

**Draft Working Paper**

***Forecasts of Aviation Activity***

**FAR PART 150 STUDY**

**PIEDMONT TRIAD INTERNATIONAL  
AIRPORT  
GREENSBORO, NORTH CAROLINA**

**Prepared for:**

**ANDREW S. HARRIS, INC.**

**Prepared by:**

**URS**

**NOVEMBER 2004**

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 FORECASTS OF AVIATION ACTIVITY .....	1-1
1.1 Introduction.....	1-1
1.2 Historical/Current PTIA Aviation Activity .....	1-2
1.2.1 Air Carrier and Regional Commuter Passenger Enplanements .....	1-2
1.2.2 Air Carrier and Regional Commuter Activity .....	1-3
1.2.3 Evolving Air Carrier and Regional/Commuter Fleet and Size .....	1-5
1.2.4 Airline Service Developments at PTIA .....	1-5
1.2.5 Current PTIA Scheduled Airline Service .....	1-6
1.2.6 Air Cargo Activity .....	1-6
1.2.7 General Aviation Activity.....	1-9
1.2.8 Military Activity .....	1-10
1.3 Review of Other Aviation Activity Forecasts by Others .....	1-10
1.3.1 1998 Airport Master Plan Update .....	1-12
1.3.2 FAA Terminal Area Forecast.....	1-14
1.3.3 FAA Aerospace Forecasts Fiscal Years 2004 Through 2015 .....	1-15
1.4 Collection and Review of Historical Data .....	1-16
1.5 Aviation Activity Forecast Using Market Share Analysis Techniques .....	1-18
1.5.1 Air Carrier and Commuter Passenger Enplanements .....	1-18
1.5.2 Air Carrier and Commuter Aircraft Operations.....	1-19
1.5.3 General Aviation Operations .....	1-20
1.5.4 Market Share Forecast Summary.....	1-21
1.6 Aviation Activity Forecast Using Growth Scenario .....	1-23
1.6.1 Commercial Service.....	1-23
1.6.1.1 Passenger Enplanements .....	1-23
1.6.1.2 Air Carrier and Commuter Operations.....	1-24
1.6.2 Air Cargo Activity .....	1-27
1.6.3 General Aviation Forecasts.....	1-28
1.6.4 Military Activity Forecasts .....	1-28
1.6.5 Preferred Forecasts.....	1-28
1.7 Comparison of Aviation Activity Forecasts .....	1-28
1.7.1 Passenger Enplanements.....	1-28
1.7.2 Commercial Operations .....	1-32
1.7.3 General Aviation Operations .....	1-35
1.7.4 Military Operations.....	1-35
1.8 Comparison to FAA Terminal Area Forecast.....	1-35

### Appendix A – Noise Modeling Assumptions

## LIST OF TABLES

<b><u>Table</u></b>	<b><u>Page</u></b>
1.2-1 Historical Passenger Enplanements .....	1-3
1.2-2 Historical Operations .....	1-4
1.2-3 Air Carrier and Commuter Airline City-Pairs .....	1-7
1.2-4 2003 Operations and Enplanements by Carrier .....	1-8
1.2-5 Historical Cargo Operations .....	1-8
1.3-1 Comparison of Previous Enplanement Forecasts .....	1-11
1.3-2 Comparison of Previous Operations Forecasts .....	1-12
1.5-1 Enplanement Market Share Forecast Comparison .....	1-19
1.5-2 Commercial Operations Market Share Forecast Comparison .....	1-20
1.5-3 General Aviation Operations Market Share Forecast Comparison .....	1-21
1.6-1 Forecast of Load Factor and Average Aircraft Size (Seats) .....	1-25
1.6-2 FAR Part 150 Derived Operations Forecasts .....	1-26
1.6-3 Forecast of Cargo Operations .....	1-27
1.6-4 Preferred Forecast .....	1-29
1.7-1 Comparison of Enplanement Forecast .....	1-30
1.7-2 Comparison of Commercial Operations Forecasts .....	1-33
1.7-3 Comparison of General Aviation Operations Forecasts .....	1-36
1.7-4 Comparison of Military Operations Forecasts .....	1-37
1.8-1 Summary and Documentation of Airport Planning Forecast .....	1-38
1.8-2 Comparison of Airport Planning and TAF Forecasts .....	1-39

## LIST OF FIGURES

<b><u>Figure</u></b>	<b><u>Page</u></b>
1.2-1 Historical Enplanements .....	1-2
1.2-2 Historical Commercial Operations .....	1-4
1.2-3 Historical General Aviation Operations .....	1-10
1.2-4 Historical Military Operations .....	1-11
1.7-1 Air Carrier Enplanement Forecast Comparison .....	1-31
1.7-2 Commuter Enplanement Forecast Comparison .....	1-31
1.7-3 Total Enplanement Forecast Comparison .....	1-32
1.7-4 Air Carrier and Cargo Operations Forecast Comparison .....	1-34
1.7-5 Commuter Operations Forecast Comparison .....	1-34
1.7-6 General Aviation Operations Forecast .....	1-37

## 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 2004 through 2020. The forecasts were developed as integral and supporting elements of the ongoing Federal Aviation Regulation (FAR) Part 150 Noise Compatibility Study. Similar projections of future aircraft operations were previously developed by others as part of the 1998 Airport Master Plan.

The forecasts of aviation activity developed for this 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 17-year forecast period.

Consistent with FAR Part 150 study design guidelines, this forecast update presents two future horizon forecast years (2006 and 2011). These years were selected to represent the anticipated submittal date (2006) of the noise exposure map (NEM) to the Federal Aviation Administration (FAA), and the fifth calendar year following the date of submission (2011).

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, an update of the forecast of aircraft operations, aircraft operating fleet mix, and day/night operational split is required. Accordingly, these updated 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. Forecasts of passenger enplanements, cargo airline operations, revenue tonnage, and itinerant military 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, the FAA's Division of Airport 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

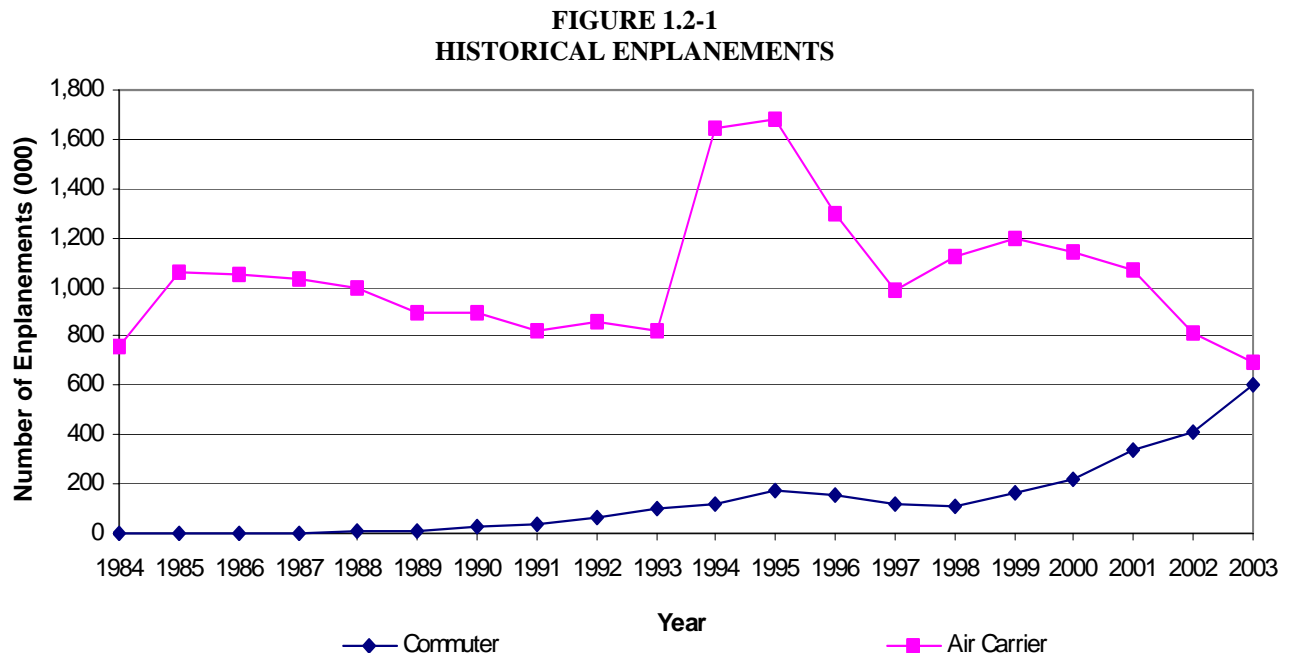
individual airport. Since deregulation of the airline industry in the late 1970s, airlines are free to enter and exit service markets based solely on economic decisions. For this and other reasons that are typically beyond the immediate control of the airline and airports, this forecast of aviation activity 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 experienced the withdrawal of service by one airline and the initiation of service by another. The direct influence of paradigm 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 20-year period 1984 through 2003, 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, after which passenger enplanements decreased 13 percent from just over 1,400,000 in 2001 to approximately 1,200,000 in 2002.

The 20-year historical levels of commercial passenger enplanements at PTIA are shown on **Figure 1.2-1** and listed in **Table 1.2-1**.



**TABLE 1.2-1  
HISTORICAL PASSENGER ENPLANEMENTS**

<b>Year</b>	<b>Air Carrier</b>	<b>Commuter</b>	<b>Total</b>
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	695,694	601,275	1,296,969

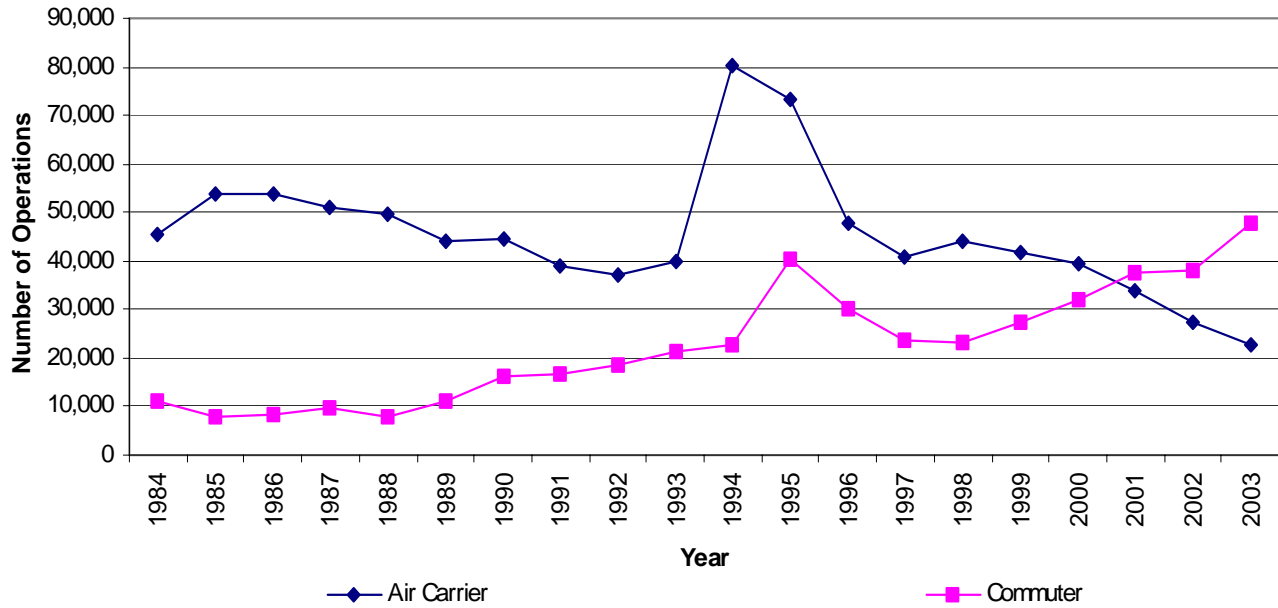
Sources: FAA 2003 Scenario TAF from 1976 to 2002, March 2004; 2003 GSO Landing Fee Reports.

## **1.2.2 AIR CARRIER AND REGIONAL COMMUTER ACTIVITY**

During the 1984 to 2003 time period, the number of total annual PTIA air carrier and commuter operations ranged from just over 56,600 in 1984 to over 113,500 in 1995. The overall number of aircraft operations fluctuated over this 20-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 2004 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 2004 and through the 2020 forecast period.

The 20-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 COMMERCIAL OPERATIONS**



**TABLE 1.2-2  
HISTORICAL OPERATIONS**

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	44,642	16,274	65,257	991	127,164	24,607	701	25,308	152,472
1991	39,114	16,568	57,468	1,033	114,183	18,893	747	19,640	133,823
1992	37,240	18,739	53,300	1,399	110,678	16,239	1,423	17,662	128,340
1993	39,946	21,132	54,164	1,210	116,452	11,770	1,023	12,793	129,245
1994	80,128	22,788	52,311	1,142	156,369	8,113	804	8,917	165,286
1995	73,220	40,287	53,386	960	167,853	4,635	405	5,040	172,893
1996	47,820	30,231	48,082	655	126,788	4,001	438	4,439	131,227
1997	40,595	23,818	52,319	566	117,298	4,416	398	4,814	122,112
1998	44,280	23,208	50,276	747	118,511	9,106	411	9,517	128,028
1999	41,611	27,289	50,625	458	119,983	13,074	341	13,415	133,398
2000	39,375	31,840	48,097	458	119,770	18,345	526	18,871	138,641
2001	34,067	37,397	45,987	593	118,044	14,839	667	15,506	133,550
2002	27,512	37,992	46,050	737	112,291	9,643	408	10,051	122,342
2003	22,920	47,633	40,699	551	111,803	7,462	282	7,744	119,547

Sources: FAA 2003 Scenario TAF from 1976 to 2002, March 2004; FAA ATADS from 1990 to 2002, May 2004; 2003 FAA 7230.

### **1.2.3 EVOLVING AIR CARRIER AND REGIONAL/COMMUTER FLEET AND SIZE**

In direct response to the events of September 11, 2001, 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 recovered 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 carrier 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 is 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. Lastly, 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 is 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 complimenting 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 70 seats) and a corresponding increase in the number of regional/commuter aircraft operations at PTIA, particularly those aircraft that are operated by regional/commuter carriers (smaller piston, turboprop, and jet aircraft having between 32 and 70 seats).

Similarly, historical PTIA enplanement levels reveal a noticeable change in the relative share of passengers utilizing smaller commuter-sized aircraft. For example, through the 1990s, approximately 90 percent of all enplanements occurred on air carrier aircraft having 70 seats or more. Since 1995, however, the air carrier share has steadily decreased representing only 76 percent of the total by the summer of 2001. Following September 11th 2001, the change was more pronounced with commuter aircraft carrying approximately 54 percent of the traffic. This trend is similar to that currently experienced by other comparably sized Small Hub O&D airports offering similar levels of service.

### **1.2.5 CURRENT PTIA SCHEDULED AIRLINE SERVICE**

Inspection of PTIA operational records for the year 2003 (hereafter referred to as the “Base Year”) indicates that scheduled air service was offered by 21 airlines providing scheduled service to 18 non-stop destinations. 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 distances from PTIA are shown in **Table 1.2-3**. Based on PTIA Landing Fee Reports for the 2003 12-month calendar year, the three predominant airlines at PTIA were as follows: Comair (15 percent), Delta (12 percent), and Chautauqua (9 percent). The ranking of each airline by total enplanements were as follows: Delta (25 percent), US Airways (13 percent), and Comair (11 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 82 percent of the air cargo operations occur on air carrier type aircraft, with the remaining 18 percent occurring on commuter type or smaller single-engine transport type aircraft. Based on PTIA Landing Fee Reports for the 2003 12-month calendar year, the rankings of the cargo carriers, as a percentage of cargo operations, were as follows: FedEx (38 percent), UPS (18 percent), Mountain Air Cargo (18 percent), Airborne (17 percent), and Tradewinds (9 percent).

Over the past 9-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 9-year historical levels of enplaned air cargo operations at PTIA, from 1995 to 2003, are listed in **Table 1.2-5**.

**TABLE 1.2-3  
AIR CARRIER AND COMMUTER AIRLINE CITY-PAIRS**

<b>Airline</b>	<b>City Code</b>	<b>Airport Name</b>	<b>Distance</b>	<b>INM Stage Length</b>
Allegheny (US Air)	DCA	Washington-Reagan National Airport	215	1
	PHL	Philadelphia International Airport	317	1
AirTran	ATL	Atlanta Hartsfield International Airport	266	1
American Eagle	DFW	Dallas-Fort Worth International Airport	868	2
Atlantic Coast (DL)	CVG	Cincinnati/Northern Kentucky International Airport	286	1
Atlantic Coast (UAL)	ORD	Chicago-O'Hare International Airport	512	2
	IAD	Washington Dulles International Airport	208	1
Atlantic Southeast (DL)	ATL	Atlanta Hartsfield International Airport	266	1
Chautauqua (USAir)	LGA	New York-LaGuardia Airport	400	1
	PIT	Pittsburgh International Airport	264	1
	BOS	Boston-Logan International Airport	560	2
	PHL	Philadelphia International Airport	317	1
	CLT	Charlotte/Douglas International Airport	72	1
Comair (DL)	MCO	Orlando International Airport	464	1
	CVG	Cincinnati/Northern Kentucky International Airport	286	1
	LGA	New York-LaGuardia Airport	400	1
Continental	DTW	Detroit Metropolitan Wayne County Airport	400	1
	EWR	Newark International Airport	387	1
Continental Express	IAH	Houston Intercontinental Airport	857	2
	EWR	Newark International Airport	387	1
Delta (includes Chautauqua)	ATL	Atlanta Hartsfield International Airport	266	1
	CVG	Cincinnati/Northern Kentucky International Airport	286	1
	MCO	Orlando International Airport	464	1
Midway <sup>1</sup>	DCA	Washington-Reagan National Airport	215	1
Mesa (USAir)	CLT	Charlotte/Douglas International Airport	72	1
	PHL	Philadelphia International Airport	317	1
Northwest	DTW	Detroit Metropolitan Wayne County Airport	400	1
	MEM	Memphis International Airport	495	1
	MSP	Minneapolis-St. Paul International Airport	802	2
Piedmont	DCA	Washington-Reagan National Airport	215	1
	CLT	Charlotte/Douglas International Airport	72	1
PSA (USAir)	CLT	Charlotte/Douglas International Airport	72	1
	DCA	Washington-Reagan National Airport	215	1
	PHL	Philadelphia International Airport	317	1
Shuttle America	PIT	Pittsburgh International Airport	264	1
Skywest (DL)	DFW	Dallas-Fort Worth International Airport	868	2
Trans State	BWI	Baltimore/Washington International Airport	241	1
	PIT	Pittsburgh International Airport	264	1
United	ORD	Chicago-O'Hare International Airport	512	2
	IAD	Washington Dulles International Airport	208	1
US Airways	CLT	Charlotte/Douglas International Airport	72	1
	PHL	Philadelphia International Airport	317	1

Source: PTIA, Airport Records, July 2004.

<sup>1</sup> Not operating after 2003.

**TABLE 1.2-4  
2003 OPERATIONS AND ENPLANEMENTS BY CARRIER**

Airline	Landing Operations			Enplanements		
	Actual	Percent of Total	Rank	Actual	Percent of Total	Rank
AirTran	1,669	5.69%	9	79,381	6.16%	6
Allegheny	110	0.37%	20	1,895	0.15%	19
American Eagle	1,038	3.54%	12	41,771	3.24%	11
ACA-United	2,082	7.10%	6	53,022	4.12%	8
ACA-Delta	315	1.07%	16	6,879	0.53%	17
Atlantic Southeast	122	0.42%	19	1,528	0.12%	20
Chautauqua	2,653	9.04%	3	97,043	7.54%	4
Comair (DL)	4,382	14.93%	1	139,404	10.82%	3
Continental Express	1,798	6.13%	8	65,624	5.10%	7
Continental	270	0.92%	17	17,254	1.34%	15
Delta <sup>1</sup>	3,491	11.90%	2	326,862	25.38%	1
Mesa	1,220	4.16%	11	38,556	2.99%	12
Midway <sup>2</sup>	25	0.09%	21	386	0.03%	21
Northwest	2,186	7.45%	5	92,992	7.22%	5
Piedmont	2,001	6.82%	7	46,802	3.63%	10
PSA	481	1.64%	15	8,317	0.65%	16
Shuttle America	239	0.81%	18	5,286	0.41%	18
Skywest	793	2.70%	13	22,099	1.72%	13
Trans States	1,389	4.73%	10	19,166	1.49%	14
United	775	2.64%	14	52,547	4.08%	9
US Airways	2,303	7.85%	4	171,001	13.28%	2
<b>Total</b>	<b>29,342</b>	<b>100%</b>		<b>1,287,815</b>	<b>100%</b>	

Source: Piedmont Triad Landing Fee Reports, August 2004.

<sup>1</sup> Includes Chautauqua.

<sup>2</sup> Not operating after 2003.

**TABLE 1.2-5  
HISTORICAL CARGO OPERATIONS**

Year	Operations		Total
	FedEx	Other All Cargo	
1995	0	7,100	7,100
1996	1,766	4,930	6,696
1997	494	2,588	3,082
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

Source: PTIA Airport Activity Records, July 2004.

## 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 1.2-1**, over the past 20-year period, the number of total annual PTIA general aviation operations (local and itinerant) fluctuated from a low of approximately 48,200 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 continued to decrease from 2002 levels. Itinerant and local general aviation operations have declined from 2002 to 2003 by 12 and 22 percent, respectively. Two primary factors are attributed to this recent trend: the current recovery of the national and local economy and residual the effect of the September 11th terrorists 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 Cessna Aircraft, 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.

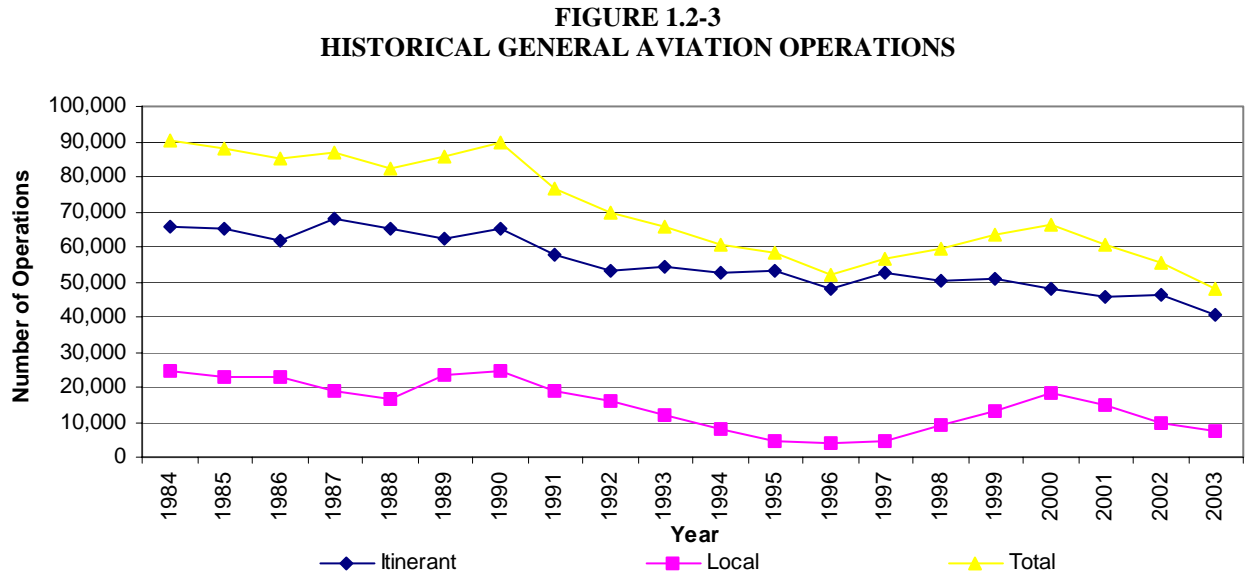
Historically, the rise and fall of the annual reported number of recreation flight hours tracks directly with the health of the economy. Therefore, it is not unreasonable to assume that general aviation activity levels at PTIA would reflect the most recent economic downturn. There are no indications that this trend will reverse in the near term in that the economy has yet to fully recover or approach levels equal that of the late 1990s. 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.

A review of General Aviation Manufacturers Association (GAMA) year end production/shipment reports indicate that for the year 2003, single-engine aircraft shipments increased by 11.2 percent, while all other aircraft types (multi-engine piston, turboprops, and business jets) decreased by -45.4 percent, -2.9 percent, and 23.4 percent, respectively, for the year. Based on these latest GAMA shipment reports, it can be generally assumed that, beyond the possible recovery of the single-engine piston aircraft product, business-related purchase and use of these aircraft will generally track parallel to the corresponding level of economic activity.

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 2004-2020 forecast period.

The 20-year historical levels of general aviation operations at PTIA are listed in **Table 1.2-1** and shown on **Figure 1.2-3**.



### 1.2.8 MILITARY ACTIVITY

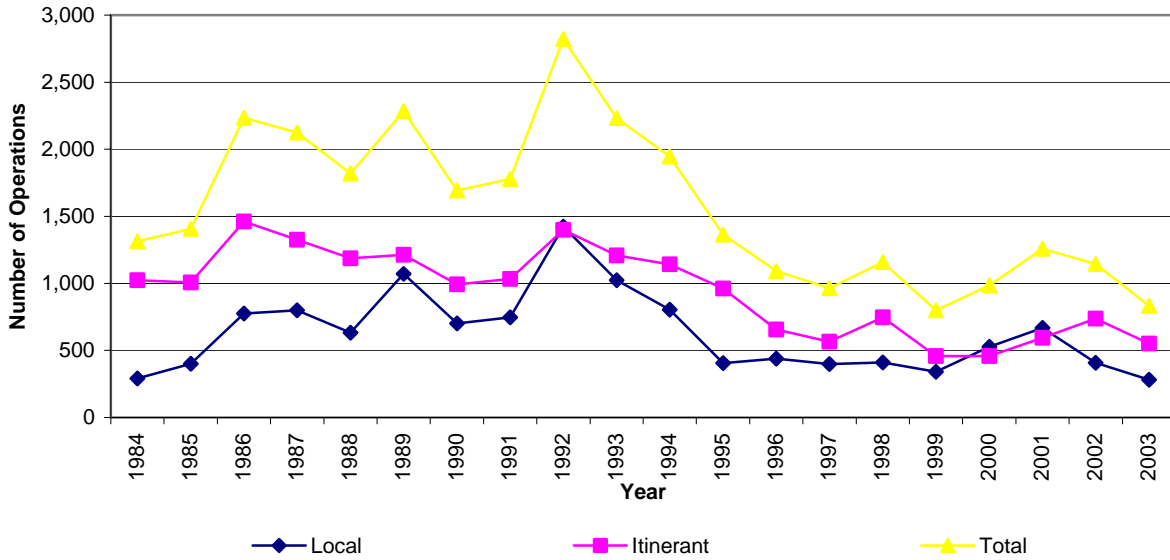
Over the past 20-year period, the number of total annual PTIA military operations (local and itinerant) fluctuated from a low of approximately 800 operations in 1999 to over 2,800 operations in 1992. Under contract to the military, itinerant military aircraft transiting to and from the designated Military 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 20-year historical levels of military operations at PTIA are listed in **Table 1.2-1** and shown on **Figure 1.2-4**.

### 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 Activity Forecast and the FAA’s most recent draft version (July 2004) of the PTIA Terminal Area Forecast (TAF). Information and data derived from the review and comparison of the other aviation activity forecasts that were 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**.

**FIGURE 1.2-4  
HISTORICAL MILITARY OPERATIONS**



**TABLE 1.3-1  
COMPARISON OF PREVIOUS ENPLANEMENT FORECASTS**

Year	Air Carrier		Commuter		Total	
	1998 MPU	FAA TAF	1998 MPU	FAA TAF	1998 MPU	FAA TAF
2000	1,174,994	1,142,180	211,625	220,092	1,386,619	1,362,272
2004	1,250,000	614,992	239,000	768,922	1,489,000	1,383,914
2009	1,410,000	614,992	318,000	993,327	1,728,000	1,608,319
2014	1,563,000	614,992	392,000	1,217,733	1,955,000	1,832,725
2019	1,769,000	614,992	442,000	1,442,138	2,211,000	2,057,130
<b>Average Annual Compound Growth Rate</b>						
2000-2004	1.56%	-14.34%	3.09%	36.72%	1.80%	0.39%
2004-2009	2.44%	0.00%	5.88%	5.25%	3.02%	3.05%
2009-2014	2.08%	0.00%	4.27%	4.16%	2.50%	2.65%
2014-2019	2.51%	0.00%	2.43%	3.44%	2.49%	2.34%
2000-2019	2.18%	-3.21%	3.95%	10.40%	2.49%	2.19%

Sources: FAA TAF Draft 2004 Scenario, July 2004; PTIA 1998 Master Plan Update.

**TABLE 1.3-2  
COMPARISON OF PREVIOUS OPERATIONS FORECASTS**

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	29659	39,569	48,877	458	469	15,388	18,510	526	562
2004	41,834	22,824	24,922	49245	48,875	42,021	600	614	8,625	7,342	500	333
2009	45,808	22,824	29,486	58550	50,575	42,021	600	614	8,925	7,868	500	333
2014	48,616	25,348	32,558	67856	52,275	42,021	600	614	9,225	8,395	500	333
2019	53,884	27,873	34,450	77161	53,975	42,021	600	614	9,525	8,921	500	333
Average Annual Compound Growth Rate												
2000-2004	0.76%	-12.79%	1.44%	13.51%	5.42%	-3.71%	6.98%	6.97%	-13.47%	-20.64%	-1.26%	-12.26%
2004-2009	1.83%	0.00%	3.42%	3.52%	0.69%	0.00%	0.00%	0.00%	0.69%	1.39%	0.00%	0.00%
2009-2014	1.20%	2.12%	2.00%	2.99%	0.66%	0.00%	0.00%	0.00%	0.66%	1.31%	0.00%	0.00%
2014-2019	2.08%	1.92%	1.14%	2.60%	0.64%	0.00%	0.00%	0.00%	0.64%	1.22%	0.00%	0.00%
2000-2019	1.50%	-1.81%	2.02%	5.16%	1.65%	-0.79%	1.43%	1.43%	-2.49%	-3.77%	-0.27%	-2.72%

Sources: FAA TAF Draft 2004 Scenario, July 2004; PTIA 1998 Master Plan Update.

### 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 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.

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 FAR Part 150 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 assumption 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 main line 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 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 2004 Scenario TAF specifically developed for PTIA was reviewed. As projected in the TAF, the PTIA air carrier passenger enplanements are anticipated to decrease from 680,595 in 2003 to 614,992 in 2004. Interestingly, the TAF maintains this level of air carrier passenger enplanements through the year 2020. However, the TAF predicts commuter enplanements at PTIA to increase from 588,325 enplanements in 2003 to 1,487,020 enplanements in 2020, at an AACGR of 5.6 percent.

With regard to air carrier and commuter aircraft operations, the TAF gives indication that air carrier operations at PTIA will increase from 23,714 operations in 2003 to 28,378 in 2020 at an AACGR of approximately 1.1 percent. Additionally, the TAF forecast of commuter operations at PTIA estimates an AACGR of 3.4 percent, from 44,503 operations in 2003 to 79,023 in 2020. Both of these categories include any expected increase or decrease in cargo operations.

In the TAF, itinerant general aviation operations at PTIA are predicted to grow from 40,811 in 2003 to 42,021 in 2004 and to remain static at 42,021 operations throughout the forecast period. The TAF predicts local general aviation operations at PTIA to increase approximately 0.7 percent annually over the forecast period, from 7,932 operations in 2003 to 9,027 operations in 2020.

The TAF predicts military operations at PTIA to remain flat throughout the forecast period, with 614 itinerant and 333 local military operations through 2020.

### **1.3.3 FAA AEROSPACE FORECASTS FISCAL YEARS 2004 THROUGH 2015**

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 2004 through 2015 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.

This forecast anticipates large air carriers and regional/commuters will grow at an annual rate of 2.8 percent over the forecast period and that passenger demand will return to pre-September 11th levels by 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 latest release (2004) of the *FAA Aerospace Forecasts* projects that domestic air carrier enplanements will increase 4.2 percent from 2003 to 2004, with a 5.3 percent increase during the 2004 to 2005 time period. Over the next 12 years (2003 to 2015), air carrier enplanements are anticipated to increase at an AACGR of 3.6 percent.

Domestic air carrier operations are projected to increase 2.2 percent over the 2003 to 2004 timeframe and 4.4 percent from 2004 to 2005. Throughout the entire forecast period (2003 through 2015) air carrier operations are projected to increase at an AACGR of 2.8 percent. Over the same period, air carrier aircraft load factors are predicted to increase at 0.2 percent annually while the average aircraft size (number of seats) is expected to increase approximately 0.3 percent annually.

## **Commuter Activity**

Domestic commuter enplanements are anticipated to increase 18.7 percent from 2003 to 2004 and 11.8 percent from 2004 to 2005, with an AACGR of 6.4 percent throughout the 2003 to 2015 forecasting period. Commuter operations are expected to increase at an average of 2.8 percent from 2003 to 2015, with an increase of 5.8 percent from 2003 to 2004, and 4.7 percent from 2004 to 2005. Commuter aircraft load factors are projected to increase approximately 0.4 percent and average aircraft size is projected to increase approximately 0.9 percent annually from 2003 to 2015.

## **General Aviation/Military**

Itinerant and local general aviation operations are predicted to grow at an AACGR of 1.2 percent from 2003 to 2015, while local and itinerant military operations are held constant throughout the *FAA Aerospace Forecast* period of 2003 to 2015.

## **1.4 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.

## **1.5 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.

### **1.5.1 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 **Table 1.5-1**.

**TABLE 1.5-1  
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
<b>Average Annual Compound Growth Rate</b>						
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.

**1.5.2 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 1.5-2**.

**TABLE 1.5-2  
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.

### **1.5.3 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 1.5-3**.

**TABLE 1.5-3  
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
<b>Average Annual Compound Growth Rate</b>						
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.

**1.5.4 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.

## **1.6 AVIATION ACTIVITY FORECAST USING GROWTH SCENARIO**

### **1.6.1 COMMERCIAL SERVICE**

#### **1.6.1.1 Passenger Enplanements**

The forecast of passenger enplanements was developed using annualized growth rates published in the FAA Draft 2004 Scenario TAF for PTIA, normalized to historical enplanements levels for 2003. Inspections of the FAA Draft 2004 Scenario TAF for PTIA indicate that projected future air carrier enplanements will remain static at 614,992 through the year 2020. These forecast assumptions do not reflect observed historical past or anticipated future air carrier enplanement activity levels for PTIA. It is interesting to note, however, that the same Draft TAF projects year-over-year increases of air carrier operations. The static passenger enplanement count and increasing aircraft operations would represent decreasing air carrier load factors throughout the remainder of the forecast period. Based on these considerations, the air carrier enplanement forecasts were considered unrealistic, particularly when such projections are typically used for the development projections of future air carrier operations using average aircraft seats and load factors.

The FAA's forecast, however, reflects positive rates of annualized growth for both passenger enplanements and commuter aircraft operations. Therefore, the FAA's forecast of commuter and overall total passenger enplanements (combined air carrier and commuter) was considered to reflect a reasonable growth scenario. For the purposes of developing a forecast of future air carrier and commuter passenger enplanement levels at PTIA, the annualized growth rates of only the commuter and total passenger enplanements as published in the FAA Draft TAF for PTIA were used to derive a realistic ratio air carrier and commuter enplanements throughout the forecast period. To derive the split, the following adjustments to the PTIA TAF were made.

#### **Commuter Enplanements**

To derive a base line of future commuter passenger enplanements, the TAF's year-over-year projections of commuter enplanements were adjusted upward to reflect changes scheduled air service caused by the loss of AirTran service in July of 2003 and the addition of Independence Air service in August 2003. By taking into consideration the change in aircraft fleet (available seats) and the number of daily operations scheduled by the two respective airlines, it was determined that there would be a net increase of approximately 42,000 annual commuter enplanements. Future commuter enplanement levels were derived using Draft TAF annualized growth for commuter enplanements throughout the remainder of the forecast period. These commuter enplanement projections were used to develop forecasts of commuter operational levels.

#### **Air Carrier Enplanements**

In an effort to present more realistic estimates of future air carrier enplanements at PTIA, air carrier enplanement levels were derived by calculating the net difference between the TAF projections of commuter enplanements and total enplanements over the 20-year forecast period.

Taking this approach, the annualized growth of air carrier enplanement decreases at an annualized rate of 0.6 percent throughout the 20-year forecast period. While the extent and duration of the pattern of declining air carrier enplanements and rise of regional jet use at PTIA is unknown, this approach in deriving the relative split between air carrier and commuter enplanements at PTIA was considered reasonable for the purposes of this forecast update. That said, however, this overly simplistic approach may not remain valid for estimating future enplanement patterns, particularly over an extended period of time.

### **1.6.1.2 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 were filled on each flight) and aircraft size (e.g., the number of seats available per aircraft).

#### **Determination of Average Seats Available**

To derive the average number of seats available to PTIA air travelers, the historical 2003 documented number seats available for each flight for aircraft model for each departure were utilized. Using a weighted average technique, a “composite” or representative average number of seats available was determined.

#### **Determination of Average Aircraft Load Factors**

PTIA landing fee records for the calendar year 2003 were used to derive the number of annual air carrier and commuter aircraft arrivals and passenger enplanements counts. These records, however, did not provide adequate information that could be used to determine the relative split between the number of air carrier to commuter enplanements.

#### **Using Department of Transportation National Enplanement Data**

This information was derived using the Draft FAA TAF for PTIA that provides 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.

#### **Historical “Best Fit” Methodology**

In the absence of specific historical passenger load factors by airline, estimates of average load factor by category of either air carrier or commuter were developed using the following algebraic formula:

$$A = B / (x * y)$$

Where  $A$  = Air Carrier or Commuter Aircraft Arrivals  
 $B$  = Enplanements  
 $x$  = Average Aircraft Size  
 $y$  = Load Factor

## 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 aircraft operations.

The calculated average aircraft size and derived load factors were then projected to increase at rates provided by the *FAA Aerospace Forecast* predicted national levels through the forecast period, as shown in **Table 1.6-1**.

**TABLE 1.6-1  
FORECAST OF LOAD FACTOR AND AVERAGE AIRCRAFT SIZE (SEATS)**

Year	Load Factor		Average Aircraft Size	
	Air Carrier	Commuter	Air Carrier	Commuter
2003	63.58%	58.21%	131.24	48.59
2004	63.84%	58.21%	131.24	51.31
2006	64.00%	58.08%	132.12	53.56
2011	64.78%	59.24%	134.32	56.18
2015	65.42%	60.18%	136.10	58.37
2020	66.22%	61.38%	138.37	61.23
Average Annual Compound Growth Rate				
2004-2006	0.22%	-0.07%	0.22%	3.30%
2007-2011	0.24%	0.40%	0.33%	0.96%
2012-2020	0.24%	0.40%	0.33%	0.96%
2004-2020	0.24%	0.31%	0.31%	1.37%

Sources: *FAA Aerospace Forecasts*, FY 2004-2015, March 2004; URS, 2004.

These forecasts of average load factor and average aircraft size were then applied to the forecast of enplanements to develop a forecast of air carrier and commuter operations.

For comparative purposes, this method was also applied to the passenger enplanements forecasts as projected in the Draft 2004 PTIA TAF and the application of the *FAA Aerospace Forecast* growth rates historical 2003 enplanement levels. The result of these derived forecasts of air carrier and commuter operations are presented in **Table 1.6-2**. These derived operations forecasts were also compared to the FAA TAF projection of operations and the *FAA Aerospace Forecast* growth rates applied to historical 2003 operations in **Table 1.6-2**.

## Selection of Preferred Forecast

Based on the development and comparison of the three passenger enplanements forecasts and the operations forecasts derived from these projections, a preferred forecast of air carrier and commuter operations was chosen. The air carrier and commuter operations forecast developed from the subjective use of the FAA Draft 2004 PTIA TAF growth rates for 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 1.6-2  
FAR PART 150 DERIVED OPERATIONS FORECASTS**

Year	Air Carrier			Commuter		
	FAA TAF	FAA Aerospace	FAR Part 150	FAA TAF	FAA Aerospace	FAR Part 150
<b>Enplanements</b>						
2003	680,595	695,694	695,694	588,325	601,275	601,275
2004	614,992	724,838	701,071	768,922	713,406	652,687
2006	614,992	789,097	709,620	858,684	835,313	750,569
2011	614,992	932,284	714,480	1,083,089	1,049,233	973,450
2015	614,992	1,065,327	695,084	1,262,614	1,259,188	1,200,928
2020	614,992	1,258,638	628,723	1,487,020	1,581,661	1,564,561
<b>Load Factor</b>						
2003	63.58%	63.58%	63.58%	58.21%	58.21%	58.21%
2004	63.58%	63.84%	63.84%	58.21%	58.21%	58.21%
2006	63.58%	64.00%	64.00%	58.21%	58.08%	58.08%
2011	63.58%	64.78%	64.78%	58.21%	59.24%	59.24%
2015	63.58%	65.42%	65.42%	58.21%	60.18%	60.18%
2020	63.58%	66.22%	66.22%	58.21%	61.38%	61.38%
<b>Average Aircraft Size (Number of Seats)</b>						
2003	131.24	131.24	131.24	48.59	48.59	48.59
2004	131.24	131.24	131.24	48.59	51.31	51.31
2006	131.24	132.12	132.12	48.59	53.56	53.56
2011	131.24	134.32	134.32	48.59	56.18	56.18
2015	131.24	136.10	136.10	48.59	58.37	58.37
2020	131.24	138.37	138.37	48.59	61.23	61.23
<b>Average Seats Filled (Load Factor x Average Aircraft Size)</b>						
2003	83.44	83.44	83.44	28.28	28.28	28.28
2004	83.44	83.79	83.79	28.28	29.87	29.87
2006	83.44	84.55	84.55	28.28	31.11	31.11
2011	83.44	87.01	87.01	28.28	33.28	33.28
2015	83.44	89.03	89.03	28.28	35.13	35.13
2020	83.44	91.62	91.62	28.28	37.59	37.59
<b>Derived Departures (Enplanements/Average Seats Filled)</b>						
2003	8,156	8,337	8,337	20,800	21,258	21,258
2004	7,370	8,651	8,367	27,186	23,887	21,854
2006	7,370	9,333	8,393	30,359	26,854	24,129
2011	7,370	10,714	8,211	38,293	31,526	29,249
2015	7,370	11,966	7,807	44,640	35,843	34,184
2020	7,370	13,737	6,862	52,574	42,079	41,624
<b>Total Derived Operations (Derived Departures x 2)</b>						
2003	16,313	16,675	16,675	41,601	42,517	42,517
2004	14,741	17,302	16,735	54,371	47,774	43,708
2006	14,741	18,665	16,785	60,718	53,708	48,259
2011	14,741	21,429	16,422	76,586	63,052	58,498
2015	14,741	23,931	15,614	89,280	71,686	68,369
2020	14,741	27,474	13,724	105,148	84,158	83,248

Sources: FAA TAF Draft 2004 Scenario, July 2004; FAA Aerospace Forecasts, FY 2004-2015, March 2004; PTIA, 1998 Master Plan Update; PTIA, FAR Part 150, URS 2004.

## 1.6.2 AIR CARGO ACTIVITY

### **Planned FedEx Mid-Atlantic Sort Hub Facility Operations**

The anticipated 2009 operational levels, fleet mix, and operating schedules for the Mid- Atlantic Sort Hub were developed by FedEx in the Fall of 2004 and incorporated into this aviation activity forecast. Based on those plans, FedEx anticipates that the Mid-Atlantic Sort 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 Sort Hub operation (2009 through 2011); the overall number of FedEx aircraft operations will remain unchanged.

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

This forecast of cargo operations is presented in **Table 1.6-3**.

**TABLE 1.6-3  
FORECAST OF CARGO OPERATIONS**

Year	FedEx		Other	Total
	Existing	Hub	All Cargo	
2003	2,088		3,476	5,564
2004	2,186		3,640	5,826
2005	2,282		3,799	6,081
2006	2,369		3,944	6,313
2007	2,460		4,095	6,554
2008	2,554		4,251	6,805
2009		12,350	4,414	16,764
2010		12,350	4,582	16,932
2011		12,350	4,757	17,107
2012		12,350	4,939	17,289
2013		12,350	5,128	17,478
2014		32,760	5,324	38,084
2015		32,760	5,527	38,287
2016		32,760	5,738	38,498
2017		32,760	5,957	38,717
2018		32,760	6,185	38,945
2019		32,760	6,421	39,181
2020		32,760	6,666	39,426

Sources: *FAA Aerospace Forecast*, FY 2004-2015, Table I-6, page I-29, March 2004; PTIA Airport Records, July 2004; PTIA 1998 Master Plan Update, FedEx Planning, November 2004.

### **1.6.3 GENERAL AVIATION FORECASTS**

The general aviation activity forecasts determined to be most representative of the operating conditions at PTIA were those developed by applying the *FAA Aerospace Forecast* growth rates to the actual operations levels for 2003. These forecasts result in an AACGR of 1.23 percent for itinerant and 1.27 percent for local general aviation operations.

### **1.6.4 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 remain flat throughout the forecast period at the 1999 to 2003 5-year average of 559 itinerant and 445 local military operations.

### **1.6.5 PREFERRED FORECASTS**

The preferred forecasts as discussed and developed in conjunction with this FAR Part 150 Study for PTIA are presented in **Table 1.6-4**.

## **1.7 COMPARISON OF AVIATION ACTIVITY FORECASTS**

A review of previously developed forecasts and a comparison to the preferred forecasts are presented for reference in the following sections. The previously developed forecasts include the 1998 PTIA Master Plan Update, the FAA Draft 2004 Scenario PTIA TAF and the *FAA Aerospace Forecast* growth rates, as applied to historical 2003 PTIA activity levels. It should be noted the 1998 Master Plan Update provided forecasts for the years 2004, 2009, 2014, and 2019. Key years in the FAR Part 150 Study are 2006 as the initial study year and 2011 as the 5-year forecast. To compare to the forecasted years equally, the Master Plan Update forecasts for years 2006 and 2011 were interpolated between the available Master Plan Update data points.

### **1.7.1 PASSENGER ENPLANEMENTS**

The air carrier passenger enplanements forecasts varied between a low of 614,992 from the FAA PTIA TAF to a high of 1,311,697 in the 1998 Master Plan Update for year 2006 and 614,992 provided by the FAA TAF to 1,469,315 from the 1998 Master Plan Update in forecast year 2011.

Commuter passenger enplanements in 2006 ranged from 267,923 in the 1998 Master Plan Update to 858,684 in the FAA TAF. In year 2011, the high forecast was 1,083,089 passenger enplanements in the FAA TAF and 345,757 in the 1998 Master Plan Update was the low forecast.

These forecasts are presented in **Table 1.7-1** and on **Figures 1.7-1, 1.7-2, and 1.7-3**.

**TABLE 1.6-4  
PREFERRED FORECAST**

Year	Enplanements			Operations									
				Itinerant						Local			
	Air Carrier	Commuter	Total	Air Carrier	Commuter	Cargo	GA	Military	Total	GA	Military	Total	
2003	695,694	601,275	1,296,969	16,675	42,517	5,564	40,699	551	106,005	7,462	282	7,744	113,749
2004	701,071	652,687	1,353,759	16,735	43,708	5,826	40,998	559	107,826	7,462	445	7,907	115,732
2006	709,620	750,569	1,460,189	16,785	48,259	6,313	41,834	559	113,751	7,646	445	8,091	121,842
2011	714,480	973,450	1,687,930	16,422	58,498	17,107	44,621	559	137,338	8,174	445	8,619	145,957
2015	695,084	1,200,928	1,896,012	15,614	68,369	38,287	46,983	559	169,813	8,623	445	9,068	178,880
2020	628,723	1,564,561	2,193,284	13,724	83,248	39,426	50,114	559	187,071	9,218	445	9,663	196,734
Average Annual Compound Growth Rate													
2004-2006	0.66%	7.67%	4.03%	0.22%	4.31%	4.30%	0.92%	0.51%	2.38%	0.82%	16.41%	1.47%	2.32%
2007-2011	0.14%	5.34%	2.94%	-0.44%	3.92%	22.06%	1.30%	0.00%	3.84%	1.34%	0.00%	1.27%	3.68%
2012-2020	-1.41%	5.41%	2.95%	-1.97%	4.00%	9.72%	1.30%	0.00%	3.49%	1.34%	0.00%	1.28%	3.37%
2004-2020	-0.59%	5.79%	3.14%	-1.14%	4.03%	12.21%	1.23%	0.09%	3.40%	1.25%	2.72%	1.31%	3.28%

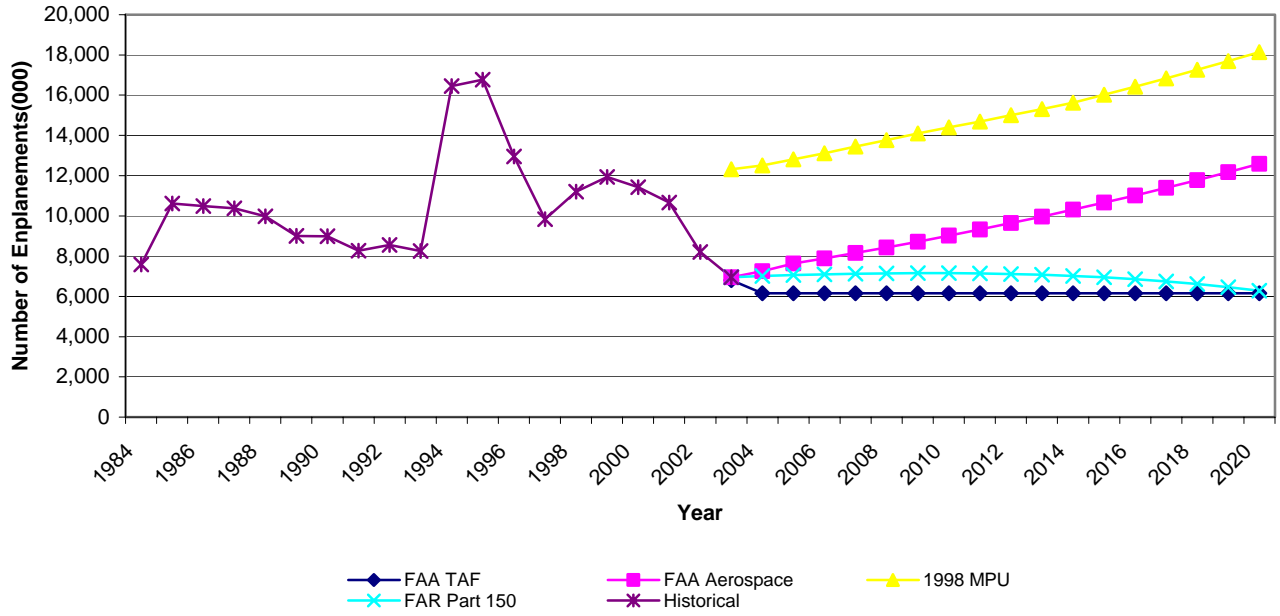
Source: URS, 2004.

**TABLE 1.7-1  
COMPARISON OF ENPLANEMENT FORECASTS**

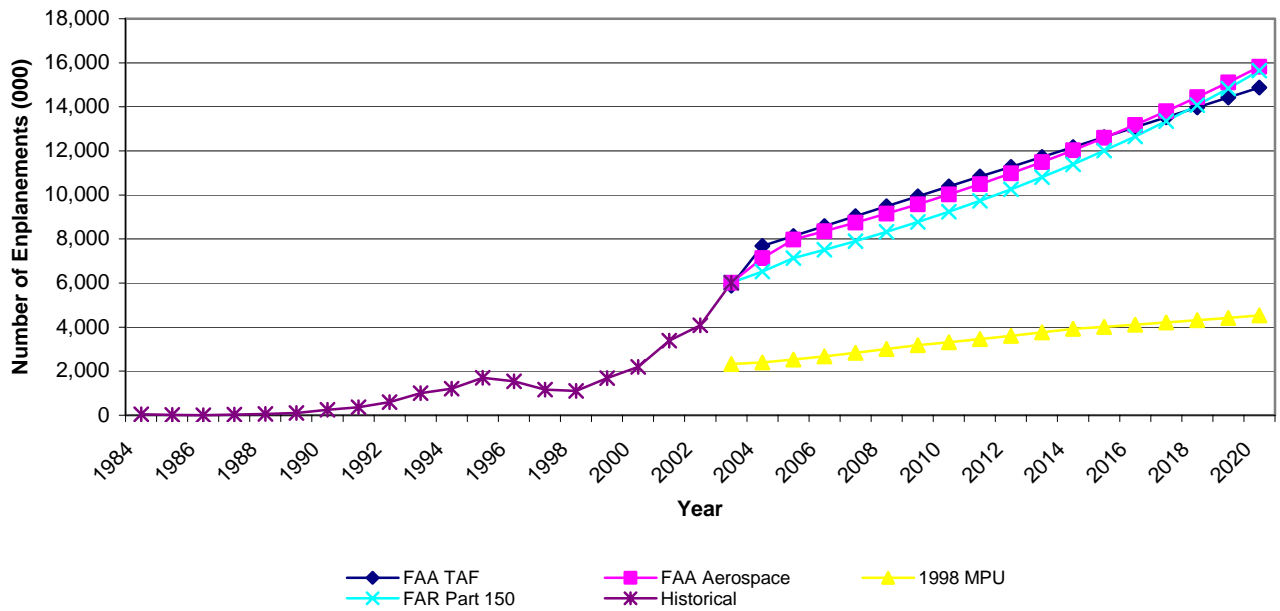
Year	Air Carrier				Commuter				Total			
	FAA TAF	FAA Aerospace	1998 MPU	FAR Part 150	FAA TAF	FAA Aerospace	1998 MPU	FAR Part 150	FAA TAF	FAA Aerospace	1998 MPU	FAR Part 150
2003	680,595	695,694	1,230,811	695,694	588,325	601,275	231,841	601,275	1,268,920	1,296,969	1,462,652	1,296,969
2004	614,992	724,838	1,250,000	701,071	768,922	713,406	239,000	652,687	1,383,914	1,438,244	1,489,000	1,353,759
2006	614,992	789,097	1,311,697	709,620	858,684	835,313	267,923	750,569	1,473,676	1,624,410	1,579,620	1,460,189
2011	614,992	932,284	1,469,315	714,480	1,083,089	1,049,233	345,757	973,450	1,698,081	1,981,518	1,815,072	1,687,930
2015	614,992	1,065,327	1,602,185	695,084	1,262,614	1,259,188	401,526	1,200,928	1,877,606	2,324,514	2,003,711	1,896,012
2020	614,992	1,258,638	1,813,350	628,723	1,487,020	1,581,661	452,741	1,564,561	2,102,012	2,840,299	2,266,091	2,193,284
<b>Average Annual Compound Growth Rate</b>												
2004-2006	-3.322%	4.289%	2.144%	0.663%	13.433%	11.581%	4.940%	7.673%	5.113%	7.793%	2.598%	4.030%
2007-2011	0.000%	3.391%	2.295%	0.137%	4.753%	4.666%	5.233%	5.338%	2.875%	4.054%	2.818%	2.941%
2012-2020	0.000%	3.391%	2.365%	-1.411%	3.584%	4.666%	3.041%	5.414%	2.399%	4.082%	2.497%	2.953%
2004-2020	-0.594%	3.549%	2.306%	-0.594%	5.606%	5.854%	4.015%	5.787%	3.014%	4.719%	2.609%	3.139%

Sources: FAA TAF Draft 2004 Scenario, July, 2004; FAA Aerospace Forecast, FY 2004-2015, March 2004; PTIA 1998 Master Plan Update; PTIA FAR Part 150, URS, 2004.

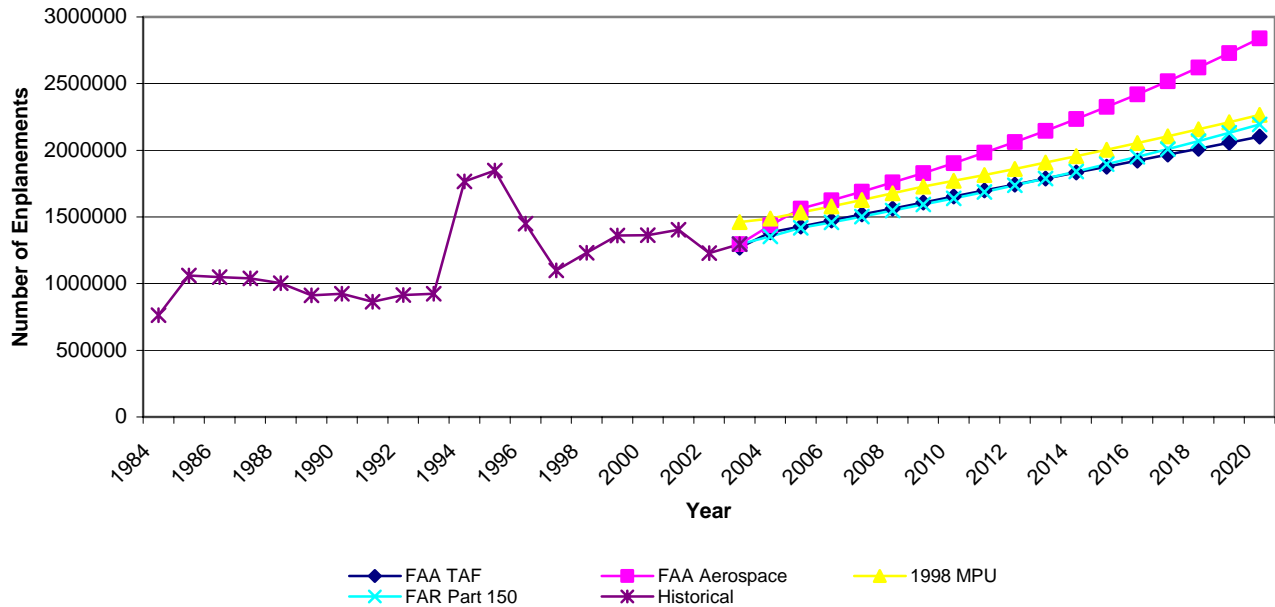
**FIGURE 1.7-1  
AIR CARRIER ENPLANEMENT FORECAST COMPARISON**



**FIGURE 1.7-2  
COMMUTER ENPLANEMENT FORECAST COMPARISON**



**FIGURE 1.7-3  
TOTAL ENPLANEMENT FORECAST COMPARISON**



## 1.7.2 COMMERCIAL OPERATIONS

Commercial operations forecasts are separated into air carrier, commuter, and cargo operations, but the FAA TAF does not forecast cargo operations separate from air carrier and commuter.

Air carrier operations for year 2006 of the forecast vary from a low of 14,741 in the URS derived FAA TAF activity counts to a high of 43,380 in the 1998 Master Plan Update. In year 2011, the high forecast was again the URS derived FAA TAF, with a count of 14,741 operations to 46,911 in the 1998 Master Plan Update.

Commuter operations range from a high of 55,210 operations in the URS derived FAA TAF to a low of 26,656 in the 1998 Master Plan Update for year 2006. For year 2011 of the forecast, the low commuter operations count was 30,678 in the 1998 Master Plan Update and the high forecast was 65,087 in the URS derived FAA TAF.

Cargo operations in the year 2006 ranged from 6,313 in the *FAA Aerospace Forecast* and the URS preferred forecast to 25,013 in the 1998 Master Plan Update. The high forecast for year 2011 was also the 1998 Master Plan Update, with 40,815 operations, while the low forecast was developed by the *FAA Aerospace Forecast* growth rates, at a count of 7,615 operations.

These forecasts are shown in **Table 1.7-2** and on **Figures 1.7-4** and **1.7-5**.

**TABLE 1.7-2  
COMPARISON OF COMMERCIAL OPERATIONS FORECASTS**

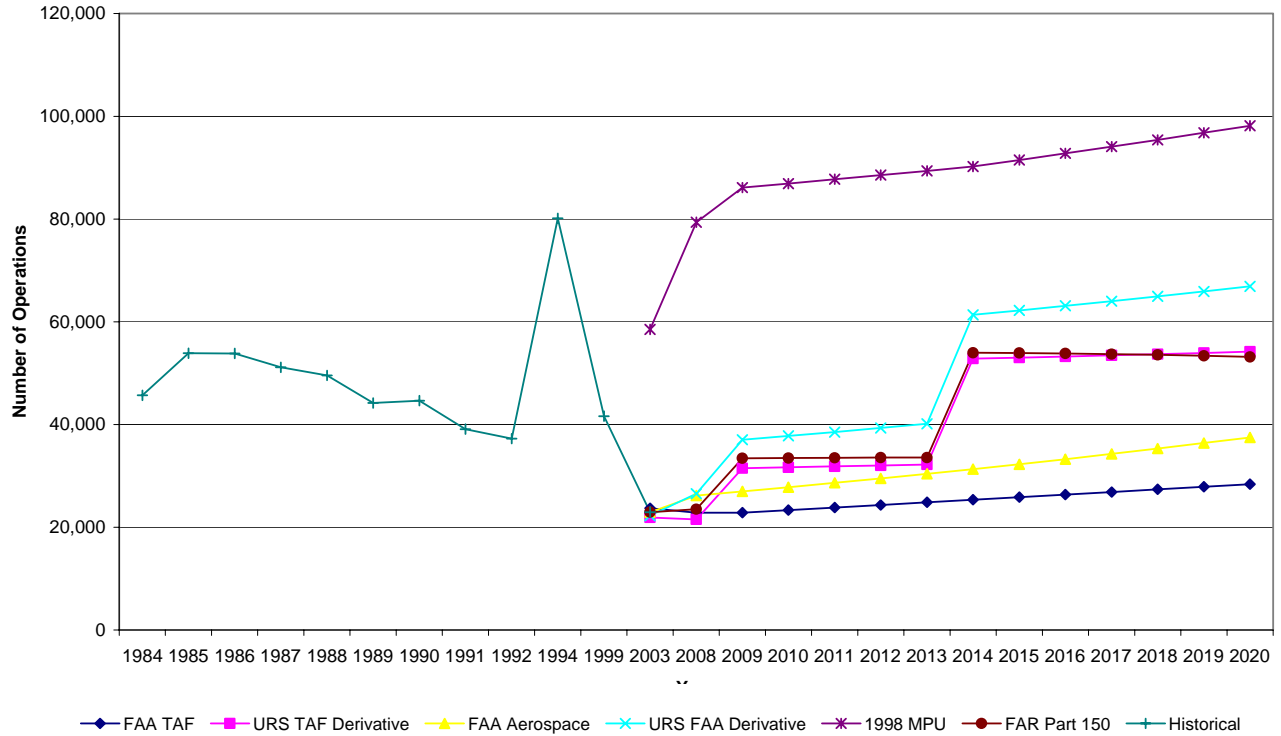
Year	Air Carrier						Cargo			Commuter					
	FAA TAF <sup>1</sup>	URS <sup>2</sup> TAF Derived (a)	FAA <sup>3</sup> Aerospace	URS <sup>4</sup> FAA Aerospace Derived	1998 MPU	FAR Part 150 <sup>5</sup>	FAA <sup>6</sup> Aerospace	1998 MPU	FAR Part 150 <sup>7</sup>	FAA TAF <sup>1</sup>	URS <sup>8</sup> TAF Derived (a)	FAA <sup>9</sup> Aerospace	URS <sup>10</sup> FAA Aerospace Derived	1998 MPU	FAR Part 150 <sup>11</sup>
2003	23,714	16,313	16,675	16,675	41,517	16,675	5,564	16,977	5,564	44,503	41,601	42,517	42,517	24,569	42,517
2004	22,824	14,741	17,072	17,302	41,834	16,735	5,826	18,200	5,826	49,245	51,491	45,093	47,774	24,922	43,708
2006	22,824	14,741	18,356	18,665	43,380	16,785	6,313	25,013	6,313	52,967	55,210	48,324	53,708	26,656	48,259
2011	23,833	14,741	21,019	21,429	46,911	16,422	7,615	40,815	17,107	62,272	65,087	54,126	63,052	30,678	58,498
2015	25,853	14,741	23,424	23,931	49,627	15,614	8,847	41,857	38,287	69,717	71,881	59,266	71,686	32,928	68,369
2020	28,378	14,741	26,822	27,474	55,004	13,724	10,671	43,165	39,426	76,023	79,122	66,381	84,158	34,841	83,248
<b>Average Annual Compound Growth Rate</b>															
2004-2006	-1.27%	-3.32%	3.25%	3.83%	1.47%	0.22%	4.30%	13.79%	4.30%	5.98%	9.89%	4.36%	8.10%	2.75%	4.31%
2007-2011	0.87%	0.00%	2.75%	2.80%	1.58%	-0.44%	3.82%	10.29%	22.06%	3.29%	3.35%	2.29%	3.26%	2.85%	3.92%
2012-2020	1.96%	0.00%	2.75%	2.80%	1.78%	-1.97%	3.82%	0.62%	9.72%	2.24%	2.19%	2.29%	3.26%	1.42%	4.00%
2004-2020	1.06%	-0.59%	2.84%	2.98%	1.67%	-1.14%	3.90%	5.64%	12.21%	3.20%	3.85%	2.66%	4.10%	2.08%	4.03%

Sources: Draft FAA TAF 2004 Scenario, July 2004; *FAA Aerospace Forecast*, FY 2004-2015, March 2004; PTIA 1998 Master Plan Update; PTIA Airport Records, July 2004; URS, 2004.

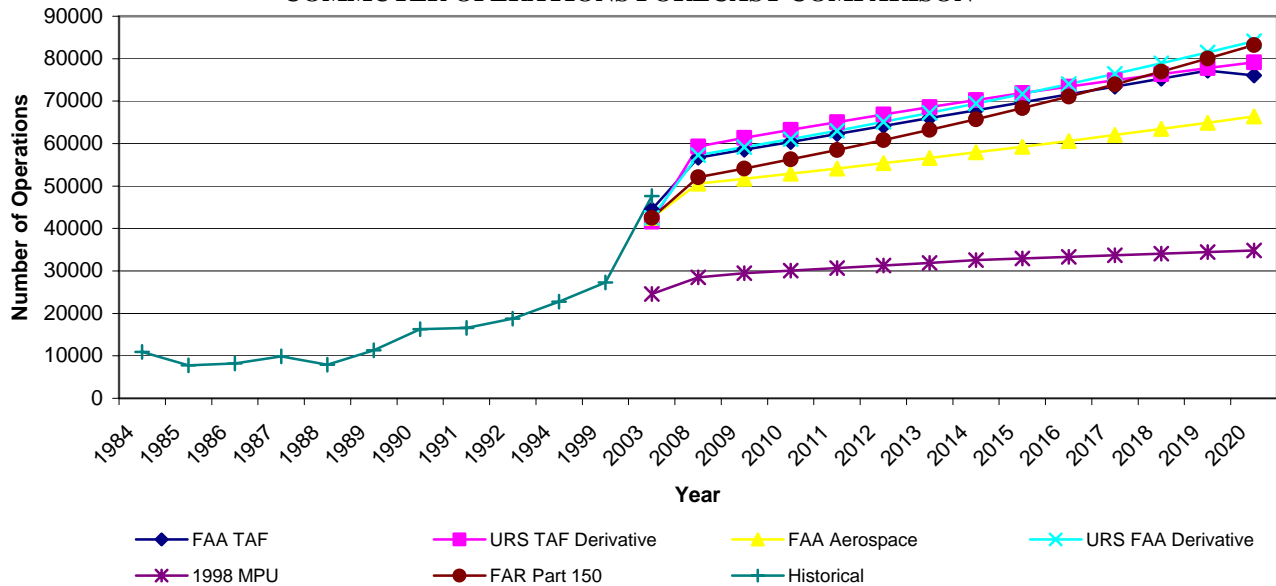
Notes:

1. Includes scheduled Air Cargo Operations.
2. Derived using PTIA TAF - projected air carrier enplanements with assumed constant aircraft size (seats) and load factor.
3. Derived using *FAA Aerospace Forecast* of annualized nation-wide air carrier operations growth rates as applied to PTIA 2003 actual air carrier operations.
4. Derived using *FAA Aerospace Forecast* of annualized nation-wide air carrier enplanement growth as applied to PTIA 2003 actual air carrier passenger enplanements, with assumed changing average aircraft size (seats) and load factor.
5. Air Carrier operations derived using FAA TAF (Draft 2004 Scenario) enplanement projections (AACGR 2003-2020). Air Carrier enplanements represent net difference between total projected scheduled enplanements minus projected commuter enplanements. Air carrier operations derived using assumed changing average aircraft size (seats) and load factor.
6. Derived using *FAA Aerospace Forecast* of annualized nation-wide air cargo domestic revenue-ton-miles (RTMs) growth rates as applied to PTIA 2003 actual air cargo operations.
7. Derived using *FAA Aerospace Forecast* of annualized nation-wide air cargo domestic revenue-ton-miles (RTMs) growth rates as applied to PTIA 2003 actual air cargo operations, with assumed start-up of constant 12,480 annual FedEx Mid-Atlantic Sort Hub operations starting in 2009 (Phase 1). An additional constant 20,280 annual operations are assumed to start in 2013 (Phase 2).
8. Derived using PTIA TAF - projected commuter enplanements with assumed changing aircraft size (seats) and load factor.
9. Derived using *FAA Aerospace Forecast* of annualized nation-wide commuter operations growth rates as applied to PTIA 2003 actual commuter operations.
10. Derived using *FAA Aerospace Forecast* of annualized nation-wide commuter enplanement growth as applied to PTIA 2003 actual commuter passenger enplanements, with assumed changing average aircraft size (seats) and load factor.
11. Commuter operations derived using FAA TAF (Draft 2004 Scenario) enplanement projections (AACGR 2003-2020). Commuter operations derived using assumed changing average aircraft size (seats) and load factor. Total enplanements represent loss of 5 daily departures of AirTran and gain of 9 daily departures of Independence Air, effective August 2004.

**FIGURE 1.7-4  
AIR CARRIER AND CARGO OPERATIONS FORECAST COMPARISON**



**FIGURE 1.7-5  
COMMUTER OPERATIONS FORECAST COMPARISON**



### **1.7.3 GENERAL AVIATION OPERATIONS**

A comparison of the itinerant general aviation operations vary between a high from the 1998 Master Plan Update of 49,548 to the low of 40,699 operations in the FAA TAF normalized to historical 2003 operations levels for the year 2006. In 2011, the low forecast was again the normalized FAA TAF counts and the high was the 1998 Master Plan Update, with levels of 40,699 and 51,248, respectively.

Local general aviation operations showed less of a variation between forecasts, from 7,646 in the URS preferred forecast to 8,744 in the 1998 Master Plan Update for the year 2006 and from 8,174 to 9,044 for the year 2011, as shown in the URS preferred forecast and the 1998 Master Plan Update, respectively.

These forecasts are presented in **Table 1.7-3** and on **Figure 1.7-6**.

### **1.7.4 MILITARY OPERATIONS**

In all forecasts, military operations a projected to remain flat based on available information as previously discussed. The FAA TAF projected the high itinerant military operations levels of 614 for 2006 and 2011, while the URS preferred forecast of 559 was the low for both forecast years. The local military operations ranged from 333 in year 2006 and 2011 for the FAA TAF projections to a high of 500 forecasted by the 1998 MPU in both forecast years. These forecasts are shown in **Table 1.7-4**.

## **1.8 COMPARISON TO FAA TERMINAL AREA FORECAST**

The review and approval of this and other similar forecasts requires a comparison between the recommended forecasts as developed for the FAR Part 150 Study and the FAA's forecast of passenger enplanements, commercial operations, and total operations, as referenced in the TAF developed specifically for PTIA. The comparison of these forecasts indicate lower short-term activity levels in this FAR Part 150 forecast as compared to the TAF, but higher projections for the 10- and 15-year forecast levels. The required forecast documentation and preferred forecast to FAA TAF comparisons are shown in **Tables 1.8-1** and **1.8-2**.

### **Passenger Enplanements**

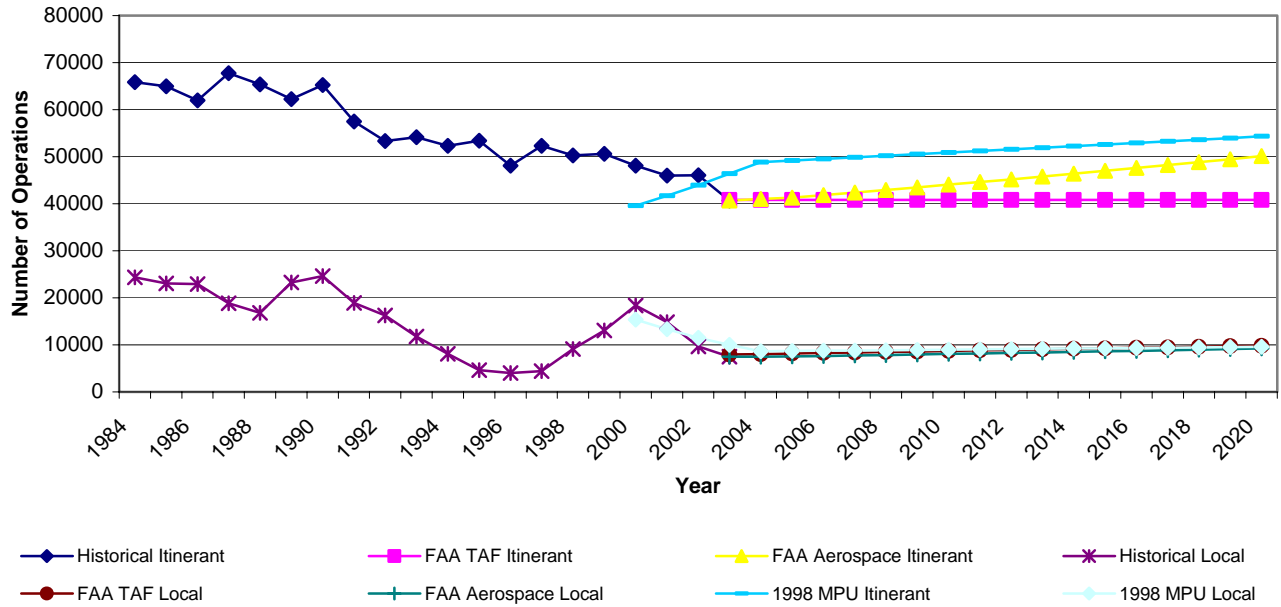
The FAR Part 150 forecast of passenger enplanements predicts 16,175 fewer enplanements than the TAF in the year 2008 and 56,820 more in the year 2018. This can be explained by a higher expected rate of increase predicted in the TAF as compared to the FAR Part 150 forecast, approximately 4.2 percent AACGR verses 3.5 percent, respectively. In the later stages of the forecasts, the TAF projects an AACGR of 2.5 percent from 2008 to 2018, with a corresponding AACGR of 3.12 percent for the entire forecast period, while the FAR Part 150 forecast projects approximately 2.9 percent AACGR from 2008 to 2018 and 3.16 percent throughout the forecast.

**TABLE 1.7-3  
COMPARISON OF GENERAL AVIATION OPERATIONS FORECASTS**

Year	Itinerant			Local				Total		
	FAA TAF	1998 MPU	FAR Part 150	FAA TAF	1998 MPU	FAR Part 150	Normalized TAF	FAA TAF	1998 MPU	FAR Part 150
2003	40,811	46,361	40,699	7,932	9,968	7,462	7,462	48,743	56,329	48,161
2004	40,811	48,875	40,998	8,043	8,625	7,462	7,566	48,854	57,500	48,460
2006	40,811	49,548	41,834	8,266	8,744	7,646	7,776	49,077	58,292	49,480
2011	40,811	51,248	44,621	8,821	9,044	8,174	8,298	49,632	60,292	52,795
2015	40,811	52,611	46,983	9,265	9,284	8,623	8,716	50,076	61,895	55,606
2020	40,811	54,322	50,114	9,820	9,586	9,218	9,238	50,631	63,908	59,332
<b>Average Annual Compound Growth Rate</b>										
2004-2006	0.000%	2.241%	0.921%	1.384%	-4.274%	0.817%	1.384%	0.228%	1.148%	0.905%
2007-2011	0.000%	0.677%	1.298%	1.308%	0.677%	1.344%	1.308%	0.225%	0.677%	1.305%
2012-2020	0.000%	0.649%	1.298%	1.199%	0.649%	1.344%	1.199%	0.222%	0.649%	1.305%
2004-2020	0.000%	0.936%	1.232%	1.264%	-0.230%	1.251%	1.264%	0.224%	0.745%	1.235%

Sources: Draft FAA TAF 2004 Scenario, July 2004; *FAA Aerospace Forecast*, FY 2004-2015, Table I-9, Page I-35 March 2004; PTIA Airport Records, July 2004.

**FIGURE 1.7-6  
GENERAL AVIATION OPERATIONS FORECAST COMPARISON**



**TABLE 1.7-4  
COMPARISON OF MILITARY OPERATIONS FORECASTS**

Year	Itinerant			Local			Total		
	FAA TAF	FAR Part 150*	1998 MPU	FAA TAF	FAR Part 150*	1998 MPU	FAA TAF	FAR Part 150*	1998 MPU
2003	574	551	600	303	282	500	877	833	1,100
2004	614	559	600	333	445	500	947	1,004	1,100
2006	614	559	600	333	445	500	947	1,004	1,100
2011	614	559	600	333	445	500	947	1,004	1,100
2015	614	559	600	333	445	500	947	1,004	1,100
2020	614	559	600	333	445	500	947	1,004	1,100

Sources: Draft FAA TAF 2004 Scenario, July 2004; \* FAA Aerospace Forecast, FY 2004-2015, March 2004; PTIA Airport Records, July 2004.



**TABLE 1.8-2  
COMPARISON OF AIRPORT PLANNING AND TAF FORECASTS**

<b>AIRPORT NAME: Piedmont Triad International Airport</b>				
	<b>Year</b>	<b>Airport Forecast</b>	<b>TAF</b>	<b>AF/TAF (% Difference)</b>
<b>Passenger Enplanements</b>				
Base Year	2003	1,296,969	1,268,920	2.2%
Base Year +5 Years	2008	1,547,263	1,563,438	-1.0%
Base Year +10 Years	2013	1,788,892	1,787,844	0.1%
Base Year +15 Years	2018	2,069,069	2,012,249	2.8%
<b>Commercial Operations</b>				
Base Year	2003	64,755	68,217	-5.1%
Base Year +5 Years	2008	75,619	79,513	-4.9%
Base Year +10 Years	2013	96,791	90,838	6.6%
Base Year +15 Years	2018	130,485	102,668	27.1%
<b>Total Operations</b>				
Base Year	2003	113,749	117,837	-3.5%
Base Year +5 Years	2008	127,403	130,244	-2.2%
Base Year +10 Years	2013	151,978	142,095	7.0%
Base Year +15 Years	2018	189,301	154,452	22.6%

Notes:

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

Not factored into the TAF forecast is the net gain in available commercial operations caused by the exit of AirTran and the entry of Independence Air. The FAR Part 150 forecast of total enplanements at PTIA are projected to increase at the same AACGR as used in the FAA Draft 2004 Scenario TAF with a greater increase expected in commuter enplanements due to the changing market conditions at PTIA. Even with these differences, the final comparison year of the forecast, 2018, the FAR Part 150 forecast only projects 2.8 percent more enplanements than forecasted in the TAF.

**Commercial Operations**

Commercial operations forecasts for PTIA as projected for this FAR Part 150 forecast and the TAF for PTIA forecast differ. For the base year and year five of the forecast, the Part 150 forecast for commercial operations is approximately 5 percent lower than the TAF, while for the 10- and 15- year forecasts, the Part 150 forecast is 29 percent and 27 percent, respectively, higher than the TAF. The low initial year forecasts can be explained, in part, by the lower historical base year forecast as compared to the TAF base year. The long-term difference has two primary factors attributing to the large difference. First, the TAF projects an overall AACGR of 0.95 percent and 3.56 percent for air carrier and commuter operations, respectively, for the forecast comparison, while the recommended forecasts increases approximately 6 percent annually for air carrier and approximately 4 percent for commuter operations over the forecast period.

The second major factor influencing the difference in the commercial operations forecasts is the planned opening of the FedEx Mid-Atlantic Hub at PTIA in 2009 with 12,350 annual operations, increasing to over 32,000 operations in 2014.

At PTIA, the Part 150 total operations forecast follows the trend presented in the commercial operations, with lower than TAF forecast levels for base year and base year plus 5, while having higher than TAF projected activity levels for the 10- and 15-year forecasts. For the 5-year forecast, the TAF predicts 2,841 more total operations than the FAR Part 150 recommended forecast, but 9,883 fewer operations for the 15-year forecast. Again, most of these differences can be attributed to the commercial operations forecasts.

### **General Aviation/Military**

The FAR Part 150 general aviation forecasts project an AACGR of 1.2 percent for both local and itinerant operations while the TAF predicts 0.17 percent annual growth for itinerant and 0.7 percent for local general aviation operations growth throughout the forecast period. Military operations for the TAF and the FAR Part 150 forecast are expected to remain flat.

**APPENDIX A**

---

**NOISE MODELING ASSUMPTIONS**

## **Appendix A**

### **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 the airport's Landing Fee Reports submitted by the signatory airlines and airline schedules published in the Official Airline Guide for the period May 2003 through April 2004. Projected aircraft fleet mix changes at the airport developed for this aviation activity forecast were based on the most recent changes of airline services at the airport that included the cessation of services by AirTran and Midway airlines and the entry of Independence Air. Throughout the forecast period it was assumed any changes to the airline's overall aircraft fleet would not affect the fleet mix operating into and out of PTIA.

#### **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 within the first two years of the Mid-Atlantic Sort Hub operations would be limited only to the gauge (size or aircraft lift capacity) of aircraft. For the purpose of modeling the anticipated change in FedEx fleet mix between the years 2009 and 2011 without increasing the number operations, the relative percentile share of each make and model of aircraft was adjusted. Accordingly, the utilization of the larger aircraft was forecasted with similar decreases in the operations by the smaller gauge aircraft.

#### **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 25's and Lear 35's, the over-all 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) 500's and CNA 750's utilizing the Cessna maintenance facility would reverse with a steady decrease in the relative share of the CNA 500's. Currently, the ratio of CNA 500's to CNA 750's is approximately 70:30; it was assumed this would reverse in the 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 2003, 2006 and 2011 are presented in the following tables. The tables provide aircraft fleet mix, arrival operations, departure operations by stage length during day-time and night-time for noise modeling purposes using the FAA's Integrated Noise Model (INM).

**Table A-1  
Air Carrier Operations Forecast  
Average Daily Operations  
Piedmont Triad International Airport**

Airline	Aircraft Type	Arrival						Departures												
		2003		2006		2011		2003				2006				2011				
		Day	Night	Day	Night	Day	Night	Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2		
						Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	
Airtran	DC9	0.93291	0.586315	0	0	0	0	1.336572	0.494812	0	0	0	0	0	0	0	0	0	0	0
Continental	737500	0.366501	0	0	0	0	0	0.51867	0	0	0	0	0	0	0	0	0	0	0	0
Delta	737800	3.114588	0.299021	3.361142	0.361192	3.288452	0.353381	4.024078	0.25218	0	0	4.470506	0.305836	0	0	4.373824	0.299222	0	0	0
	MD88	4.481968	1.124888	4.836765	1.35877	4.732163	1.329385	5.790747	0.948678	0	0	6.433167	1.150526	0	0	6.29404	1.125644	0	0	0
Northwest	DC9	2.099048	0.293158	2.265211	0.35411	2.216223	0.346452	3.331455	0	0	0	0	3.694799	0	0	3.614893	0	0	0	0
United	737300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	737500	2.789402	0.293158	3.010214	0.35411	2.945114	0.346452	0.995646	0.245959	2.986939	0	1.103821	0.30001	3.311463	0	1.079949	0.293522	3.239848	0	0
	A320	0.242557	0	0.261758	0	0.256097	0	0.346312	0	0	0	0.383938	0	0	0	0.375635	0	0	0	0
US Airways	737300	0	0.681801	0	0.823558	0	0.805748	0	0.704484	0	0	0	0.8557	0	0	0	0.837194	0	0	0
	737400	5.297599	0.239552	5.716962	0.289358	5.593324	0.283101	0.618414	0.247521	0	0	0.682735	0.300651	0	0	0.667969	0.294149	0	0	0
<b>TOTAL</b>		<b>19.32457</b>	<b>3.517892</b>	<b>19.45205</b>	<b>3.541099</b>	<b>19.03137</b>	<b>3.464517</b>	<b>16.96189</b>	<b>2.893635</b>	<b>2.986939</b>	<b>0</b>	<b>16.76896</b>	<b>2.912723</b>	<b>3.311463</b>	<b>0</b>	<b>16.40631</b>	<b>2.849731</b>	<b>3.239848</b>	<b>0</b>	<b>0</b>

Source: URS, 2004. Error due to rounding.

Year	2003	2006	2011
Annual Op:	16675	16785	16422
Ave Day	45.68493	45.9863	44.99178
Arr	22.84247	22.99315	22.49589
Dep	22.84247	22.99315	22.49589

**Table A-2  
Commuter Operations Forecast  
Average Daily Operations  
Piedmont Triad International Airport**

Airline	Aircraft Type	Arrival						Departures												
		2003		2006		2011		2003			2006			2011						
		Day	Night	Day	Night	Day	Night	Stage Length 1 Day	Stage Length 1 Night	Stage Length 2 Day	Stage Length 2 Night	Stage Length 1 Day	Stage Length 1 Night	Stage Length 2 Day	Stage Length 2 Night	Stage Length 1 Day	Stage Length 1 Night	Stage Length 2 Day	Stage Length 2 Night	
Airtran	CRJ	2.074274	0.312756	0	0	0	0	2.417078	0.165563	0	0	0	0	0	0	0	0	0	0	0
	RJ	1.068565	0.161117	0	0	0	0	1.245161	0.08529	0	0	0	0	0	0	0	0	0	0	0
Alleghany (US)	DHC810	0.698409	0	0.850602	0	1.031073	0	0	0	0.508644	0	0	0	0.577338	1.172423	0	0	0.69983	1.421173	
American Eagle	ER4	1.955544	0	2.381687	0	2.887004	0	1.83112	0.996034	0	0	2.193883	0	0	2.659354	0	0	0	0	
Atlantic Coast (DL)	FRJ	0.488886	0	0	0	0	0	0.712102	0	0	0	0	0	0	0	0	0	0	0	
Atlantic Coast (UA)	CRJ	1.451992	0.255891	0	0	0	0	0	0.135461	1.579341	0	0	0	0	0	0	0	0	0	
	FRJ	1.720879	0.303278	0	0	0	0	0.804879	0.160546	1.066932	0	0	0	0	0	0	0	0	0	
	J41	2.204876	0.388575	0	0	0	0	2.398258	0.205699	0	0	0	0	0	0	0	0	0	0	
Independence Air	CRJ	0	0	1.932841	0.307877	2.342927	0.373198	0	0	0	0	0	0.158277	2.15116	0	0	0.191858	2.607567	0	
	FRJ	0	0	2.290775	0.364891	2.776803	0.442309	0	0	0	0	1.096295	0.187588	1.453228	0	1.328893	0.227388	1.761556	0	
	J41	0	0	2.935055	0.467516	3.557779	0.566708	0	0	0	0	3.266577	0.240347	0	0	3.959639	0.29134	0	0	
Atlantic Southeast (DL)	CRJ	1.361897	0	1.658675	0	2.010592	0	1.181072	0.206585	0.192268	0.206585	1.489531	0.251233	0.242482	0.251233	1.805562	0.304537	0.293929	0.304537	
Chautauqua (DL)	EMB145	0.488886	0	0.595422	0	0.721751	0	0.508644	0	0	0	0.635071	0	0	0	0.769813	0	0	0	
Chautauqua (US)	EMB145	6.844406	0.846201	8.335904	1.014055	10.10451	1.229204	0	1.283777	1.983713	0	0	1.507401	2.367085	0	0	1.827222	2.869304	0	
COMAIR	CRJ	6.599963	0.710809	2.679398	0.851806	3.247879	1.032531	2.899273	0.250853	0	0	3.52176	0.293106	0	0	4.268964	0.355293	0	0	
COMAIR (DL)	CRJ	2.199988	2.132426	8.038193	2.555417	9.743638	3.097594	8.189174	0.501706	0	0	9.987943	0.586211	0	0	12.10706	0.710586	0	0	
Continental Express	ER4	1.222215	0	1.488554	0	1.804377	0	1.097134	0.195175	0	0	1.456771	0.230054	0	0	1.76585	0.278864	0	0	
	ERJ	4.7841	0	5.826627	0	7.062849	0	3.220872	0.763969	1.073624	0	4.276663	0.900497	1.425554	0	5.184032	1.091553	1.728011	0	
Delta	CRJ	0.244443	0	0.297711	0	0.360875	0	0.254322	0	0	0	0.346403	0	0	0	0.419898	0	0	0	
MESA	CRJ	0.195554	0	0.08506	0	0.103107	0	0.074601	0	0	0	0.092374	0.005583	0	0	0.111973	0.006767	0	0	
	EJZ	1.271104	0	0.552892	0	0.670197	0	0.484908	0	0	0	0.600431	0.036289	0	0	0.727823	0.043989	0	0	
MESA (US)	CRJ	0.187074	0.072531	0.637952	0.086919	0.773305	0.10536	0.817464	0.013175	0	0	1.010341	0	0	0	1.224703	0	0	0	
	EJZ	0.205781	0.079785	0.701747	0.095611	0.850635	0.115896	0.899211	0.014493	0	0	1.111375	0	0	0	1.347173	0	0	0	
	ERJ	0.130952	0.050772	0.446566	0.060843	0.541313	0.073752	0.572225	0.009223	0	0	0.707239	0	0	0	0.857292	0	0	0	
Midway (USAir)	CRJ200	0.209523	0	0	0	0	0	0.203458	0	0	0	0	0	0	0	0	0	0	0	
Northwest	ARJ	0.488886	1.218529	0.595422	1.460238	0.721751	1.770054	0.445572	0.483999	1.039669	0	0.540388	0.569462	1.260906	0	0.655041	0.690284	1.528429	0	
	CRJ	0.733329	1.827794	0.893133	2.190358	1.082626	2.655081	1.559504	0.725998	0.668359	0	1.891358	0.854194	0.810582	0	2.292643	1.035426	0.982561	0	
Piedmont	DHC810	0.698409	0	0.850602	0	1.031073	0	0.775077	0	0	0	0.934737	0	0	0	1.133058	0	0	0	
	DHC830	0.03492	0	0.04253	0	0.051554	0	0.038754	0	0	0	0.046737	0	0	0	0.056653	0	0	0	
Piedmont (USAir)	DHC810	1.536499	0	1.871325	0	2.26836	0	2.014232	0.188287	0	0	2.438675	0.221085	0	0	2.956082	0.267993	0	0	
	DHC830	0.209523	0	0.255181	0	0.309322	0	0.274668	0.025676	0	0	0.332547	0.030148	0	0	0.403102	0.036544	0	0	
PSA (US)	FRJ	1.187295	0.406176	1.446024	0.486746	1.752824	0.590018	1.576797	0.177073	0	0	1.905214	0.209361	0	0	2.309439	0.253781	0	0	
Shuttle America	SF340	0.279363	0.203088	0.340241	0.243373	0.412429	0.295009	0.305187	0.250853	0	0	0.346403	0.293106	0	0	0.419898	0.355293	0	0	
Skywest (DL)	CRJ200	1.815863	0	2.211566	0	2.680789	0	0	0.91556	0.501706	0	0	1.096942	0.586211	0	0	1.329677	0.710586	0	
Trans State	J41	2.479351	0	2.679398	0	3.247879	0	2.390628	0	0	0	2.886689	0	0	0	3.499151	0	0	0	
Trans State (US)	J41	1.983087	0	2.721928	0	3.299433	0	2.384181	0.033253	0	0	2.914336	0.037744	0	0	3.532664	0.045752	0	0	
	RJS	0.2169	0	0.297711	0	0.360875	0	0.26077	0.003637	0	0	0.318755	0.004128	0	0	0.386385	0.005004	0	0	
TOTAL		49.27274	8.969729	55.94072	10.18565	67.80953	12.34672	41.83633	6.876324	9.02811	0.708291	46.3485	6.615813	11.38528	2.009867	56.18215	8.019475	13.80086	2.436296	

Source: URS, 2004. Error due to rounding.

Year	2003	2006	2011
Annual Op	42517	48259	58498
Ave Day	116.4849	132.2164	160.2685
Arr	58.24247	66.10822	80.13425
Dep	58.24247	66.10822	80.13425

**Table A-3  
Cargo Operations Forecast  
Average Daily Operations  
Piedmont Triad International Airport**

Non-FedEx Cargo Operations																		
	Arrival Operations						Departure Operations											
	2003		2006		2011		2003				2006				2011			
Aircraft							Stage Length 1		Stage Length 3		Stage Length 1		Stage Length 3		Stage Length 1		Stage Length 3	
Type	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
A300B4	0.51757	0	0.587254	0	0.708309	0	0	0	0.529072	0	0	0	0.600304	0	0	0	0.724049	0
B757	0.51757	0.51757	0.587254	0.587254	0.708309	0.708309	0	1.058143	0	0	0	1.200609	0	0	0	1.448097	0	0
C208	1.03514	0	1.174509	0	1.416617	0	0	1.058143	0	0	0	1.200609	0	0	0	1.448097	0	0
DC930	0.51757	0.621084	0.587254	0.704705	0.708309	0.84997	0	1.058143	0	0	0	1.200609	0	0	0	1.448097	0	0
F27	1.03514	0	1.174509	0	1.416617	0	1.05814	0	0	0	1.200609	0	0	0	1.448097	0	0	0
<b>TOTAL</b>	<b>3.62299</b>	<b>1.138654</b>	<b>4.11078</b>	<b>1.291959</b>	<b>4.95816</b>	<b>1.558279</b>	<b>1.058143</b>	<b>3.174429</b>	<b>0.529072</b>	<b>0</b>	<b>1.200609</b>	<b>3.601826</b>	<b>0.600304</b>	<b>0</b>	<b>1.448097</b>	<b>4.344292</b>	<b>0.724049</b>	<b>0</b>

FedEx Cargo Operations																		
	Arrival Operations						Departure Operations											
	2003		2006		2011		2003				2006				2011			
							Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2		Stage Length 1		Stage Length 2	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
A300	0.408611	0.743388	0.463601	0.843432	0.637483	4.876742	0	0	0.034387	0.855409	0	0	0.039015	0.970529	0.579738	3.51005	0	1.422993
A310-Pratt	0.051076	0.424793	0.05795	0.481961	0.573734	1.87567	0.209226	0	0.016047	0	0.237383	0	0.018207	0	0.521764	1.350019	0	0.547305
B727-200	0	0.743388	0	0.843432	0.063748	4.876742	0	0	0.022925	1.283114	0	0	0.02601	1.455793	0.057974	3.51005	0	1.422993
C208	0.255382	0.02124	0.28975	0.024098	0	0	0	0	0.005731	0	0	0	0.006502	0	0	0	0	0
DC10-10	0	0.212397	0	0.240981	0.063748	2.025724	0	0	0.005731	0.427705	0	0	0.006502	0.485264	0.057974	1.458021	0	0.591089
ATR 72	0	0	0	0	0.573734	1.350482	0	0	0	0	0	0	0	0	0.521764	0.972014	0	0.39406
<b>TOTAL</b>	<b>0.715068</b>	<b>2.145205</b>	<b>0.811301</b>	<b>2.433904</b>	<b>1.912448</b>	<b>15.00536</b>	<b>0.209226</b>	<b>0</b>	<b>0.084821</b>	<b>2.566227</b>	<b>0.237383</b>	<b>0</b>	<b>0.096236</b>	<b>2.911586</b>	<b>1.739214</b>	<b>10.80015</b>	<b>0</b>	<b>4.378441</b>

Source: URS, 2004. Error due to rounding.

Other	2003	2006	2011	FedEx	2003	2006	2011
Annual	3476	3944	4757	Annual	2088	2369	12350
Ave Daily	9.523288	10.80548	13.03288	Ave Daily	5.720548	6.490411	33.83562
Arr	4.761644	5.40274	6.516438	Arr	2.860274	3.245205	16.91781
Dep	4.761644	5.40274	6.516438	Dep	2.860274	3.245205	16.91781

**Table A-4  
General Aviation Forecast  
Average Daily Operations  
Piedmont Triad International Airport**

	Itinerant Operations												Local Operations					
	Arrival Operations						Departure Operations						2003		2006		2011	
	2003		2006		2011		2003		2006		2011		Day	Night	Day	Night	Day	Night
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Single Engine Piston	24.279	2.698	24.956	2.773	26.619	2.958	24.279	2.698	24.956	2.773	26.619	2.958	17.037		17.457		18.662	
Twin Engine Piston	4.856	0.540	4.991	0.555	5.324	0.592	4.856	0.540	4.991	0.555	5.324	0.592	3.407		3.491		3.732	
Turbo Prop	6.243	0.694	6.417	0.713	6.845	0.761	6.243	0.694	6.417	0.713	6.845	0.761						
Jet																		
737300	0.173	0.022	0.201	0.022	0.214	0.024	0.173	0.019	0.201	0.022	0.214	0.024						
A300	0.029	0.004	0.034	0.004	0.036	0.004	0.029	0.003	0.034	0.004	0.036	0.004						
CIT3	0.925	0.116	1.072	0.119	1.144	0.127	0.925	0.103	1.072	0.119	1.144	0.127						
CL601	0.809	0.101	0.938	0.104	1.001	0.111	0.809	0.090	0.938	0.104	1.001	0.111						
CNA500	2.081	0.080	0.737	0.082	0.786	0.087	2.081	0.231	0.737	0.082	0.786	0.087						
CNA750	0.636	0.261	2.412	0.268	2.573	0.286	0.636	0.071	2.412	0.268	2.573	0.286						
EMB145	0.058	0.007	0.067	0.007	0.071	0.008	0.058	0.006	0.067	0.007	0.071	0.008						
FAL20	0.809	0.101	0.938	0.104	1.001	0.111	0.809	0.090	0.938	0.104	1.001	0.111						
GII	0.058	0.007	0.067	0.007	0.071	0.008	0.058	0.006	0.067	0.007	0.071	0.008						
GIIB	0.116	0.014	0.134	0.015	0.143	0.016	0.116	0.013	0.134	0.015	0.143	0.016						
GIV	0.173	0.022	0.201	0.022	0.214	0.024	0.173	0.019	0.201	0.022	0.214	0.024						
GV	0.058	0.007	0.067	0.007	0.071	0.008	0.058	0.006	0.067	0.007	0.071	0.008						
IA1125	0.202	0.025	0.235	0.026	0.250	0.028	0.202	0.022	0.235	0.026	0.250	0.028						
LEAR25	0.983	0.062	0.570	0.063	0.608	0.068	0.983	0.109	0.570	0.063	0.608	0.068						
LEAR35	2.370	0.148	1.374	0.153	1.465	0.163	2.370	0.263	1.374	0.153	1.465	0.163						
MD81	0.029	0.004	0.034	0.004	0.036	0.004	0.029	0.003	0.034	0.004	0.036	0.004						
MU3001	5.289	0.663	6.131	0.681	6.540	0.727	5.289	0.588	6.131	0.681	6.540	0.727						
<b>TOTAL</b>	<b>50.177</b>	<b>5.575</b>	<b>51.576</b>	<b>5.731</b>	<b>55.012</b>	<b>6.112</b>	<b>50.177</b>	<b>5.575</b>	<b>51.576</b>	<b>5.731</b>	<b>55.012</b>		<b>20.444</b>		<b>20.948</b>		<b>22.395</b>	

Source: URS, 2004 Error due to rounding.

Itinerant	2003	2006	2011	Local	2003	2006	2011
Annual	40699	41834	44621	Annual	7462	7646	8174
Ave Daily	111.5041	114.6137	122.2493	Ave Daily	20.44384	20.94795	22.39452
Arr	55.75205	57.30685	61.12466	Arr	10.22192	10.47397	11.19726
Dep	55.75205	57.30685	61.12466	Dep	10.22192	10.47397	11.19726

**Table A-5  
Military Operations Forecast  
Average Daily Operations  
Piedmont Triad International Airport**

Aircraft Type	Itinerant Operations												Local Operations					
	Arrival Operations						Departure Operations						2003		2006		2011	
	2003		2006		2011		2003		2006		2011		Day	Night	Day	Night	Day	Night
BE20	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0.193151	0	0.304795	0	0.304795	0
AH-1	0.139859	0.01554	0.14189	0.015766	0.14189	0.015766	0.139859	0.01554	0.14189	0.015766	0.14189	0.015766	0	0	0	0	0	0
CNA650	0.139859	0.01554	0.14189	0.015766	0.14189	0.015766	0.139859	0.01554	0.14189	0.015766	0.14189	0.015766	0	0	0	0	0	0
H60	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0	0	0	0	0	0
AC95	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0.193151	0	0.304795	0	0.304795	0
CNA210	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0.03996	0.00444	0.04054	0.004504	0.04054	0.004504	0.193151	0	0.304795	0	0.304795	0
T34	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0.193151	0	0.304795	0	0.304795	0
F15	0.079919	0.00888	0.08108	0.009009	0.08108	0.009009	0.079919	0.00888	0.08108	0.009009	0.08108	0.009009	0	0	0	0	0	0
UH60	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0.05994	0.00666	0.06081	0.006757	0.06081	0.006757	0	0	0	0	0	0
CNA560	0.01998	0.00222	0.02027	0.002252	0.02027	0.002252	0.01998	0.00222	0.02027	0.002252	0.02027	0.002252	0	0	0	0	0	0
<b>TOTAL</b>	<b>0.679315</b>	<b>0.075479</b>	<b>0.689178</b>	<b>0.076575</b>	<b>0.689178</b>	<b>0.076575</b>	<b>0.679315</b>	<b>0.075479</b>	<b>0.689178</b>	<b>0.076575</b>	<b>0.689178</b>	<b>0.076575</b>	<b>0.772603</b>	<b>0</b>	<b>1.219178</b>	<b>0</b>	<b>1.219178</b>	<b>0</b>

Source: URS, 2004 Error due to rounding.

Itinerant	2003	2006	2011	Local	2003	2006	2011
Annual	551	559	559	Annual	282	445	445
Ave Daily	1.509589	1.531507	1.531507	Ave Daily	0.772603	1.219178	1.219178
Arr	0.754795	0.765753	0.765753	Arr	0.386301	0.609589	0.609589
Dep	0.754795	0.765753	0.765753	Dep	0.386301	0.609589	0.609589