802	2
Trans States (UA)	IAD	Washington Dulles International Airport	208	1
Trans States (USAir)	BWI	Baltimore-Washington International Airport	241	1
	PIT	Pittsburgh International Airport	264	1
United	ORD	Chicago-O'Hare International Airport	512	2
US Airways	CLT	Charlotte/Douglas International Airport	72	1
	PHL	Philadelphia International Airport	317	1

Source: FAA T-100 Data for PTIA, April 2006.

TABLE 1.2-4
2005 OPERATIONS AND ENPLANEMENTS BY CARRIER
Piedmont Triad International Airport

Airline	Landing Operations			Enplanements		
	Actual	Percent of Total	Rank	Actual	Percent of Total	Rank
Air Wisconsin (UA)	1,825	2.76%	13	31,990	2.47%	14
American	259	0.39%	19	10,989	0.85%	18
American Eagle (AA)	2,635	3.99%	11	47,188	3.64%	13
Atlantic Southeast (DL)	1,393	2.11%	17	22,439	1.73%	16
Chautauqua (DL)	3,972	6.01%	6	61,267	4.73%	9
Chautauqua (UA)	3,305	5.00%	9	64,226	4.96%	7
Chautauqua (USAir)	8,684	13.14%	2	129,345	9.98%	3
Comair (DL)	10,833	16.40%	1	155,610	12.01%	2
Continental	75	0.11%	23	2,403	0.19%	22
Delta	6,109	9.25%	3	260,256	20.09%	1
Express Jet (CO)	5,120	7.75%	4	89,206	6.88%	4
Independence	4,245	6.42%	5	64,041	4.94%	8
Mesa (UA)	130	0.20%	21	2,566	0.20%	21
Mesa (USAir)	1,769	2.68%	14	30,873	2.38%	15
Mesaba (NW)	141	0.21%	20	3,444	0.27%	20
Northwest	1,536	2.32%	15	49,334	3.81%	12
Piedmont (USAir)	564	0.85%	18	8,397	0.65%	19
Pinnacle (NW)	2,843	4.30%	10	52,889	4.08%	10
PSA (USAir)	3,599	5.45%	7	64,963	5.01%	6
Trans States (UA)	86	0.13%	22	1,571	0.12%	23
Trans States (USAir)	3,391	5.13%	8	19,742	1.52%	17
United	1,441	2.18%	16	50,916	3.93%	11
US Airways	2,118	3.20%	12	72,042	5.56%	5
Total	66,073	100%		1,295,692	100%	

Source: FAA T-100 Data for PTIA, April 2006.

**TABLE 1.2-5
HISTORICAL CARGO OPERATIONS
Piedmont Triad International Airport**

Year	Operations		Total
	FedEx	Other All Cargo	
1995	1,722	5,559	7,281
1996	1,766	4,930	6,696
1997	2,062	6,910	8,972
1998	2,024	7,680	9,704
1999	1,506	7,686	9,192
2000	1,280	7,158	8,438
2001	1,290	4,986	6,276
2002	2,204	3,348	5,552
2003	2,088	3,476	5,564
2004	1,936	3,498	5,434
2005	1,888	3,056	4,944

Source: PTIA Airport Activity Records, July 2004, April 2006.

1.2.7 GENERAL AVIATION ACTIVITY

General aviation activity is typically forecasted as “local” and “itinerant” operations. Local operations are those flight activities that include locally generated touch-and-go or other airport traffic pattern training that is conducted within a 20-mile radius of the airport. Itinerant activity represents all other operations.

As previously shown in **Table 1.2-2**, over the past 22-year period, the number of total annual general aviation operations (local and itinerant) at PTIA fluctuated from a low of approximately 48,700 operations in 2003 to over 90,100 operations in 1984. Additional review of airport operations records indicates annual operations of general aviation aircraft at PTIA have slowly begun to increase from 2003 levels. Itinerant and local general aviation operations have increased from 2003 to 2005 by 0.2 and 15 percent, respectively. Two primary factors are attributed to this recent trend: the current recovery of the national and local economy and the residual effect of the September 11th terrorist attacks.

General aviation activity at PTIA is typical of that generated at most small hub commercial airports. The activities conducted at PTIA range from recreational/personal use to business, emergency medical, and law enforcement. PTIA is home to a Cessna Aircraft Citation Service Center, generating approximately 2,000 annual operations. A large number of cabin-class jets are also based at the airport and are used in support of commercial or business activities.

Historically, the rise and fall of the annual reported number of recreation flight hours correlates directly with the health of the economy. Therefore, it is not unreasonable to assume that general aviation activity levels at PTIA would reflect recent economic trends. The decision to purchase, lease, or rent general aviation aircraft is typically correlated with the “perceived wealth” effect where the use of personal disposable income or levels of business activity facilitate economic decisions that guide personal or business-related use of general aviation aircraft.

Following the attacks of September 11th, new guidelines and restrictions were enacted that affected the level of service and amount of general aviation training activities at all U.S. airports, particularly those airports having schools that offered flight training to international students. While these and other issues are addressed, it is anticipated that this segment of general aviation will most likely recover at a much slower rate than other segments that directly serve the personal and business use of general aviation aircraft.

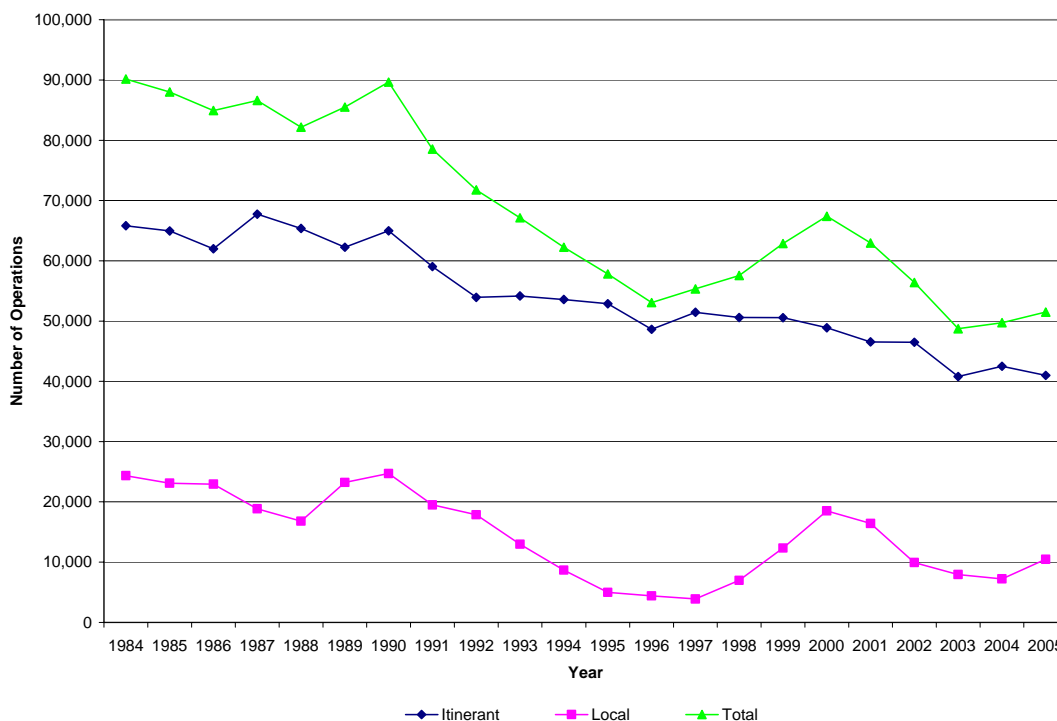
It is anticipated that general aviation activity at PTIA will rebound in the near term with annualized increased levels of activity occurring throughout the entire 2006-2020 forecast period.

Despite the slowdown in the demand for business jets experienced from 2000 through 2003, the FAA's (2006-2017) Aerospace Forecast assumes that business use of general aviation aircraft will expand at an accelerated rate as compared to personal/sport use. It is also anticipated that the emergence of a new genre of small private jets called "microjets" will further serve to fuel the growth of general aviation activity within the business sector. The relatively inexpensive twin-engine microjets (anticipated to be priced between \$1 and \$2 million) are believed by many to have the potential to redefine the business jet segment by expanding business jet flying and offering performance that could support a true on-demand air-taxi business service. The FAA's Aerospace Forecast assumes that microjets will begin to enter the active fleet in 2006 and grow by as many as 500 aircraft per year. At the October 2005 TRB/FAA Workshop, industry experts suggested that the market for new microjets could add 500 aircraft a year to the nation's active fleet by 2010.

Because the microjets have yet to be fully developed, produced or certificated, the use of microjets at PTIA were not specifically included in the forecast of general aviation activity as part of this forecast.

The 22-year historical levels of general aviation operations at PTIA are listed in **Table 1.2-2** and shown on **Figure 1.2-3**.

**FIGURE 1.2-3
HISTORICAL GENERAL AVIATION OPERATIONS
Piedmont Triad International Airport**

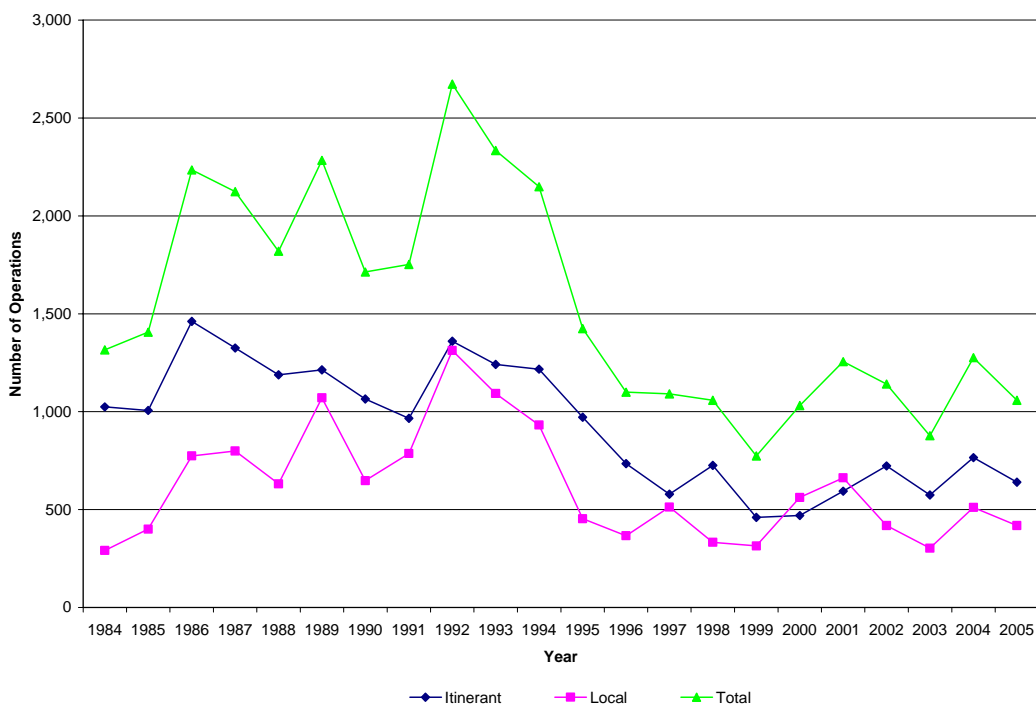


1.2.8 MILITARY ACTIVITY

Over the past 22-year period, the number of total annual PTIA military operations (local and itinerant) fluctuated from a low of approximately 800 operations in 1999 to over 2,600 operations in 1992. Under contract to the military, itinerant military aircraft transiting to and from the designated Military Operating Areas (MOAs) within the state utilize PTIA for refueling purposes. The itinerant military aircraft fleet is primarily comprised of UH-60 helicopters, C-12 VIP transport fixed-wing, and limited jet fighter aircraft.

The 22-year historical levels of military operations at PTIA are listed in **Table 1.2-2** and shown on **Figure 1.2-4**.

**FIGURE 1.2-4
HISTORICAL MILITARY OPERATIONS
Piedmont Triad International Airport**



1.3 REVIEW OF OTHER AVIATION ACTIVITY FORECASTS BY OTHERS

As part of the development of this forecast update, other aviation activity forecasts developed specifically for PTIA were reviewed. These included the 1998 Airport Master Plan Update Activity Forecast and the FAA’s Draft 2006 Terminal Area Forecast (TAF) for PTIA, issued May 16, 2006. Information and data derived from the review and comparison of aviation activity forecasts developed by others was found to be extremely valuable for validation of these forecasts. These forecasts are presented in **Tables 1.3-1** and **1.3-2**.

As prescribed in the FAA’s Office of Aviation Policy and Plans *Forecasting Aviation Activity by Airport*, other forecast methods were examined in the previous forecast effort for the PTIA Part 150 forecast. These methods included trend analysis, regression analysis, and multiple market share analyses. It was determined these alternative quantitative analysis methods did not produce the necessary correlations between historical aviation activity and the various socio-economic or historical activity variables. Based on this information, it was deemed unnecessary to reinvestigate these forecast methods for this update of the FAR Part 150 Aviation Activity Forecasts. These forecasts are provided for informational purposes in **Appendix A**.

1.3.1 1998 AIRPORT MASTER PLAN UPDATE

The PTIA 1998 Master Plan Update provided a forecast of passenger enplanements, air carrier, commuter, cargo, general aviation, and military operations through the year 2019.

Over the 1998 Master Plan Update forecast period, air carrier enplanements were expected to increase at an average annual compound growth rate (AACGR) of approximately 2.2 percent, from 1,174,994 enplanements in 2000 to 1,769,000 in 2019. Commuter enplanement levels were predicted to increase at approximately 3.9 percent annually, from 211,625 enplanements in 2000 to 442,000 in 2019.

The 1998 Master Plan Update AACGR for air carrier operations over the forecast period was approximately 1.5 percent, increasing from 40,580 operations in 2000 to 53,884 operations in 2019. Commuter operations were predicted to increase from 23,540 operations in 2000 to 34,450 operations in 2019, an AACGR of approximately 2.0 percent. FedEx-specific overnight express air cargo operations, also a component of commercial operations, were predicted to increase annually at a rate of 7.3 percent from 8,580 operations in 2000 to 32,760 operations in 2019. All other “All Cargo” operations were projected to increase at an AACGR of 2.8 percent from 5,200 operations in 2000 to 10,140 operations in 2019.

**TABLE 1.3-1
COMPARISON OF PREVIOUS ENPLANEMENT FORECASTS
Piedmont Triad International Airport**

Year	Air Carrier		Commuter		Total	
	1998 Master Plan Update	FAA TAF (2006)	1998 Master Plan Update	FAA TAF (2006)	1998 Master Plan Update	FAA TAF (2006)
2000	1,174,994	1,142,180	211,625	220,092	1,386,619	1,362,272
2004	1,250,000	629,261	239,000	692,851	1,489,000	1,322,112
2009	1,410,000	493,804	318,000	848,381	1,728,000	1,342,185
2014	1,563,000	557,267	392,000	1,044,651	1,955,000	1,601,918
2019	1,769,000	628,908	442,000	1,286,328	2,211,000	1,915,236
Average Annual Compound Growth Rate						
2000-2004	1.56%	-13.85%	3.09%	33.20%	1.80%	-0.75%
2004-2009	2.44%	-4.73%	5.88%	4.13%	3.02%	0.30%
2009-2014	2.08%	2.45%	4.27%	4.25%	2.50%	3.60%
2014-2019	2.51%	2.45%	2.43%	4.25%	2.49%	3.64%
2000-2019	2.18%	-3.09%	3.95%	9.74%	2.49%	1.81%

Sources: FAA Draft 2006 TAF, May 16, 2006; PTIA 1998 Master Plan Update.

**TABLE 1.3-2
COMPARISON OF PREVIOUS OPERATIONS FORECASTS
Piedmont Triad International Airport**

Year	Itinerant Operations								Local			
	Air Carrier		Commuter		General Aviation		Military		General Aviation		Military	
	1998 MPU	FAA TAF	1998 MPU	FAA TAF	1998 MPU	FAA TAF	1998 MPU	FAA TAF	1998 MPU	FAA TAF	1998 MPU	FAA TAF
2000	40,580	39,449	23,540	29,659	39,569	48,877	458	469	15,388	18,510	526	562
2004	41,834	21,421	24,922	53,052	48,875	42,485	600	765	8,625	7,243	500	511
2009	45,808	31,070	29,486	57,974	50,575	41,816	600	996	8,925	8,857	500	891
2014	48,616	53,031	32,558	67,359	52,275	44,923	600	996	9,225	9,414	500	891
2019	53,884	58,548	34,450	78,236	53,975	47,136	600	996	9,525	10,006	500	891
Average Annual Compound Growth Rate												
2000-2004	0.76%	-14.16%	1.44%	15.65%	5.42%	-3.44%	6.98%	13.01%	-13.47%	-20.91%	-1.26%	-2.35%
2004-2009	1.83%	7.72%	3.42%	1.79%	0.69%	-0.32%	0.00%	5.42%	0.69%	4.11%	0.00%	11.76%
2009-2014	1.20%	11.29%	2.00%	3.05%	0.66%	1.44%	0.00%	0.00%	0.66%	1.23%	0.00%	0.00%
2014-2019	2.08%	2.00%	1.14%	3.05%	0.64%	0.97%	0.00%	0.00%	0.64%	1.23%	0.00%	0.00%
2000-2019	1.50%	2.10%	2.02%	5.24%	1.65%	-0.19%	1.43%	4.04%	-2.49%	-3.19%	-0.27%	2.46%

Sources: FAA Draft 2006 TAF, May 16, 2006; PTIA 1998 Master Plan Update.

The 1998 Master Plan Update projected that general aviation itinerant operations would steadily increase from 39,569 operations in 2000 to 53,975 in 2019, at an AACGR of 1.6 percent. The predicted rate of growth for local general aviation operations was -2.5 percent, decreasing from 15,388 operations in 2000 to 9,525 operations in 2019.

The 1998 Master Plan Update predicted very little growth for military operations, growing from 984 total military operations in 2000 to 1,100 in 2001, maintaining this activity level throughout the forecast period.

Because this aviation activity forecast serves as an update to the most recent FAA-approved forecast of aviation activity at PTIA, the following paragraphs provide verbatim text from the 1998 Airport Master Plan Update and are included to provide a historical perspective of the dynamic nature of the airline industry, particularly within the market in which PTIA operates.

The Piedmont Triad market has benefited from a range of airline choices that emerged after airline deregulation in 1978. Total enplanement activity, as well as the capture of market share by PTIA, has been closely linked to major hub activities at the Charlotte, North Carolina, and Raleigh/Durham, North Carolina, airports. The Charlotte-Douglas International Airport (CLT) was formerly a Piedmont Airlines hub. Piedmont Airlines was purchased and subsequently CLT transitioned to a USAir/US Airways hub. Raleigh/Durham International Airport (RDU) became an American Airlines hub in 1987 until hub activity was redirected between 1994 and 1995. Since 1995, Midway Airlines operations out of RDU replaced a large portion of the lost American Airlines activity, albeit on a

small route structure and scale. Unfortunately, the September 11th, 2001 terrorist attacks in America resulted in the demise of Midway Airlines. However, another factor providing assistance to RDU's market capture was the start-up of service by Southwest Airlines in 1999. During 1994 and 1995, PTIA's market share increased. Some of this increase was due to new traveling demand created by lower fares offered by Continental Airline's low fare spin-off CALite and others at the time. Since 1995, the PTIA market share has readjusted to pre-CALite levels.

Essential to the understanding of enplanement trends at PTIA is the perspective of individual airline activity levels. A comparison of the major air carrier and regional airline enplanements from 1989 through 1997 shows that total enplanements were reasonably constant until 1994 when an increase of 872, 831 enplanements was recorded in a single year associated with Continental's CALite low fare experiment. Since 1994, total enplanements have declined due primarily to activity reductions by Continental Airlines and, secondarily US Airways. Activity levels for Delta Airlines and United Airlines (including regional affiliates) have remained comparatively consistent through recent time. The 1995 to 1996 introduction of service from Northwest and Air Tran also contributed to the recent enplanement growth.

Considering the relative positions of the airlines (air carrier and associated regional airlines), US Airways has historically been the dominant carrier. The exception to this dominance occurred during 1994, 1995 and, to a lesser degree, 1996 while Continental was conducting hub activities. The strength of Delta Airlines, combined with the remaining Continental flights, has reduced US Airway's dominance to a 1997 level [Master Plan Forecast Base Year] of 36.8 percent from the 1989 level of 63.5 percent. Over the years PTIA has been served by a number of different airlines providing connections to airline hubs in Atlanta, Charlotte, Chicago, Cleveland, Dallas, Detroit, Newark, New York, Philadelphia, Pittsburgh, and Washington D.C. It is anticipated that passengers flying from PTIA will continue to have an array of options to connect to larger hub airports in addition of other direct flights.

An array of elements influence the aviation industry both nationally and in the Piedmont Triad market area. Prior to generating aviation activity forecasts for this analysis, it was determined that there have been no significant changes to factors that affect the PTIA market since the demise of the CALite hub in 1995 and 1996. The most influential factor was the introduction of regional jet service which occurred at roughly the same time as the CALite hub was dismantled. Piedmont Triad's service area is defined by the location of other airports providing commercial service as well as the extent of the services provided by each competing facility. While the location of these facilities shapes PTIA's market, there are also other factors, such as fares, frequency of service, nonstop destinations, hub connections, and jet service, which influence a traveler's decision regarding which airport to patronize...

Based on the review of the previous forecasting efforts, PTIA operates within a very dynamic marketplace. From the review of the 1998 forecast, it is apparent that while planning and forecast assumptions regarding overall levels of passenger enplanements have been generally correct to date, a major shift in the share of commuter versus air carrier enplanements has taken place. This is not surprising because there has been a major shift in the adoption and use of regional jets by mainline and regional air carrier operators, particularly with markets served by PTIA. It is also evident that entry and exit of airline service at O&D airports similar in size to PTIA will continue into the foreseeable future.

1.3.2 FAA TERMINAL AREA FORECAST

The FAA publishes annual projections of aviation activity across numerous sectors of the aviation industry. As part of the National Plan of Integrated Airport Systems (NPIAS), these projections are published as Terminal Area Forecasts (TAFs) and are used by the FAA when making federal decisions regarding investments in airports.

As part of the development of this forecast update, the FAA's Draft 2006 TAF issued May 16, 2006 specifically developed for PTIA was reviewed. As projected in the TAF, the PTIA air carrier passenger enplanements are anticipated to decrease from 510,310 in 2005 to 459,258 in 2006. From there, the TAF projects air carrier passenger enplanements to increase at an AACGR of 2.4 percent, to 644,308, through the year 2020. Additionally, the TAF predicts commuter enplanements at PTIA to decrease from 852,942 in 2005 to 748,795 in 2006. Commuter enplanements are then projected to increase to 1,340,997 in 2020, an AACGR of 4.2 percent, as shown in **Table 1.3-3**.

With regard to air carrier aircraft operations, the TAF indicates that air carrier operations at PTIA will decrease from 19,863 operations in 2005 to 17,871 in 2006. The TAF then projects air carrier aircraft operations to increase at an AACGR of 9.0 percent through 2020, to 59,718 aircraft operations. Additionally, the TAF forecast of commuter operations at PTIA projects a decrease from 61,862 aircraft operations in 2005 to 52,984 in 2006. Then, TAF projections for PTIA expect commuter aircraft operations to increase to 80,647 by 2020, an AACGR of 3.0 percent.

Both of these categories include any expected increase or decrease in cargo operations. As published by FedEx and included within the airport's Master Plan Update and the Final Environmental Impact Statement (FEIS) for the *Proposed Runway 5L/23R, Proposed Overnight Express Air Cargo Sorting and Distribution Facility and Associated Developments at GSO*, the average number of daily and annual FedEx Mid-Atlantic Sort Hub operations is anticipated to occur at two sustained levels. As the Sort Hub initiates its Phase I level of operations in 2009, 12,350 (FedEx-specific) annual operations are anticipated representing an average daily total of 24 arrivals and 24 departures that are scheduled to occur over 260 days of the year. Beginning in 2014, the Sort Hub will be expanded (Phase II) to generate 32,760 annual operations representing an average daily total of 63 arrivals and 63 departures.

**TABLE 1.3-3
 FAA APO TERMINAL AREA FORECAST DETAIL REPORT
 (DRAFT 2006 FORECAST ISSUED MAY 16, 2006)
 Piedmont Triad International Airport**

Year	Aircraft Operations											
	Scheduled Enplanements			Itinerant Operations					Local Operations			Total OPS
	AC	Comm.	Total	AC	AT & Comm.	GA	Mil	Total	GA	Mil	Total	
REGION: ASO STATE: NC LOCID: GSO												
CITY: GREENSBORO AIRPORT: PIEDMONT TRIAD INTERNATIONAL												
2005	510,310	852,942	1,363,252	19,863	61,862	41,002	640	123,367	10,486	418	10,904	134,271
2006	459,258	748,795	1,208,053	17,871	52,984	39,914	996	111,765	8,538	891	9,429	121,194
2007	470,495	780,619	1,251,114	18,226	54,598	40,538	996	114,358	8,644	891	9,535	123,893
2008	482,008	813,795	1,295,803	18,590	56,261	41,172	996	117,019	8,750	891	9,641	126,660
2009	493,804	848,381	1,342,185	31,070	57,974	41,816	996	131,856	8,857	891	9,748	141,604
2010	505,889	884,438	1,390,327	31,691	59,740	42,470	996	134,897	8,966	891	9,857	144,754
2011	518,270	922,026	1,440,296	32,321	61,560	43,134	996	138,011	9,076	891	9,967	147,978
2012	530,955	961,212	1,492,167	32,964	63,435	43,809	996	141,204	9,187	891	10,078	151,282
2013	543,952	1,002,063	1,546,015	33,619	65,368	44,494	996	144,477	9,300	891	10,191	154,668
2014	557,267	1,044,651	1,601,918	53,031	67,359	44,923	996	166,309	9,414	891	10,305	176,614
2015	570,909	1,089,049	1,659,958	54,091	69,411	45,357	996	169,855	9,530	891	10,421	180,276
2016	584,885	1,135,333	1,720,218	55,172	71,525	45,796	996	173,489	9,647	891	10,538	184,027
2017	599,205	1,183,585	1,782,790	56,275	73,704	46,238	996	177,213	9,765	891	10,656	187,869
2018	613,877	1,233,888	1,847,765	57,400	75,950	46,685	996	181,031	9,884	891	10,775	191,806
2019	628,908	1,286,328	1,915,236	58,548	78,263	47,136	996	184,943	10,006	891	10,897	195,840
2020	644,308	1,340,997	1,985,305	59,718	80,647	47,591	996	188,952	10,129	891	11,020	199,972
2021	660,087	1,397,989	2,058,076	60,912	83,104	48,051	996	193,063	10,255	891	11,146	204,209
2022	676,252	1,457,404	2,133,656	62,130	85,635	48,515	996	197,276	10,381	891	11,272	208,548
2023	692,813	1,519,344	2,212,157	63,372	88,244	48,984	996	201,596	10,508	891	11,399	212,995
2024	709,781	1,583,916	2,293,697	64,639	90,932	49,457	996	206,024	10,637	891	11,528	217,552
2025	727,165	1,651,232	2,378,397	65,931	93,702	49,934	996	210,563	10,768	891	11,659	222,222

Comment: FedEx expected to start hubbing in 2009 or later.

In the TAF, itinerant general aviation operations at PTIA are predicted to decrease from 41,002 in 2005 to 39,914 in 2006, and then grow to 47,591 in 2020, an AACGR of 1.3 percent from 2006 through 2020. After decreases from 10,486 local general aviation aircraft operations in 2005 to 8,538 in 2006, the TAF predicts local general aviation operations at PTIA to increase approximately 1.2 percent annually from 2006 through 2020, to 10,596 operations in 2020.

The TAF predicts military operations at PTIA to remain flat throughout the forecast period, with 996 itinerant and 891 local military operations through 2020.

1.3.3 FAA AEROSPACE FORECASTS FISCAL YEARS 2006 THROUGH 2017

During the spring of each year, the FAA's Statistics and Forecast Branch (APO-110), Office of Aviation Policy and Plans, publishes the *FAA Aerospace Forecasts*. The most recent publication provides the FAA's projections for the fiscal years 2006 through 2017 and addresses the current state of the aviation industry. This forecast also provides an analytical review of the FAA's past forecasting accuracies and projections of future rates of growth within specific sectors of aviation. These projections include, but are not limited to, the anticipated growth rates of the U.S. air carriers, commuters, passenger enplanement levels, air cargo tonnage, general aviation and military aviation activity, average aircraft size and load factor, in addition to other indicators.

The *FAA Aerospace Forecasts* anticipate large air carriers and regional/commuters will grow at an annual rate of 2.8 percent over the forecast period and that passenger demand has returned to pre-September 11th levels in 2005. The FAA also anticipates that low-cost carriers and regional/commuters could account for more than half of all domestic passengers by the end of the FAA's 12-year forecast period.

Air Carrier Activity

The 2006 *FAA Aerospace Forecasts* projects that domestic air carrier enplanements will decrease less than 1.0 percent from 2005 to 2006, with a 3.0 percent increase during the 2006 to 2007 time period. Over the next 12 years (2006 to 2017), air carrier enplanements are anticipated to increase at an AACGR of 2.5 percent.

Domestic air carrier operations are also projected to decrease less than 1.0 percent over the 2005 to 2006 timeframe, with a 3.0 percent increase from 2006 to 2007. Throughout the entire forecast period (2006 through 2017), air carrier operations are projected to increase at an AACGR of 2.4 percent. Over the same period, air carrier aircraft load factors are predicted to increase at 0.1 percent annually while the average aircraft size (number of seats) is expected to increase approximately 0.2 percent annually.

Commuter Activity

Domestic commuter enplanements are anticipated to increase 2.7 percent from 2005 to 2006 and 5.9 percent from 2006 to 2007, with an AACGR of 4.2 percent throughout the 2005 to 2017 forecasting period. Commuter operations are expected to increase at an average of 2.3 percent from 2005 to 2017, with a decrease of 0.9 percent from 2005 to 2006, and an increase of 2.7 percent from 2006 to 2007. Commuter aircraft load factors are projected to increase approximately 0.6 percent and average aircraft size is projected to increase approximately 0.9 percent annually from 2005 to 2017.

General Aviation/Military

Itinerant and local general aviation operations are predicted to grow at an AACGR of 1.9 percent from 2005 to 2017, while local and itinerant military operations are expected to increase less than 0.1 percent throughout the *FAA Aerospace Forecast* period of 2005 to 2017.

1.4 UPDATE AND REFINEMENT OF AVIATION ACTIVITY FORECAST USING GROWTH SCENARIO

1.4.1 COMMERCIAL SERVICE

1.4.1.1 Passenger Enplanements

Based on a review of historical data, this FAR Part 150 Aviation Activity Forecast assumes that the air carrier and commuter passenger enplanements projected by the FAA 2006 TAF present the most reasonable forecast available for the forecast period.

1.4.1.2 Air Carrier and Commuter Operations

Commercial air carrier and commuter aircraft operational levels were developed using calculated average aircraft load factors (e.g., the number of seats filled on each flight) and aircraft size (e.g., the number of seats available per aircraft). The following sections describe the data formulation used in the commercial service activity forecasts.

Determination of Average Seats Available

To derive the average number of seats available to PTIA air travelers, the FAA T-100 data provided year 2005 documented number of seats available for air carrier and commuter operations. Using a weighted average technique, a “composite” or representative average number of seats available for each category was determined.

Determination of Average Aircraft Load Factors

FAA T-100 data for the year 2005 was used to determine average aircraft load factors for air carrier and commuter operations at the airport.

Using TAF PTIA Enplanement Data

The information obtained from the FAA’s Draft 2006 TAF issued May 16, 2006 for PTIA provided accurate historical enplanement records and the relative split as well as six-month look-ahead information supplied by the airline industry and the Department of Transportation.

Derived Air Carrier and Commuter Operations

By multiplying the air carrier and commuter average aircraft sizes by the respective load factors, an average number of seats filled per aircraft was determined. This average seats filled factor was divided into the projected levels of enplanements to derive both air carrier and commuter aircraft operations.

The FAA projected national load factors and average aircraft size are shown on **Table 1.4-1**.

**TABLE 1.4-1
FAA NATIONAL FORECAST OF
LOAD FACTOR AND AVERAGE AIRCRAFT SIZE (SEATS)
Piedmont Triad International Airport**

Year	Load Factor		Average Aircraft Size	
	Air Carrier	Commuter	Air Carrier	Commuter
2005	77.3%	69.8%	150.3	49.4
2006	77.9%	71.6%	149.7	49.6
2010	78.0%	73.3%	151.1	51.6
2011	78.1%	73.6%	151.6	52.1
2014	78.3%	74.5%	153.1	53.6
2015	78.4%	74.7%	153.6	54.1
2020	78.9%	76.0%	156.1	56.6
Average Annual Compound Growth Rate				
2005-2010	0.18%	0.98%	0.11%	0.88%
2010-2015	0.10%	0.38%	0.33%	0.95%
2015-2020	0.13%	0.33%	0.32%	0.92%

Sources: *FAA Aerospace Forecasts*, FY 2006-2017, March 2006; URS, 2006.

The calculated average aircraft size and derived load factors were then projected to increase at rates provided by the *FAA Aerospace Forecast* through the forecast period but normalized to reflect 2005 actual levels at PTIA derived by T-100 data, as shown in **Table 1.4-2**.

**TABLE 1.4-2
PTIA FORECAST OF
LOAD FACTOR AND AVERAGE AVAILABLE SEATS
Piedmont Triad International Airport**

Year	Load Factor		Average Aircraft Size	
	Air Carrier	Commuter	Air Carrier	Commuter
2005	62.04%	53.03%	127.20	48.60
2006	62.15%	53.55%	127.34	49.03
2010	62.60%	55.69%	127.88	50.76
2011	62.67%	55.90%	128.30	51.25
2014	62.86%	56.54%	129.57	52.72
2015	62.92%	56.75%	129.99	53.22
2020	63.33%	57.71%	132.12	55.72
Average Annual Compound Growth Rate				
2005-2010	0.18%	0.98%	0.11%	0.88%
2010-2015	0.10%	0.38%	0.33%	0.95%
2015-2020	0.13%	0.33%	0.32%	0.92%

Sources: FAA Aerospace Forecasts, FY 2006-2017, March 2006; URS, 2006.

These PTIA-specific forecasts of average load factor and average aircraft size were then applied to the FAA Draft 2006 PTIA TAF forecast of enplanements to develop a forecast of air carrier and commuter operations.

The results of these derived forecasts of air carrier and commuter operations are presented in **Table 1.4-3**. This same method was applied using the projected FAA Aerospace Forecast projections of average aircraft size and load factor. These derived operations forecasts were also compared to the FAA Aerospace projections of operations and shown in **Table 1.4-3**.

Selection of Preferred Forecast

Based on the development and comparison of the two passenger aircraft operations forecasts derived from the FAA Draft 2006 PTIA TAF, a preferred forecast of air carrier and commuter operations was developed. The air carrier and commuter operations forecast developed from the use of the FAA Draft 2006 PTIA TAF forecast of enplanements in conjunction with the calculated average aircraft size and resultant load factor provided the projections of commercial aircraft operations expected to most closely represent the future activity levels at PTIA.

**TABLE 1.4-3
DERIVED OPERATIONS FORECASTS
Piedmont Triad International Airport**

Year	Air Carrier		Commuter	
	FAA Aerospace	Forecast	FAA Aerospace	Forecast
Passenger Enplanements (FAA TAF)				
2005	588,669	588,669	797,182	797,182
2006	602,919	602,919	831,062	831,062
2010	663,504	663,504	981,607	981,607
2011	679,590	679,590	1,023,326	1,023,326
2014	730,256	730,256	1,159,423	1,159,423
2015	747,980	747,980	1,208,699	1,208,699
2020	843,342	843,342	1,488,327	1,488,327
Derived Aircraft Operations				
2005	19,863	14,919	61,862	61,862
2006	10,340	15,236	46,802	63,309
2010	11,259	16,576	51,906	69,444
2011	11,480	16,905	53,374	71,442
2014	12,183	17,933	58,070	77,790
2015	12,423	18,289	59,818	80,029
2020	13,694	20,160	69,196	92,576

Sources: FAA Draft 2006 TAF, May 16, 2006. *FAA Aerospace Forecasts*, FY 2006-2017, March 2006; URS 2006.

1.4.2 AIR CARGO ACTIVITY

Planned FedEx Mid-Atlantic Hub Facility Operations

The anticipated 2009 operational levels, fleet mix, and operating schedules for the Mid-Atlantic Hub were developed by FedEx in the fall of 2004 and incorporated into this FAR Part 150 aviation activity forecast. Based on those plans, FedEx anticipates that the Mid-Atlantic Hub Facility will generate approximately 12,350 annual operations during 325 operational days and 260 operational nights of the 365-day calendar year. FedEx further anticipates that as air cargo tonnage throughput demand at the FedEx facility increases over the first two years of Hub operation (2009 through 2011), the overall number of FedEx aircraft operations will remain unchanged.

As the Hub operations increase beyond 2011, FedEx will accommodate this demand by providing additional lift capacity by larger aircraft until such time that additional planned Phase II Hub facilities can be developed around the 2014 time frame. At such time that the expanded Phase II facilities are in place and on line, the annual FedEx operations are anticipated to increase to just under 33,000.

This forecast of PTIA cargo operations is presented in **Table 1.4-4**.

**TABLE 1.4-4
FORECAST OF PTIA CARGO OPERATIONS
Piedmont Triad International Airport**

Year	FedEx		Other	Total
	Existing	Hub	All Cargo	
2003	2,088	---	3,476	5,564
2004	1,936	---	3,498	5,434
2005	1,888	---	3,056	4,944
2006	2,369	---	3,166	5,535
2007	2,454	---	3,279	5,734
2008	2,542	---	3,397	5,939
2009	---	12,350	3,519	15,869
2010	---	12,350	3,646	15,996
2011	---	12,350	3,776	16,126
2012	---	12,350	3,905	16,255
2013	---	12,350	4,038	16,388
2014	---	32,760	4,175	36,935
2015	---	32,760	4,316	37,076
2016	---	32,760	4,461	37,221
2017	---	32,760	4,612	37,372
2018	---	32,760	4,767	37,527
2019	---	32,760	4,928	37,688
2020	---	32,760	5,094	37,854

Sources: *FAA Aerospace Forecast*, FY 2006-2017, Table 19, page 74, March 2006; PTIA Airport Records, July 2004 and April 2006; PTIA 1998 Master Plan Update, FedEx Planning, November 2004.

1.4.3 GENERAL AVIATION FORECASTS

The general aviation activity forecasts developed in the FAA Draft 2006 PTIA TAF were believed to represent the most reasonable assumptions of general aviation growth for PTIA through the forecast period. These forecasts result in an AACGR of 1.3 percent for itinerant and 1.2 percent for local general aviation operations.

1.4.4 MILITARY ACTIVITY FORECASTS

Military operations are typically difficult to forecast since they are dependent on training requirements and funding availability as opposed to economic activity or localized demand. Further, military activity usually remains stable based on training requirements unless there is a major change in the region's military operating capacity, such as an increase or decrease in the regional military assets. Therefore, military operations at PTIA are forecast to increase to 996 itinerant and 891 local military aircraft operations in 2006 and remain constant throughout the forecast period at these levels, following the Draft 2006 TAF projections.

1.4.5 PREFERRED FORECASTS

The preferred forecasts as discussed and developed in conjunction with this forecast study for PTIA are presented in **Table 1.4-5**.

**TABLE 1.4-5
PREFERRED FORECAST
Piedmont Triad International Airport**

Year	Enplanements			Operations									
				Itinerant						Local			Total
	Air Carrier	Commuter	Total	Air Carrier	Commuter	Cargo	GA	Mil	Total	GA	Mil	Total	
2005	510,310	852,942	1,363,252	14,919	61,862	4,944	41,002	640	123,367	10,486	418	10,904	134,271
2006	459,258	748,795	1,208,053	13,388	53,313	5,535	39,914	996	113,146	8,538	891	9,429	122,575
2010	505,889	884,438	1,390,327	14,579	58,479	15,996	42,470	996	132,520	8,966	891	9,857	142,377
2011	518,270	922,026	1,440,296	14,872	60,162	16,126	43,134	996	135,291	9,076	891	9,967	145,258
2014	557,267	1,044,651	1,601,918	15,786	65,508	36,935	44,923	996	164,148	9,414	891	10,305	174,453
2015	570,909	1,089,049	1,659,958	16,103	67,393	37,076	45,357	996	166,925	9,530	891	10,421	177,346
2020	644,308	1,340,997	1,985,305	17,767	77,959	37,854	47,591	996	182,167	10,129	891	11,020	193,187
Average Annual Compound Growth Rate													
2005-10	-0.17%	0.73%	0.39%	-0.46%	-1.12%	26.47%	0.71%	9.25%	1.44%	-3.08%	16.34%	-2.00%	1.18%
2010-15	2.45%	4.25%	3.61%	2.01%	2.88%	18.31%	1.32%	0.00%	4.72%	1.23%	0.00%	1.12%	4.49%
2015-20	2.45%	4.25%	3.64%	1.99%	2.96%	0.42%	0.97%	0.00%	1.76%	1.23%	0.00%	1.12%	1.73%

Source: URS, 2006.

1.5 COMPARISON OF PART 150 PREFERRED FORECAST TO FAA DRAFT 2006 TERMINAL AREA FORECAST

The review and approval of this and other similar aviation activity forecasts requires a comparison between the recommended forecasts developed for this forecast update study and the FAA's forecast of passenger enplanements, commercial operations, and total operations, as referenced in the Draft 2006 TAF developed specifically for PTIA. The comparison of these forecasts indicates lower activity levels in the Part 150 forecast as compared to the Draft 2006 TAF, for the 5-, 10- and 15-year forecast levels. The required comparisons of the preferred forecast to the FAA TAF are shown in **Tables 1.5-1** and **1.5-2**.

Passenger Enplanements

The Part 150 forecast used the FAA Draft 2006 TAF forecast of air carrier and commuter passenger enplanements for PTIA.

Commercial Operations

Commercial operations forecasts for PTIA as projected for this FAR Part 150 forecast and the TAF for PTIA forecast differ, as shown in **Table 1.5-2**. For year five of the forecast, the Part 150 forecast for commercial operations is 2.6 percent lower than the TAF, and the 10- and 15-year Part 150 forecasts are 2.4 percent and 4.8 percent, respectively, lower than the TAF. The difference in the forecasts can be explained, in part, by the lower growth of passenger air carrier aircraft operations in the Part 150 forecast. The FAA Draft 2006 PTIA TAF forecast projects an AACGR of 3.4 percent, while the Part 150 forecast predicts an AACGR of 1.2 percent for passenger air carrier aircraft operations over the forecast period.

At PTIA, the Part 150 total operations forecast mirrors the same issue noted above. The FAA Draft 2006 TAF follows the trend presented in the commercial operations, with the Part 150 forecast 1.6 percent, 1.6 percent, and 3.4 percent lower than TAF forecast levels for 2010, 2015, and 2020, respectively.

General Aviation/Military

The general aviation and military aircraft activity forecasts developed in the FAA Draft 2006 PTIA TAF were felt to represent the most recent data available for PTIA.

**TABLE 1.5-1
SUMMARY AND DOCUMENTATION OF AIRPORT PLANNING FORECAST
Piedmont Triad International Airport**

AIRPORT NAME: PTIA/GSO	A. Forecast Levels and Growth Rates Specify Base Year: 2005					Average Annual Compound Growth Rates			
	<u>Base Year</u> <u>Level</u>	<u>Base Year</u> <u>+1 Year</u>	<u>Base Year</u> <u>+5 Years</u>	<u>Base Year</u> <u>+10 Years</u>	<u>Base Year</u> <u>+15 Years</u>	<u>Base Year</u> <u>to +1</u>	<u>Base Year</u> <u>to +5</u>	<u>Base Year</u> <u>to +10</u>	<u>Base Year</u> <u>to +15</u>
Passenger Enplanements	2005	2006	2010	2015	2020				
Air Carrier	510,310	459,258	505,889	570,909	644,308	-10.0%	-0.2%	1.1%	1.6%
Commuter	852,942	748,795	884,438	1,089,049	1,340,997	-12.2%	0.7%	2.5%	3.1%
Total	1,363,252	1,208,053	1,390,327	1,659,958	1,985,305	-11.4%	0.4%	2.0%	2.5%
Operations									
<u>Itinerant</u>									
Air Carrier	19,863	18,923	30,575	53,179	55,621	-4.7%	9.0%	10.3%	7.1%
Commuter/Air Taxi	61,862	53,313	58,479	67,393	77,959	-13.8%	-1.1%	0.9%	1.6%
Total Commercial Operations	81,725	72,236	89,054	120,572	133,580	-11.6%	1.7%	4.0%	3.3%
General Aviation	41,002	39,914	42,470	45,357	47,591	-2.7%	0.7%	1.0%	1.0%
Military	640	996	996	996	996	55.6%	9.2%	4.5%	3.0%
<u>Local</u>									
General Aviation	10,486	8,538	8,966	9,530	10,129	-18.6%	-3.1%	-1.0%	-0.2%
Military	418	891	891	891	891	113.2%	16.3%	7.9%	5.2%
Total Operations	134,271	122,575	142,377	177,346	193,187	-8.7%	1.2%	2.8%	2.5%
Instrument Operations						N/A	N/A	N/A	N/A
Peak Hour Operations						N/A	N/A	N/A	N/A
Cargo/Mail (Enplaned + Deplaned Tons)						N/A	N/A	N/A	N/A
Based Aircraft									
Single Engine (Non-Jet)						N/A	N/A	N/A	N/A
Multi Engine (Non-Jet)						N/A	N/A	N/A	N/A
Jet Engine						N/A	N/A	N/A	N/A
Helicopter						N/A	N/A	N/A	N/A
Other						N/A	N/A	N/A	N/A
Total	0	0	0	0	0	N/A	N/A	N/A	N/A
	B. Operational Factors								
	<u>Base Year</u> <u>Level</u>	<u>Base Year</u> <u>+1 Year</u>	<u>Base Year</u> <u>+5 Years</u>	<u>Base Year</u> <u>+10 Years</u>	<u>Base Year</u> <u>+15 Years</u>				
Average Aircraft Size (Seats)									
Air Carrier	127.2	127.3	127.9	130.0	132.1				
Commuter	48.6	49.0	50.8	53.2	55.7				
Average Enplaning Load Factor									
Air Carrier	53.8%	53.9%	54.3%	54.5%	54.9%				
Commuter	56.7%	57.3%	59.6%	60.7%	61.7%				
GA Operations per Based Aircraft	N/A	N/A	N/A	N/A	N/A				

Note: Show base plus one year if forecast was done.
If planning effort did not include all forecast years shown interpolate years as needed, using average annual compound growth rates.

NOTE: Right hand side of worksheet has embedded formulas for average annual compound growth rate calculations.

**TABLE 1.5-2
COMPARISON OF AIRPORT PLANNING AND TAF FORECASTS
Piedmont Triad International Airport**

AIRPORT NAME: Piedmont Triad International Airport				
	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base Year	2005	1,363,252	1,363,252	0.0%
Base Year +5 Years	2010	1,390,327	1,390,327	0.0%
Base Year +10 Years	2015	1,659,958	1,659,958	0.0%
Base Year +15 Years	2020	1,985,305	1,985,305	0.0%
Commercial Operations				
Base Year	2005	81,725	81,725	0.0%
Base Year +5 Years	2010	89,054	91,431	-2.6%
Base Year +10 Years	2015	120,572	123,502	-2.4%
Base Year +15 Years	2020	133,580	140,365	-4.8%
Total Operations				
Base Year	2005	134,271	134,271	0.0%
Base Year +5 Years	2010	142,377	144,754	-1.6%
Base Year +10 Years	2015	177,346	180,276	-1.6%
Base Year +15 Years	2020	193,187	199,972	-3.4%

Notes:

TAF data is on a U.S. Government fiscal year basis (October through September).
Forecast/2006 TAF (% Difference) column has embedded formulas.

APPENDIX A

Previous Aviation Activity Forecasts

APPENDIX A

PREVIOUS AVIATION ACTIVITY FORECASTS

INTRODUCTION

As prescribed in the FAA's Office of Aviation Policy and Plans *Forecasting Aviation Activity by Airport*, other forecast methods were examined in the previous forecast effort for the PTIA Part 150 forecast. These methods included trend analysis, regression analysis, and multiple market share analyses. It was determined these alternative quantitative analysis methods did not produce the necessary correlations between historical aviation activity and the various socio-economic or historical activity variables. Based on this information, it was deemed unnecessary to update these forecast methods for this update. This Appendix provides these forecasts.

APPENDIX A
PREVIOUS AVIATION ACTIVITY FORECASTS

A.1 COLLECTION AND REVIEW OF HISTORICAL DATA

To fully capture existing economic and air travel market conditions that typically affect aviation activity at Small Hub airports similar in size and role of PTIA, a variety of aviation and economic data sources were referenced and documented. In the early phases of data collection, investigations centered on identifying local market-driven activity that directly influenced local demand for domestic scheduled air carrier and regional/commuter air service at PTIA.

To develop the forecasts of future aviation activity at PTIA, both quantitative and qualitative analysis was conducted as part of the review of data obtained from a variety of sources including the following:

PTIA Records

- Historical aviation activity levels (1984 through 2003);
- Current air carrier, regional/commuter, and air cargo schedules;
- Current non-stop city-pair data and distances for scheduled air carrier, commuter, and air cargo operators;
- Based general aviation aircraft fleets data;
- Landing Fee Reports for the 2003 calendar year;
- Passenger enplanement data for the 2003 calendar year;
- ATCT records;
- FAA Form 5010 data (2003);
- Air cargo operations and associated lift tonnage statistics; and
- Air carrier, regional/commuter, charter, general aviation, and military operational activity levels.

Other Sources

- Current airline/regional commuter aircraft fleet and order summaries (ATW, July 2004);
- Future GAMA statistics;
- Interviews of local Fixed Based Operators (FBOs);
- FAA Air Traffic Activity Data System (ATADS) and Form 7230-1 data for PTIA for the 2003 calendar year;
- FAA TAF for PTIA, North Carolina, and all other U.S. commercial service airports;

- Official Airline Guide (OAG); and
- Discussions with FedEx.

Trend Analysis

Although typically used as one of several measures, trend analysis techniques were attempted using 20-, 10-, and 5-year historical passenger enplanement and aircraft operations data for PTIA for the short-term (5-year), intermediate-term (10-year), and long-term (20-year) period of review.

Because historical levels of air service at PTIA have fluctuated throughout the 20-year period, the application of straight-line trend analysis yielded future projected operations and passenger enplanements that, in certain instances, were below existing levels. This type of analysis disregards large unforeseen or unexpected fluctuations that have occurred throughout the various periods of review. Such fluctuations tend to heavily influence the magnitude of derived rates of change over the various time intervals. For example, the aircraft operations and passenger enplanements generated over a relatively short period of time by CALite (Continental Airlines low fare spin-off) in the 1990s served to radically skew the trend analysis predictions, especially when measured over a short 5- to 10-year period of review. Where this occurred, the magnitude of negative growth was more pronounced within the short-term, decreasing as the time interval increased. The anomalies were most distinct with regard to air carrier passenger enplanements and operations. To that end, trend analysis techniques were not found suitable for use in developing projections of future aviation activity levels at PTIA.

Regression Analysis

Another quantitative statistical approach using regression analysis was used to investigate and identify one or more socioeconomic variables within the state and region that had direct and meaningful statistical correlations with historical levels of passenger enplanements, aircraft operations, and air cargo tonnage. The primary goal of this effort was to identify local economic activity that may have direct effects on the changing levels of demand for air service at PTIA and/or scheduled air service offerings. Of particular interest was the furniture-manufacturing sector of the region's economic base.

A series of statistical tests using regression analysis techniques were conducted in an attempt that would serve to facilitate the development of "bottom-up" statistical projections of passenger enplanements or other relevant aviation activity levels at PTIA.

Two key findings served to disqualify the use of rigorous statistical analysis. First, passenger enplanements and associated aircraft operational levels have fluctuated over the 20-year period of review without corresponding changes in the local economy. Second, it was learned that the High Point, North Carolina area, internationally known as the "Furniture Capital of the World" is experiencing changes within the furniture-manufacturing sector that included the loss of manufacturing jobs to other locations overseas. While the furniture-manufacturing sector is

experiencing these pressures, passenger enplanements and aircraft operations at PTIA appear to have increased over the same period. Based on these statistical tests, it would appear that aviation activity at PTIA cannot be correlated with local economic activity, particularly the furniture-manufacturing sector of North Carolina.

Other Quantitative Analysis Measures

Although trend and regression analysis techniques did not produce meaningful measures to develop forecasts of future aviation activity at PTIA, there are other suitable quantitative methods to develop forecasts utilizing other sources of information or data published by the FAA or other industry entities. Methods used as part of this forecast update included the use of market share analysis and projected annualized rates of growth by aviation sector.

Using market share analysis techniques, various aircraft operations and passenger enplanement growth scenarios were developed utilizing data published in the FAA TAF. The TAF provides projections of aircraft operations and passenger enplanements for PTIA, all North Carolina Primary Commercial Airports, and all other U.S. Primary Commercial Airports. A combined approach of qualitative and quantitative methods was also used to develop reasonable assumptions of future aviation activity.

A.2 AVIATION ACTIVITY FORECAST USING MARKET SHARE ANALYSIS TECHNIQUES

Using market share comparison techniques, 2003 PTIA aircraft operations and passenger enplanements were compared to projections (as a ratio) of similar aviation activity at the national and state levels as published in the FAA TAF. This ratio was held constant throughout the entire forecast period. This market share forecasting approach yielded the following forecasts of future PTIA passenger enplanements, commercial operations, and general aviation operations.

A.2.1 AIR CARRIER AND COMMUTER PASSENGER ENPLANEMENTS

National Forecasts

Air carrier passenger enplanements were projected to increase throughout the forecast period at the varying annualized rates of 3.96 percent through the year 2006, 3.03 percent through the year 2011, and 2.70 percent throughout the remainder of the forecast period.

Commuter passenger enplanements were also projected to increase throughout the forecast period. Annualized rates vary from 7.37 percent through the year 2006, 4.19 percent through the year 2011, and 3.44 percent through 2020.

State of North Carolina Forecasts

Air carrier passenger enplanements were estimated to increase at varying rates throughout the forecast period, from 5.27 percent through the year 2006, 3.14 percent through year 2011, and 2.49 percent through the end of the forecast period.

Commuter passenger enplanements are projected to increase throughout the forecast period at even higher annualized rates of 6.23 percent through the year 2006, 4.04 percent through the year 2011, and 2.99 percent throughout the remainder of the forecast period.

The future passenger enplanement levels using the market share technique are shown in **A-1**.

**TABLE A-1
ENPLANEMENT MARKET SHARE FORECAST COMPARISON**

Year	Air Carrier		Commuter		Total	
	US	NC Primary	US	NC Primary	US	NC Primary
2003	695,694	695,694	601,275	601,275	1,296,969	1,296,969
2004	722,632	739,039	667,456	643,855	1,390,087	1,382,894
2006	781,556	811,630	744,332	720,778	1,525,888	1,532,408
2011	907,380	947,477	913,807	878,579	1,821,187	1,826,056
2015	1,013,149	1,047,648	1,054,162	993,561	2,067,312	2,041,209
2020	1,153,061	1,182,455	1,238,716	1,145,624	2,391,777	2,328,079
Average Annual Compound Growth Rate						
2004-2006	3.96%	5.27%	7.37%	6.23%	5.57%	5.72%
2007-2011	3.03%	3.14%	4.19%	4.04%	3.60%	3.57%
2012-2020	2.70%	2.49%	3.44%	2.99%	3.07%	2.74%
2004-2020	3.02%	3.17%	4.34%	3.86%	3.67%	3.50%

Source: National Data: FAA TAF 2003, March 2004.

A.2.2 AIR CARRIER AND COMMUTER AIRCRAFT OPERATIONS

National Forecasts

Air carrier operations were projected to increase throughout the forecast period at the varying annualized rates of 2.66 percent, 2.18 percent, and 2.03 percent through the years 2006, 2011, and 2020, respectively.

Commuter operations, while not rising as quickly, were still projected to increase throughout the forecast period at annualized rates of 2.74 percent through the year 2006, 1.60 percent through the year 2011, and 1.47 percent through year 2020.

State of North Carolina Primary Airports Forecasts

This market share projected air carrier operations to increase throughout the forecast period at annualized rates varying from 4.24 percent through the year 2006, 2.14 percent through the year 2011, and 1.82 percent throughout the remainder of the forecast period.

The projected increase in commuter operations through the forecast period varied from an annualized rate of 3.49 percent through the year 2006, 1.86 percent through the year 2011, and 1.62 percent through the year 2020.

The various forecasts future commercial aircraft operational levels using the market share technique are shown in **Table A-2**.

**TABLE A-2
COMMERCIAL OPERATIONS MARKET SHARE FORECAST COMPARISON**

Year	Air Carrier		Commuter	
	US	NC Primary	US	NC Primary
2003	22,920	22,920	42,517	42,517
2004	23,395	24,021	44,253	44,370
2006	24,795	25,963	46,115	47,132
2011	27,616	28,862	49,926	51,688
2015	29,979	31,060	53,014	55,273
2020	33,077	33,939	56,945	59,754
Average Annual Compound Growth Rate				
2004-2006	2.66%	4.24%	2.74%	3.49%
2007-2011	2.18%	2.14%	1.60%	1.86%
2012-2020	2.03%	1.82%	1.47%	1.62%
2004-2020	2.18%	2.34%	1.73%	2.02%

Source: National Data: FAA TAF 2003, March 2004.

A.2.3 GENERAL AVIATION OPERATIONS

National Forecasts

Itinerant general aviation operations, as part of the national market, were projected to increase throughout the forecast period at annual rates varying from 0.84 percent through the year 2006, 0.82 percent through the year 2011, and 0.78 percent throughout the remainder of the forecast period.

Also using the national market, local general aviation operations were projected to increase throughout the forecast years of 2006, 2011, and 2020 at the varying annualized rates of 0.69 percent, 0.66 percent, and 0.63 percent, respectively.

State of North Carolina Primary Airports Forecasts

Itinerant general aviation operations were projected to increase at the various annualized rates throughout the forecast period of 0.86 percent through the year 2006, 0.83 percent through the year 2011, and 0.79 percent throughout the remainder of the forecast period.

Local general aviation operations were projected to increase slightly throughout the forecast period at annualized rates varying from 0.36 percent through the year 2006 and 0.35 percent throughout the remainder of the forecast period.

State of North Carolina Airports Forecasts

Itinerant general aviation operations were projected to increase throughout the forecast years at varying annualized rates, from 0.43 percent through the year 2006, to 0.42 percent through the year 2011, and 0.41 percent throughout the remainder of the forecast period.

Local general aviation operations were projected to increase throughout the forecast period at annual rate of 0.10 percent throughout the forecast period.

The forecasts of future general aviation operational levels using the market share technique are shown in **Table A-3**.

**TABLE A-3
GENERAL AVIATION OPERATIONS MARKET SHARE FORECAST COMPARISON**

Year	Itinerant			Local		
	US	NC	NC Primary	US	NC	NC Primary
2003	40,699	40,699	40,699	7,462	7,462	7,462
2004	41,037	40,873	41,052	7,514	7,470	7,488
2006	41,737	41,221	41,759	7,619	7,485	7,542
2011	43,486	42,092	43,527	7,873	7,524	7,676
2015	44,889	42,789	44,943	8,077	7,555	7,784
2020	46,648	43,660	46,711	8,332	7,594	7,918
Average Annual Compound Growth Rate						
2004-2006	0.84%	0.43%	0.86%	0.69%	0.10%	0.36%
2007-2011	0.82%	0.42%	0.83%	0.66%	0.10%	0.35%
2012-2020	0.78%	0.41%	0.79%	0.63%	0.10%	0.35%
2004-2020	0.81%	0.41%	0.81%	0.65%	0.10%	0.35%

Source: National Data: FAA TAF 2003, March 2004.

A.2.4 MARKET SHARE FORECAST SUMMARY

Based on the projections derived from the use of market share analysis techniques, the following findings and conclusions were developed.

Air Carrier and Commuter Enplanements

Because of the growing popularity and use of the regional jet aircraft by mainline and regional airlines, the derived forecast of air carrier enplanements using the national- and state-level market share techniques were considered to be unrealistically high. These forecasts, therefore, were not retained for consideration as part of the development of the preferred forecast.

For the same reasons, the increased use of the regional jet aircraft is anticipated to occur throughout the forecast period. Thus, the various derived commuter enplanement forecasts were considered to be lower than what is realistically anticipated and, therefore, were not retained for consideration as part of the development of the preferred forecast.

Air Carrier and Commuter Operations

Projected future levels of air carrier operations using the market share approach generated air carrier operational annualized growth rates for the 20-year forecast period that were in excess of 2 percent. Through review of the historical air carrier operations at PTIA, it is evident that there has been a steady decline in the overall number of air carrier operations. Based on observed and anticipated changes in air carrier operations at PTIA, the derived air carrier operations forecast were considered to be optimistically high and, therefore, were not retained for consideration as part of the development of the preferred forecast.

Based on the continued growth of regional jet operations combined with the observed shift of passenger enplanements from the larger air carrier fleet, the forecast of commuter operations derived using the market share analysis generated annualized growth rates that were considered to be extremely low and, therefore, were not retained for consideration as part of the development of the preferred forecast.

General Aviation Operations

Using the national and North Carolina market share, the forecast of itinerant and local operations by general aviation aircraft were found to be unrealistically low. The reason for this may be primarily driven by the fact that the FAA TAF traditionally places less emphasis on the projections of general aviation activities, particularly when the TAF projections of future activity are developed for small general aviation airports. That said, it is not surprising to see projected annualized growth rates that are flat or extremely conservative. For this reason, the forecasts of general aviation operations derived from market share analysis were not retained for consideration as part of the development of the preferred forecast.

Military Operations

As with most forecasts, including the FAA TAF, military operations are predicted to remain flat barring some unforeseen change in the operating conditions at a particular airport. This also holds true for the FAA TAF forecast of military operations at public airports for the state of North Carolina as a whole. With this information and no known change in military operating procedure at PTIA, a market share analysis for PTIA would show no growth.

APPENDIX B

Noise Modeling Assumptions

APPENDIX B

NOISE MODELING ASSUMPTIONS

Air Carrier and Commuter:

The air carrier and commuter aircraft operations fleet mix for Piedmont Triad International Airport (PTIA) for existing and future conditions were based on airline schedules published in the Official Airline Guide for the period January through December 2005. Projected aircraft fleet mix changes at the airport developed for this aviation activity forecast were based on the most recent available information from sources such as the *Airport Noise Report* and the *Airline Fleet Directory*.

Cargo Aircraft:

Since cargo aircraft perform fewer pressurization cycles, the turnover or attrition of older aircraft within the respective all-cargo fleets is not as significant as with aircraft serving the commercial passenger transport market. Therefore, it was assumed that 1) the fleet mix for non-FedEx cargo operations would remain static throughout the forecast period, and 2) changes in the FedEx aircraft fleet mix were based on scheduling information provided by FedEx as part of this forecast.

General Aviation:

Any change in the fleet mix for general aviation aircraft operating at PTIA, as with any airport, is relatively slight unless there is a major change in operational conditions at the airport. These changes can include a loss or addition of flight training or flight service facility or a major increase in commercial operational levels, forcing the general aviation activity to relocate.

The fleet mix of general aviation jet aircraft operating at PTIA was obtained from information provided by the Air Traffic Control Tower and the Cessna aircraft maintenance facility. It is anticipated that throughout the entire forecast period, there will only slight changes to the general aviation fleet mix that operate at PTIA. For noise modeling purposes, the single-engine piston, multi-engine piston, and turbo-prop aircraft are typically modeled as a single "composite" aircraft type. With the exception of Lear 25s and Lear 35s, the overall percent of general aviation operations were held constant. Due to the age of these two specific Lear jets, it was assumed the relative mix of these aircraft would diminish at a constant rate throughout the forecast period to approximately 50 percent of their current level. It was further assumed that the relative share of transient Cessna (CNA) 500s and CNA 750s utilizing the Cessna maintenance facility would reverse with a steady decrease in the relative share of the CNA 500s. Currently, the ratio of CNA 500s to CNA 750s is approximately 70:30; it was assumed this would reverse in future years at PTIA.

Military Aircraft:

Without any known plans to change the operational conditions at PTIA of military aircraft, the fleet mix was held static throughout the forecast period.

The average daily operations for 2006 and 2014 are presented in the following tables. The tables provide aircraft fleet mix, arrival operations, and departure operations by stage length during daytime and nighttime for noise modeling purposes using the FAA's Integrated Noise Model (INM).

**TABLE B-1
AIR CARRIER OPERATIONS FORECAST
AVERAGE DAILY OPERATIONS**

Aircraft Type	Arrivals			
	2006		2014	
	Day	Night	Day	Night
Airbus A-319	1.0353	0.0000	1.2207	0.0000
B 737-200	2.9580	0.0000	0.0000	0.0000
B 737-300	1.0353	0.0000	1.2207	0.0000
B 737-500	1.0353	0.0000	1.2207	0.0000
B 737-800	0.0000	0.0000	3.4878	0.0000
CRJ 90	6.3597	0.0000	7.4989	0.0000
MD 80	1.0353	0.0000	1.2207	0.0000
MD 88	4.8807	0.0000	5.7549	0.0000
TOTAL	18.3397	0.0000	21.6247	0.0000

Aircraft Type	Departures							
	2006				2014			
	Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2	
	Day	Night	Day	Night	Day	Night	Day	Night
Airbus A-319	0.7817	0.0207	0.2329	0.0000	0.9218	0.0244	0.2746	0.0000
B 737-200	2.2335	0.0592	0.6653	0.0000	0.0000	0.0000	0.0000	0.0000
B 737-300	0.7817	0.0207	0.2329	0.0000	0.9218	0.0244	0.2746	0.0000
B 737-500	0.7817	0.0207	0.2329	0.0000	0.9218	0.0244	0.2746	0.0000
B 737-800	0.0000	0.0000	0.0000	0.0000	2.6336	0.0698	0.7845	0.0000
CRJ 90	4.8021	0.1272	1.4304	0.0000	5.6623	0.1500	1.6866	0.0000
MD 80	0.7817	0.0207	0.2329	0.0000	0.9218	0.0244	0.2746	0.0000
MD 88	3.6854	0.0976	1.0978	0.0000	4.3455	0.1151	1.2944	0.0000
TOTAL	13.8480	0.3668	4.1249	0.0000	16.3284	0.4325	4.8638	0.0000

Source: URS, 2006.

Error due to rounding.

Note: Retirement of 737-200 based on *Airport Noise Report*, Vol 17, Number 28 September 26, 2005.

Summary		
Year	2006	2014
Annual Ops	13388	15786
Ave Day	36.67945	43.24932
Arr	18.33973	21.62466
Dep	18.33973	21.62466

**TABLE B-2
COMMUTER OPERATIONS FORECAST
AVERAGE DAILY OPERATIONS**

Aircraft Type	Arrival			
	2006		2014	
	Day	Night	Day	Night
CR2	0.5689	0.0926	0.6990	0.1138
CR7	4.4375	0.7224	5.4525	0.8876
CRJ	32.2000	5.2419	39.5656	6.4409
ER3	2.9583	0.4816	3.6350	0.5917
ER4	3.9823	0.6483	4.8933	0.7966
ERD	0.7965	0.1297	0.9787	0.1593
ERJ	17.8636	2.9080	21.9498	3.5732
TOTAL	62.8071	10.2244	77.1738	12.5632

Aircraft Type	Departures							
	2006				2014			
	Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2	
	Day	Night	Day	Night	Day	Night	Day	Night
CR2	0.4332	0.1073	0.0960	0.0250	0.5323	0.1318	0.1180	0.0308
CR7	3.3790	0.8367	0.7488	0.1952	4.1520	1.0281	0.9201	0.2399
CRJ	24.5198	6.0717	5.4337	1.4167	30.1285	7.4605	6.6767	1.7408
ER3	2.2527	0.5578	0.4992	0.1302	2.7680	0.6854	0.6134	0.1599
ER4	3.0325	0.7509	0.6720	0.1752	3.7261	0.9227	0.8257	0.2153
ERD	0.6065	0.1502	0.1344	0.0350	0.7452	0.1845	0.1651	0.0431
ERJ	13.6028	3.3684	3.0145	0.7860	16.7144	4.1389	3.7040	0.9657
TOTAL	47.8265	11.8429	10.5987	2.7634	58.7665	14.5519	13.0231	3.3955

Source: URS 2006.
Error due to rounding.

Summary						
Year	2006	2014			2006	2014
Annual Ops	53313	65508		Arr	73.03151	89.7370
Ave Day	146.063	179.474		Dep	73.03151	89.73699
Arr	73.03151	89.73699				
Dep	73.03151	89.73699				

**TABLE B-3
CARGO OPERATIONS FORECAST
AVERAGE DAILY OPERATIONS**

Aircraft Type	Non-FedEx Cargo Operations											
	Arrival Operations				Departure Operations							
	2006		2014		2006				2014			
					Stage Length 1		Stage Length 3		Stage Length 1		Stage Length 3	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
757	0.82333662	0.258763	1.0857	0.34123	0.2405	0.7214	0.1202	0.0000	0.3171	0.9513	0.1586	0.0000
727-100	0.02287046	0.007188	0.030159	0.009479	0.0067	0.020039	0.00334	0.0000	0.0088	0.0264	0.0044	0.0000
A300	1.3362884	0.419976	1.762162	0.553822	0.3903	1.170843	0.195141	0.0000	0.5147	1.5440	0.2573	0.0000
DC8	0.02940488	0.009242	0.038776	0.012187	0.0086	0.025764	0.004294	0.0000	0.0113	0.0340	0.0057	0.0000
DC9-3	0.11761952	0.036966	0.155105	0.048747	0.0344	0.103057	0.017176	0.0000	0.0453	0.1359	0.0227	0.0000
DC9-4	0.97036101	0.304971	1.279614	0.402164	0.2834	0.850221	0.141704	0.0000	0.3737	1.1212	0.1869	0.0000
TOTAL	3.29988088	1.037105	4.351549	1.36763	0.963775	2.891324	0.481887	0	1.270928	3.8127854	0.635464	0

Aircraft Type	FedEx Cargo Operations											
	Arrival Operations				Departure Operations							
	2006		2014		2006				2014			
					Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
A300	0.0826	0.3615	1.1425	4.9985	0.1281	0.2050	0.0427	0.0683	1.7714	2.8343	0.5905	0.9448
A310	0.0537	1.0736	0.7423	14.8464	0.1708	0.9565	0.0000	0.0000	2.3619	13.2268	0.0000	0.0000
727EM2	0.0000	0.2733	0.0000	3.7791	0.0000	0.1562	0.0000	0.1171	0.0000	2.1595	0.0000	1.6196
DC1010	0.6377	0.3188	8.8179	4.4089	0.0000	0.9565	0.0000	0.0000	0.0000	13.2268	0.0000	0.0000
CNA208	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ATR72	0.1708	0.2733	2.3619	3.7791	0.1708	0.2733	0.0000	0.0000	2.3619	3.7791	0.0000	0.0000
TOTAL	0.9448	2.3005	13.0646	31.8120	0.4697	2.5475	0.0427	0.1854	6.4952	35.2265	0.5905	2.5644

Source: URS, 2006. Error due to rounding.

Summary											
Other	2006	2014	FedEx	2006	2014					2006	2014
Annual	3166	4175	Annual	2369	32760		Non Fedex	Arr		4.337	5.719
Ave Daily	8.674	11.438	Ave Daily	6.490	89.753			Dep		4.337	5.719
Arr	4.337	5.719	Arr	3.245	44.877		FedEx	Arr		3.245	44.877
Dep	4.337	5.719	Dep	3.245	44.877			Dep		3.245	44.877

**TABLE B-4
GENERAL AVIATION OPERATIONS FORECAST
AVERAGE DAILY OPERATIONS**

Aircraft Category	Itinerant Operations							
	Arrival Operations				Departure Operations			
	2006		2014		2006		2014	
	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	23.8108	2.6456	26.7990	2.9777	23.8108	2.6456	26.7990	2.9777
Twin Engine Piston	4.7622	0.5291	5.3598	0.5955	4.7622	0.5291	5.3598	0.5955
Turbo Prop	6.1228	0.6803	6.8912	0.7657	6.1228	0.6803	6.8912	0.7657
Jet								
737300	0.1701	0.0189	0.2159	0.0240	0.1701	0.0189	0.2159	0.0240
A300	0.0283	0.0031	0.0360	0.0040	0.0283	0.0031	0.0360	0.0040
CIT3	0.9071	0.1008	1.1513	0.1279	0.9071	0.1008	1.1513	0.1279
CL601	0.7937	0.0882	1.0074	0.1119	0.7937	0.0882	1.0074	0.1119
CNA500	2.0409	0.2268	0.7915	0.0879	2.0409	0.2268	0.7915	0.0879
CNA750	0.6236	0.0693	2.5905	0.2878	0.6236	0.0693	2.5905	0.2878
EMB145	0.0567	0.0063	0.0720	0.0080	0.0567	0.0063	0.0720	0.0080
FAL20	0.7937	0.0882	1.0074	0.1119	0.7937	0.0882	1.0074	0.1119
GII	0.0567	0.0063	0.0720	0.0080	0.0567	0.0063	0.0720	0.0080
GIIB	0.1134	0.0126	0.1439	0.0160	0.1134	0.0126	0.1439	0.0160
GIV	0.1701	0.0189	0.2159	0.0240	0.1701	0.0189	0.2159	0.0240
GV	0.0567	0.0063	0.0720	0.0080	0.0567	0.0063	0.0720	0.0080
IA1125	0.1984	0.0220	0.2519	0.0280	0.1984	0.0220	0.2519	0.0280
LEAR25	0.9638	0.1071	0.6116	0.0680	0.9638	0.1071	0.6116	0.0680
LEAR35	2.3244	0.2583	1.4752	0.1639	2.3244	0.2583	1.4752	0.1639
MD81	0.0283	0.0031	0.0360	0.0040	0.0283	0.0031	0.0360	0.0040
MU3001	5.1874	0.5764	6.5842	0.7316	5.1874	0.5764	6.5842	0.7316
TOTAL	49.2090	5.4677	55.3845	6.1538	49.2090	5.4677	55.3845	6.1538

Aircraft Category	Local Operations			
	2006		2014	
	Day	Night	Day	Night
Single Engine Piston	19.4932	0.0000	21.4932	0.0000
Twin Engine Piston	3.8986	0.0000	4.2986	0.0000
TOTAL	23.3918	0.0000	25.7918	0.0000

Source: URS, 2006

Error due to rounding.

Summary							
		Itinerant	2006	2014	Local	2006	2014
Arrival		Annual	39914	44923	Annual	8538	9414
Dep		Ave Daily	109.3534	123.0767	Ave Daily	23.39178	25.79178
Pattern		Arr	54.67671	61.53836			
		Dep	54.67671	61.53836			

**TABLE B-5
MILITARY OPERATIONS FORECAST
AVERAGE DAILY OPERATIONS**

Aircraft Type	Itinerant Operations							
	Arrival Operations				Departure Operations			
	2006		2014		2006		2014	
	Day	Night	Day	Night	Day	Night	Day	Night
BE20	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120
AH-1	0.2528	0.0281	0.2528	0.0281	0.2528	0.0281	0.2528	0.0281
CNA650	0.2528	0.0281	0.2528	0.0281	0.2528	0.0281	0.2528	0.0281
H60	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080
AC95	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080
CNA210	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080	0.0722	0.0080
T34	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120
F15	0.1445	0.0161	0.1445	0.0161	0.1445	0.0161	0.1445	0.0161
UH60	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120	0.1083	0.0120
CNA560	0.0361	0.0040	0.0361	0.0040	0.0361	0.0040	0.0361	0.0040
TOTAL	1.2279	0.1364	1.2279	0.1364	1.2279	0.1364	1.2279	0.1364

Aircraft Type	Local Operations			
	2006		2014	
	Day	Night	Day	Night
BE20	0.6103	0.0000	0.6103	0.0000
AH-1	0.0000	0.0000	0.0000	0.0000
CNA650	0.0000	0.0000	0.0000	0.0000
H60	0.0000	0.0000	0.0000	0.0000
AC95	0.6103	0.0000	0.6103	0.0000
CNA210	0.6103	0.0000	0.6103	0.0000
T34	0.6103	0.0000	0.6103	0.0000
F15	0.0000	0.0000	0.0000	0.0000
UH60	0.0000	0.0000	0.0000	0.0000
CNA560	0.0000	0.0000	0.0000	0.0000
TOTAL	2.4411	0.0000	2.4411	0.0000

Source: URS, 2006 Error due to rounding.

Summary						
Itinerant	2006	2014		Local	2006	2014
Annual	996	996		Annual	891	891
Ave Daily	2.728767	2.728767		Ave Daily	2.441096	2.441096
Arr	1.364384	1.364384				
Dep	1.364384	1.364384			2006	2014
				Arr	1.364384	1.364384