

# FINAL TECHNICAL REPORT



## 2004 Virginia Airport System Economic Impact Study

# **Virginia Public-Use Airport Economic Impact Study**

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**Prepared for:  
Virginia Department of Aviation**

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# EXECUTIVE SUMMARY

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## SUMMARY OF FINDINGS

The data for this study was collected directly from airports and airport-related businesses during base year 2001. All results are reported in 2001 dollars. Detailed analysis is provided in the following chapters.

As shown in **Table ES-1**, Virginia public use airports, including Dulles International and Ronald Reagan Washington National airports, contributed a total economic impact of more than \$10.7 billion to the Virginia economy.

Virginia public use airports, excluding Dulles International and Ronald Reagan Washington National airports, contributed a total economic impact of \$4.67 billion to the state economy. Further detail is provided in **Table ES-2**. **Table ES-3** details total impact by airport.

Additional study highlights include:

- Virginia public use airports directly employed 8,190 people and expended \$275.4 million in wages.
- Virginia public use airport employees and tenants earned an average annual salary of \$33,600 per year.
- Visitor industry employees earned an average annual salary of \$15,500 per year.
- Virginia public use airports generated \$3,124 of economic impact per 2001 enplanement.
- Virginia public use airports generated \$2,765 of economic impact per 2001 operation at Air Carrier airports.
- Virginia public use airports generated \$300 of economic impact per 2001 operation at General Aviation airports.
- Virginia public use airports generated \$119,000 of economic impact per based aircraft at General Aviation airports (based on 2000 based aircraft data).

Table ES-1

## Virginia Economic Impact Study

**Total Economic Impact for Virginia Public-Use Airports  
Including Ronald Reagan National and Dulles International Airports**

Type of Impact	Jobs	Wages	Economic Activity
Total Economic Impacts*	38,744	\$921,381,000	\$2,399,139,000
Airport Dependent Business	23,606	\$773,179,000	\$2,268,056,000
Sub-total of All Airports except Ronald Reagan Washington National and Dulles International	62,350	\$1,694,560,000	\$4,667,195,000
Ronald Reagan Washington National Airport (Virginia Impact)	35,779	\$1,026,891,000	\$1,715,653,000
Dulles International Airport (Virginia Impact)	65,961	\$2,122,560,000	\$4,368,960,000
Total Economic Impact for All VA Airports	164,091	\$4,844,011,000	\$10,751,808,000

\* All airports except Ronald Reagan Washington National and Dulles International.

Note: Economic impacts for Ronald Reagan Washington National and Dulles International airports were provided by Martin Associates from their 2002 Economic Impact Study. With the assistance of Martin Associates, Virginia specific economic impacts were estimated by multiplying total impacts by the percent of employees located in Virginia. Employee location was chosen as the most appropriate factor because it reflects the location that employees would most likely spend their wages. Complete MWAA impacts are provided below.

	Jobs	Wages	Economic Activity
<b>Direct Impacts</b>			
Ronald Reagan Washington National Airport	8,693	\$ 410,000,000	\$ 1,049,000,000
Dulles International Airport	17,789	\$ 809,000,000	\$ 3,571,000,000
<b>Total Impacts</b>			
Ronald Reagan Washington National Airport	68,674	\$1,971,000,000	\$ 3,293,000,000
Dulles International Airport	91,613	\$2,948,000,000	\$ 6,068,000,000

Source: HNTB Analysis

Note: Totals may not add due to rounding.

Table ES-2

## Virginia Economic Impact Study

**Total Economic Impact for Virginia Public-Use Airports**

Type of Impact	Jobs	Wages	Economic Activity
On-Airport Direct	8,190	\$275,372,000	\$610,059,000
Off-Airport Direct (Visitor Spending)	17,103	\$266,432,000	\$695,768,000
Spin-Off	13,451	\$379,577,000	\$1,093,312,000
Airport Dependent Business	23,606	\$773,179,000	\$2,268,056,000
IAD and DCA*	101,740	\$3,149,451,000	\$6,084,613,000
<b>Total Economic Impact</b>	<b>164,091</b>	<b>\$4,844,011,000</b>	<b>\$10,751,808,000</b>

Source: EDRG and HNTB Analysis

\* Economic impacts for Ronald Reagan Washington National and Dulles International airports were provided by Martin Associates from their 2002 Economic Impact Study. With the assistance of Martin Associates, Virginia specific economic impacts were estimated by multiplying total impacts by the percent of employees located in Virginia. Total impacts for Ronald Reagan Washington National Airport are 62,700 jobs, \$1.97 billion in wages, and \$3.29 billion in economic activity. Total impacts for Dulles International Airport are 91,600 jobs, \$2.95 billion in wages, and \$6.07 billion in economic activity.

Table ES-3

## Virginia Economic Impact Study

**Total Airport Impacts - Alphabetical Listing**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	2,605	\$62,741,000	\$167,258,000
Lynchburg Regional	1,262	\$25,392,000	\$68,500,000
Newport News-Williamsburg International	2,459	\$55,491,000	\$148,124,000
Norfolk International	11,457	\$266,345,000	\$702,898,000
Richmond International	11,843	\$295,395,000	\$744,785,000
Roanoke Regional	4,148	\$94,981,000	\$252,728,000
Shenandoah Valley Regional	476	\$10,120,000	\$27,069,000
<b><u>General Aviation Airports</u></b>			
Accomack County	41	\$608,000	\$1,657,000
Blackstone Municipal	11	\$113,000	\$314,000
Blue Ridge	91	\$1,372,000	\$3,805,000
Bridgewater Air Park	123	\$3,464,000	\$8,910,000
Brookneal-Campbell County	1	\$21,000	\$57,000
Chase City Municipal	1	\$22,000	\$62,000
Chesapeake Regional	120	\$2,746,000	\$7,304,000
Chesterfield County	266	\$6,752,000	\$16,847,000
Crewe Municipal	3	\$44,000	\$121,000
Culpeper County	140	\$2,488,000	\$6,786,000
Danville Regional	74	\$1,650,000	\$4,323,000
Dinwiddie County	114	\$1,795,000	\$4,821,000
Emporia-Greenville Regional	18	\$206,000	\$567,000
Falwell	21	\$207,000	\$553,000
Farmville Regional	51	\$617,000	\$1,690,000
Franklin Municipal	23	\$379,000	\$992,000
Front Royal-Warren County	77	\$2,035,000	\$5,328,000
Gordonsville Municipal	8	\$202,000	\$529,000
Grundy Municipal	5	\$111,000	\$295,000
Hampton Roads	256	\$5,964,000	\$15,857,000
Hanover County Municipal	138	\$3,799,000	\$9,969,000
Hartwood Field	38	\$706,000	\$1,854,000
Hummel Field	13	\$181,000	\$486,000
Ingalls Field	16	\$344,000	\$922,000
Lake Anna	-	\$4,000	\$12,000
Lawrenceville-Brunswick	3	\$55,000	\$152,000
Lee County (Pennington Gap)	1	\$23,000	\$64,000
Leesburg Executive	617	\$16,966,000	\$40,582,000
Lonesome Pine	89	\$1,952,000	\$5,788,000
Louisa County	64	\$1,646,000	\$4,344,000

Table ES-3

## Virginia Economic Impact Study

**Total Airport Impacts - Alphabetical Listing**

Airport Name	Jobs	Wages	Economic Activity
Lunenburg County	-	\$4,000	\$12,000
Luray Caverns	17	\$160,000	\$432,000
Manassas Regional	921	\$32,137,000	\$84,214,000
Marks Municipal	10	\$147,000	\$413,000
Mecklenburg-Brunswick Regional	33	\$326,000	\$914,000
Middle Peninsula Regional	34	\$583,000	\$1,610,000
Mountain Empire	27	\$674,000	\$1,912,000
New Kent County	33	\$720,000	\$1,887,000
New London	15	\$271,000	\$738,000
New Market	18	\$367,000	\$987,000
New River Valley	43	\$662,000	\$1,811,000
Orange County	23	\$390,000	\$1,059,000
Shannon	97	\$2,240,000	\$5,960,000
Smith Mountain Lake	9	\$157,000	\$430,000
Suffolk Municipal	144	\$2,816,000	\$7,333,000
Tangier Island	5	\$45,000	\$125,000
Tappahannock Municipal	12	\$225,000	\$610,000
Tazewell County	21	\$351,000	\$947,000
Twin County	12	\$226,000	\$613,000
Virginia Highlands	113	\$3,024,000	\$7,033,000
Virginia Tech/Montgomery Executive	39	\$913,000	\$2,430,000
Wakefield Municipal	15	\$294,000	\$802,000
Warrenton-Fauquier	193	\$2,855,000	\$7,572,000
Waynesboro	16	\$179,000	\$479,000
William M. Tuck	25	\$583,000	\$1,555,000
Williamsburg-Jamestown	82	\$1,406,000	\$3,826,000
Winchester Regional	114	\$2,689,000	\$7,082,000
<b>Totals</b>	<b>38,744</b>	<b>\$921,381,000</b>	<b>\$2,399,139,000</b>
Stafford Regional*	22	\$566,000	\$1,492,000
Lee County (Jonesville)*	5	\$68,000	\$192,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

# Chapter One

## INTRODUCTION

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### 1.1 INTRODUCTION

Airports are an essential component of the communities they serve. While offering a fast, efficient, and safe method to move people and goods, airports also provide additional benefits. They are an important factor in influencing economic growth and development. In fact, many businesses cite proximity to an airport as a reason for locating in a particular area. Not only can airports generate economic benefits, but many companies not directly tied to aviation rely on airport services to support their daily business activities, further contributing to an area's economy.

With dwindling resources and ever-increasing demands for public works improvements, the true value of airports as economic tools must be assessed in order to provide decision makers with better information to make informed judgments.

This report quantifies the economic impacts of the public use airports in the Commonwealth of Virginia in the base year 2001, and describes the relationship between the airports and the Commonwealth's economy.

### 1.2 AIRPORT CLASSIFICATIONS AND LOCATION

At the time of this base year 2001 study, the Commonwealth had an extensive air transportation system organized in five classifications. The number of airports by Classification Category is shown in **Table 1.1**. In addition, a new airport opened in Stafford County in December 2001, and a replacement airport opened in Lee County in the year 2002. These facilities were not open during the study period and are not included in state impact totals. However, an estimate of their expected economic impact has been provided separately for informational purposes.

Table 1.1

**Number of Airports by Classification Category in 2001**

<b>Classification</b>	<b>2001</b>
Commercial Service	9
Reliever	7
General Aviation Regional	17
General Aviation Community	16
Local Service	17

The description provided below for each of the five classifications gives a general impression of the airport role and the type of facilities at each airport.

**Commercial Service (CS).** Commercial Service airports provide scheduled air carrier and/or commuter service to surrounding communities. Established Commercial Service airports are included in this category. If a noncommercial service airport acquires scheduled passenger service, it would qualify as a Commercial Service airport upon reaching 10,000 annual enplanements. Commercial Service airports should be developed at a minimum according to the Federal Aviation Administration Airport Reference Code (ARC)-Category “C” design criteria. A precision instrument approach should be provided if technically and economically feasible. Such airports are eligible to receive Air Carrier entitlement, as well as, Air Carrier/Reliever discretionary funding from the Commonwealth Airport Fund.

**Reliever (RL).** General aviation airports in metro areas intended to reduce congestion at large commercial service airports by providing general aviation pilots with comparable landside and airside facilities. To accommodate the full range of general aviation aircraft, reliever airports should be developed to ARC-C design criteria when feasible. A precision instrument approach should be provided if technically and economically feasible. Such airports are eligible for Air Carrier/Reliever discretionary funding from the Commonwealth.

**General Aviation Regional (GR).** Service areas for Regional airports are often multi-jurisdictional due to geographic isolation or the relative scarcity of other airport services and facilities. Regional airports serve a large market area. They provide a full range of aviation facilities and services to business and recreational users, including jet fuel, instrument approaches, full service fixed based operations, corporate hangars and GA terminal facilities. These airports should be developed to ARC-C category design criteria when feasible. A precision instrument approach should be provided if technically and economically feasible. Regional airports are eligible for General Aviation discretionary funding by the Commonwealth.

**General Aviation Community (GC).** These airports provide general aviation facilities and services to business and recreational users. Community airports typically serve their respective communities or a smaller market area. The services provided by Community airports typically include aircraft rental, flight training and AvGas sales. Community airports should be developed to ARC-B category design criteria. A non-precision instrument approach should be considered if technically and economically feasible and where justified by the level of operations. Community airports are eligible for General Aviation discretionary funding by the Commonwealth.

**Local Service (LO).** Local service airports are generally low activity facilities and provide limited general aviation facilities to their respective communities. These airports typically have development constraints which preclude substantial expansion. Such constraints include airspace conflicts, environmental concerns, topography, competing aeronautical services, surrounding land use patterns and ownership status. When technically and economically feasible, Local Service airports should be developed to an ARC A or B category design criteria. These airports are not eligible for Commonwealth funding except for safety and preservation projects. Local Service airports must meet minimum requirements for licensing in accordance with 5.1-7

of the Code of Virginia and 24 FAC 5-20-140 and may be in close proximity to larger airports in surrounding communities.

A detailed list of the Commonwealth’s classification of each public-use airport is provided in **Table 1.2**. Airport locations are shown in **Figure 1-1**.

Table 1.2

Virginia Economic Impact Study

**Airport Classifications**

Airport Name	Service Role
Charlottesville-Albemarle	CM
Lynchburg Regional	CM
Newport News-Williamsburg International	CM
Norfolk International	CM
Richmond International	CM
Roanoke Regional	CM
Ronald Reagan Washington National	CM
Shenandoah Valley Regional	CM
Washington Dulles International	CM
Chesapeake Regional	RL
Chesterfield County	RL
Hampton Roads	RL
Hanover County Municipal	RL
Leesburg Executive	RL
Manassas Regional	RL
Warrenton-Fauquier	RL
Accomack County	GR
Blue Ridge	GR
Culpeper County	GR
Danville Regional	GR
Dinwiddie County Airport	GR
Farmville Regional	GR
Ingalls Field	GR
Lonesome Pine	GR
Mecklenburg-Brunswick Regional	GR

Table 1.2 Continued

## Virginia Economic Impact Study

**Airport Classifications**


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Middle Peninsula Regional	GR
New River Valley	GR
Shannon	GR
Suffolk Municipal	GR
Tazewell County	GR
Virginia Highlands	GR
William M. Tuck	GR
Winchester Regional	GR
Blackstone Municipal	GC
Brookneal-Campbell County	GC
Emporia-Greenville Regional	GC
Franklin Municipal	GC
Front Royal-Warren County	GC
Louisa County	GC
Luray Caverns	GC
Marks Municipal	GC
Mountain Empire	GC
New Kent County	GC
Orange County	GC
Tangier Island	GC
Twin County	GC
Virginia Tech	GC
Wakefield Municipal	GC
Williamsburg-Jamestown	GC
Bridgewater Air Park	LO
Chase City Municipal	LO
Crewe Municipal	LO
Falwell	LO
Gordonsville Municipal	LO
Grundy Municipal	LO
Hartwood Field	LO
Hummel Field	LO
Lake Anna	LO
Lawrenceville-Brunswick	LO
Lee County (Pennington Gap)	LO
Lee County (Jonesville)	LO
Lunenburg County	LO
New London	LO
New Market	LO
Smith Mountain Lake	LO
Tappahannock Municipal	LO
Waynesboro	LO

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Source: HNTB

Figure 1-1  
2001 Virginia Airports



# Chapter Two

## METHODOLOGY

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### 2.1 TYPES OF ECONOMIC IMPACT

Total economic impacts are derived from the sum of on-airport direct impacts, off-airport direct impacts (visitor spending), and spin-off impacts (multiplier effect). In addition, airport dependent impacts are provided to show the importance of each airport to the business community. All impacts reported represent a base year of 2001. Each type of impact is defined as follows:

**On-Airport Direct Impacts** represent those impacts that would not occur if the airport did not exist, such as airlines, fixed base operators (FBO), government, and other tenants located at the airport or directly dependent on the airport. This category also includes airport management and other individuals employed directly by the airport.

**Off-Airport Direct Impacts (Visitor Spending)** are financial transactions that occur primarily off-site and are associated with visitor spending. The primary difference between on-airport direct impacts and off-airport direct impacts is that off-airport businesses benefit from additional revenue because of the airport, but would likely exist in the absence of the airport. The principal measure of off-airport direct impacts are expenditures made in the regional area by air travelers who are visiting from outside the region. These expenditures include items such as lodging, food, entertainment, and retail purchases. Off-airport direct impacts are often reported as indirect impacts.

**Airport Dependent Impacts** represent area businesses that are dependent on an airport for just-in-time shipping, a high degree of corporate travel, or specialized airport facilities and services such as free trade zones, U.S. Customs, and U.S. Immigration and Naturalization Services. These businesses would relocate or suffer substantial loss if the airport were not available. This impact is not included in traditional economic impact methodology and is provided as an indicator of the importance of airports to area businesses.

**Spin-Off Impacts (Multiplier Effect)** are calculated using impact multipliers, which are used to reflect the recycling of dollars through the economy. A dollar spent in the economy does not disappear; rather, it continues to move through the local economy in successive rounds until it is incrementally exported from the community. As the expenditures described above are released into the economy, they circulate among other industry sectors, creating successive waves of additional economic benefit in the form of jobs, payroll, and output (expenditures). These successive rounds of spending are known as spin-off impacts, and help to represent the full impact of each dollar spent in a region. An example would be an airport employee spending his or her salary for housing, food, and other services. Spending occurring outside the area is considered economic leakage and is not reflected in the multiplier. Spin-off impacts are often reported as induced impacts.

## 2.2 MEASURES OF ECONOMIC IMPACT

Each of the four impact types is measured in three ways – jobs, wages, and economic activity.

**Jobs** represent the total number of individuals employed – not full time equivalent positions. Consequently, an airport with 10 jobs may have 2 full-time and 8 part-time employees.

**Wages** are the full payroll expended for employees, including all taxes and benefits.

**Economic Activity**, otherwise known as output, represents business sales. For government, or non-profit entities, output represents their annual budget. For visitor spending, output represents visitor expenditures.

## 2.3 DATA COLLECTION

An extensive data collection program was conducted for this study. A copy of each survey is provided in **Appendix A**. Survey efforts included the following:

- Airport Manager Survey
- Airport Tenant Survey
- Airport Dependent Business Survey
- Corporate Based Aircraft Owners Survey
- Air Carrier Visitor Survey
- General Aviation Visitor Survey

The **Airport Manager Survey** was designed to gather the local employment, payroll, and average annual capital expenditures for each airport. The survey also requested qualitative information on airport benefits that may not be quantifiable. The survey was distributed by mail or fax to all 66 public-use airports.

Personal visits were conducted for the Commonwealth's Air Carrier, Reliever, General Aviation Regional, and General Aviation Community Airports. The surveys were conducted by mail and telephone for the Commonwealth's 17 General Aviation Local Service airports. As previously stated, the impacts for Ronald Reagan Washington National and Dulles International were calculated separately in another study and are included in this study as reported by their consultant. Survey data for these airports was estimated with the assistance of the Virginia Department of Aviation.

Survey results indicate there are 1,060 people employed directly by Virginia airports. These jobs include airport management, airport staff and others that work for the airport directly. This does not include tenants, numerous volunteers, or those individuals who are employed primarily by city or county governments, but would not lose their jobs in the absence of the airport. When these additional personnel are included, there are 8,190 people employed by Virginia's airports.

## Capital Expenditures

Capital expenditures represent payments for the acquisition of long-term assets such as terminal buildings and runways, but not for day-to-day operations such as payroll, inventory, maintenance or advertising. As shown in **Table 2.1**, survey results indicated that capital expenditures at Commonwealth airports have increased substantially from \$47 million in 1999 to over \$140 million in 2001.

Table 2.1

### Virginia Economic Impact Study

#### Average Capital Expenditures

1999	2000	2001
\$47,528,000	\$94,468,000	\$140,460,000

Source: HNTB Analysis

## Qualitative Benefits

The Airport Manager Survey also requested information regarding the numerous “value-added” benefits of airports within the Commonwealth. These qualitative benefits, for which dollar values cannot readily be assigned, take place on a regular basis and add to the quality of life of residents in the market area. **Table 2.2** details the most common qualitative attributes of each airport. In addition, the following airports reported unique qualitative benefits.

- Richmond International Airport - Airship mooring for blimps to be received during NASCAR events at Richmond International Raceway; a substantial military presence including the Virginia Air National Guard 192nd Tactical Fighter Group, and the Virginia Army National Guard; a substantial governmental presence including the Virginia Department of Aviation, U.S. Customs, U.S. Department of Agriculture, U.S. Postal Service, and Free Trade Zone #207.
- Accomack County Airport – The airport received a grant for deer eradication. The venison is given to local food banks.
- Chesterfield County Airport – A restaurant and banquet hall serve the community.
- Dinwiddie County Airport – The airport provides military aircraft refueling; military VIP transport, and U.S. Forest Service aerial firefighting.
- Lonesome Pine Airport – Civil Air Patrol and powered parachutes.
- New Kent County – Marijuana eradication program.
- Winchester Regional Airport – Glider operations for Civil Air Patrol.

Table 2.2

Virginia Economic Impact Study

Qualitative Impacts

Airport Name	Rec flying/parachuting	Ballooning	Pres. Open space/wetlands/ etc.	Career Training/Education	Search & Rescue	Flight Training	Emergency Med. Aviation	VIP/High Profile Visitors	Staging Area (Events)	Aerial Inspections	Advertising/Banner Towing	Shipping Perishable Goods	Agricultural Spraying	Freight/Cargo	Traffic/News Reporting	Corp/Business Activity	Environmental Patrol	Aerial Photography/Surveying	Museums	Police/Law Enforcement	Community Facil./Util.	Public Charters
<b><u>Air Carrier Airports</u></b>																						
Charlottesville-Albermarle Airport			x		x	x	x	x	x	x		x		x		x		x		x		
Lynchburg Regional Airport	x			x	x	x	x	x	x			x		x	x	x		x		x	x	
Newport News	x		x	x	x	x	x	x	x			x		x	x	x		x		x		x
Norfolk International Airport	x	x	x	x	x	x	x	x				x	x	x	x	x		x	x	x	x	x
Richmond International Airport	x		x	x	x	x	x	x	x			x		x	x	x		x		x	x	x
Roanoke Regional Airport	x				x	x		x				x		x		x		x		x		
Shenandoah Regional Airport	x			x	x	x	x	x	x			x	x	x		x		x		x	x	x
<b><u>General Aviation Airports</u></b>																						
Accomack County	x		x					x	x	x			x					x			x	x
Blackstone Municipal	x																				x	
Blue Ridge	x		x	x	x	x	x	x	x		x		x	x		x		x	x	x		x
Bridgewater Air Park														x		x						
Brookneal-Campbell County	x	x			x	x	x		x	x		x	x			x		x			x	
Chase City Municipal																						
Chesapeake Regional	x				x	x	x	x					x	x		x		x		x		
Chesterfield County	x			x	x	x	x	x								x				x	x	x
Crewe Municipal																						
Culpeper County	x		x	x	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x
Danville Regional	x	x		x	x	x	x	x	x				x		x	x		x		x	x	x
Dinwiddie County Airport	x					x		x					x		x	x				x		x
Emporia-Greenville Regional	x		x	x			x	x	x			x	x			x		x		x	x	
Falwell	x			x		x				x			x			x		x				
Farmville Regional	x		x	x	x	x	x	x	x				x	x		x		x		x		x
Franklin Municipal				x	x	x	x	x					x			x		x		x		
Front Royal-Warren County	x		x	x	x	x	x	x	x	x	x	x	x	x		x		x		x	x	x
Gordonsville Municipal	x		x		x		x						x					x		x		x
Grundy Municipal	x	x			x	x				x						x		x		x		
Hampton Roads	x	x	x	x		x		x	x	x					x	x		x		x	x	x
Hanover County Municipal	x	x		x		x							x	x		x		x				
Hartwood Field	x		x								x											

Table 2.2 Continued

Virginia Economic Impact Study

Qualitative Impacts

Airport Name	Rec flying/parachuting	Ballooning	Pres. Open space/wetlands/ etc.	Career Training/Education	Search & Rescue	Flight Training	Emergency Med. Aviation	VIP/High Profile Visitors	Staging Area (Events)	Aerial Inspections	Advertising/Banner Towing	Shipping Perishable Goods	Agricultural Spraying	Freight/Cargo	Traffic/News Reporting	Corp/Business Activity	Environmental Patrol	Aerial Photography/Surveying	Museums	Police/Law Enforcement	Community Facil./Util.	Public Charters
Hummel Field																						
Ingalls Field	x		x				x	x					x			x		x		x	x	
Lake Anna																						
Lawrenceville-Brunswick	x				x		x	x	x	x			x			x		x		x	x	
Lee County (Pennington Gap)	x						x	x			x					x					x	
Lee County (Jonesville)	x						x									x					x	
Leesburg Executive	x			x	x	x	x	x	x				x			x	x	x			x	
Lonesome Pine	x			x	x	x	x	x	x	x	x			x		x	x	x			x	x
Louisa County	x		x			x	x						x			x		x			x	x
Lunenburg County																						
Luray Caverns	x	x		x	x	x	x	x		x			x	x		x	x	x			x	
Manassas Regional	x		x	x	x	x	x	x	x	x					x	x	x	x	x		x	x
Marks Municipal	x							x														
Mecklenburg-Brunswick Rgnl	x			x	x	x	x	x		x			x	x	x	x	x	x			x	x
Middle Peninsula Regional	x		x	x	x				x							x						
Mountain Empire	x				x		x	x	x	x				x		x	x	x			x	x
New Kent County	x		x	x	x	x	x	x	x	x	x				x		x	x			x	x
New London			x																			
New Market	x	x	x	x	x	x	x	x	x	x			x			x		x				
New River Valley	x		x	x	x	x	x	x		x				x		x					x	
Orange County	x						x	x									x	x	x			x
Shannon	x					x										x						
Smith Mountain Lake	x					x				x								x				
Stafford Regional Airport	x		x			x	x										x				x	
Suffolk Municipal	x		x	x	x	x	x	x	x	x											x	x
Tangier Island	x				x		x		x			x										
Tappahannock Municipal																						
Tazewell County	x	x		x	x	x	x	x	x	x						x		x			x	x
Twin County	x	x			x		x	x		x			x	x		x		x			x	x
Virginia Highlands	x	x			x	x	x	x	x							x					x	x
Virginia Tech						x	x	x	x							x		x			x	x
Wakefield Municipal	x				x	x	x						x					x			x	x
Warrenton-Fauquier	x	x	x	x	x	x	x		x	x			x	x	x	x		x			x	x
Waynesboro																						
William M. Tuck	x					x																
Williamsburg-Jamestown			x	x	x	x		x	x	x	x					x		x			x	x
Winchester Regional	x	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x			x	x

Source: HNTB Analysis

The **Airport Tenant Survey** was distributed to a total of 307 firms located on airport property and identified by airport managers and sponsors to have airport dependent employees. Care was taken to include only those employees whose jobs depend on a local airport. Although many airports lease space to businesses that are not aviation dependent, these businesses could be located anywhere within the community. Consequently, non-aviation dependent employees were not included for the purpose of this study.

The survey requested local employment, and payroll, for each tenant. Through extensive mail and telephone follow-up efforts, approximately 211 firms (69%), responded to the survey. Employment levels for the remaining firms were estimated through discussions with airport managers and sponsors and confirmed using Dun & Bradstreet data, as available. There are approximately 7,130 people employed by airport tenants throughout the Commonwealth.

The **Airport Dependent Business Survey** was mailed to approximately 2,000 Virginia businesses that were thought to be dependent on a local airport in whole or in part. The mailing list was developed based on identified Standard Industrial Classifications and was reviewed and refined with the assistance of each airport manager to identify those businesses that directly depend on airports. One example would be microchip manufacturers where next day air delivery is critical to their business. A total of 162 businesses, representing more than 11,000 employees responded that they were airport dependent.

The **Corporate Based Aircraft Owner's Survey** was designed to further identify those businesses that may have airport dependent employees. With the assistance of airport managers and sponsors, a total of 318 Corporate Based Aircraft Owners were identified. Approximately 76 firms responded to the survey, with 24 firms stating that their employment levels would decrease by up to 2907 employees if their local airport were unavailable.

**Air Carrier Visitor Surveys** were conducted at all Air Carrier airports other than Ronald Reagan Washington National and Dulles International Airports. This survey effort was conducted between July 8 and July 30, 2001 with each airport being surveyed for one 16-hour mid-week day. Approximately 750 passenger intercept style surveys were completed by outbound passengers at the seven Air Carrier airports. This survey was designed to capture the percentage of visitors to each airport as well as data to determine expenditure profiles for visiting airport passengers using Air Carrier services.

The percent of visitors was gathered from the Air Carrier Visitor Survey and is specific for each airport as shown in **Table 2.3**.

The average length of stay, as well as the number of Air Carrier Visitor Surveys received for each airport, is detailed in **Table 2.4**. The average expenditure per trip per passenger is detailed in **Table 2.5**.

Table 2.3

## Virginia Economic Impact Study

**Percentage of Visitors for Air Carrier Airports**

Airport Name	Percent Visitors
Norfolk International	48%
Newport News-Williamsburg Intl	45%
Richmond International	44%
Roanoke Regional	44%
Lynchburg Regional	42%
Charlottesville-Albemarle	41%
Shenandoah Valley Regional	38%

Source: HNTB Analysis

Table 2.4

## Virginia Economic Impact Study

**Surveys Received and Average Length of Stay  
Air Carrier Airports**

Airport Name	Surveys Received	Average Length of Stay (Days)
Charlottesville-Albemarle	83	5.7
Richmond International	171	4.9
Lynchburg Regional	51	4.5
Shenandoah Valley Regional	51	4.5
Newport News-Williamsburg International	61	4.5
Norfolk International	67	4.2
Roanoke Regional	138	3.3

Note: Data for Lynchburg and Shenandoah were combined due to small sample size at each airport.

Source: HNTB Analysis

Table 2.5

## Virginia Economic Impact Study

**Average Visitor Expenditures for Air Carrier Airports**

Airport Name	Lodging	Food & Beverage	Local Transportation	Entertainment	Retail	Average Visitor Spending per Trip
Charlottesville-Albemarle	\$486.38	\$261.85	\$138.70	\$46.63	\$41.08	\$974.65
Lynchburg Regional*	\$330.27	\$137.74	\$140.66	\$45.54	\$85.58	\$739.79
Shenandoah Valley Regional*	\$330.27	\$137.74	\$140.66	\$45.54	\$85.58	\$739.79
Roanoke Regional	\$286.61	\$143.61	\$94.97	\$54.81	\$16.21	\$596.22
Richmond International	\$129.09	\$108.94	\$69.52	\$39.02	\$17.81	\$364.38
Norfolk International	\$113.07	\$83.12	\$61.24	\$42.91	\$14.32	\$314.67
Newport News-Williamsburg	\$86.48	\$63.43	\$31.79	\$36.78	\$19.73	\$238.21

Note: Data for Lynchburg and Shenandoah were combined due to small sample size at each airport.

Source: EDRG and HNTB Analysis

**General Aviation Visitor Surveys** were conducted with the assistance of local Fixed Base Operators. Postage paid mail-back surveys were provided to all Fixed Base Operators at each airport to distribute for a period of 30 days. The purpose of this survey was to capture expenditure data for general aviation visiting airport passengers. Approximately 135 surveys were returned with sufficient data for analysis. As shown in **Tables 2.6 and 2.7**, the average general aviation (except local service) visitor spent \$133.19 per trip. Insufficient surveys were received from General Aviation Local Service airports. Consequently, an assumption of \$75 per person per trip was used for Local Service visitor expenditures.

The number of people per aircraft ranged from 1.5 at General Aviation – Local Service airports to 4.45 at Air Carrier airports.

Table 2.6

Virginia Economic Impact Study

**Average Visitor Expenditures for General Aviation Airports (Except Local Service)**

Lodging	\$60.61
Food & Beverage	\$34.52
Local Transportation	\$17.96
Entertainment	\$15.05
Retail	\$5.05
Average Visitor Spending per Trip	\$133.19

Source: EDRG and HNTB Analysis

Table 2.7

Virginia Economic Impact Study

**Average Number of Passengers Per General Aviation Aircraft**

Airport Type	Average Passengers Per Aircraft
Air Carrier Airports	4.45
Reliever and GA Regional Airports	3.25
GA Community	2.00
GA Local Service	1.50

Source: EDRG and HNTB Analysis

## 2.4 CALCULATING IMPACTS

**On-Airport Direct Impacts** represent economic activities that would not occur if the airport did not exist. They are aggregated directly from the Airport Manager and Airport Tenant Surveys and include local taxes, payroll, and local operating and capital expenditures made by the airport, airlines, parking, maintenance facilities, ground transportation, food and drink establishments, etc. Because this study focuses on the impact of airports within the Commonwealth of Virginia, only those expenditures made within the state were used. Substantial effort was made to include only those businesses that sell products or services directly to the end users of the product or service in order to avoid double counting. Stafford Regional Airport opened 12/2001. The new Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

**Off-Airport Direct Impacts (Visitor Spending)** are those financial transactions that are associated with the users of airport services. For example, visitors to an area have associated expenses such as lodging, food and entertainment. These impacts may occur on or off of the airport, but occur because of the airport. These impacts were derived by multiplying the estimated number of visitors by the average expenditure per trip, however the inputs varied substantially for General Aviation and Air Carrier airports. Estimates of 2002 impacts for Stafford Regional Airport and the replacement Lee County Airport (Jonesville) are provided for informational purposes, but are not included in state totals.

### Visitors Arriving by Air Carrier

The number of estimated visitors for each Air Carrier airport was calculated by multiplying reported 2001 enplaned passengers by the percent of visitors to the area. The percent of visitors was gathered from the Air Carrier Visitor Survey and is specific for each airport as shown in **Table 2.8**. **Table 2.9** details the total visitor spending for visitors arriving via air carrier for each Air Carrier airport. General aviation visitors to Air Carrier airports were estimated using the assumptions documented below, in General Aviation Assumptions.

Table 2.8

## Virginia Economic Impact Study

**Number of Visitors for Air Carrier Airports**

Airport Name	Enplanements	Percent Visitors	Total Air Carrier Visitors
Norfolk International	1,481,612	48%	711,174
Richmond International	1,208,477	44%	531,730
Roanoke Regional	304,328	44%	133,904
Newport News-Williamsburg Intl	209,520	45%	94,284
Charlottesville-Albemarle	154,634	41%	63,400
Lynchburg Regional	63,699	42%	26,754
Shenandoah Valley Regional	18,947	38%	7,200
<b>Total</b>	<b>3,441,217</b>		<b>1,568,445</b>

Source: HNTB Analysis

Table 2.9

## Virginia Economic Impact Study

**Air Carrier Passenger Visitor Spending at Air Carrier Airports**

Airport Name	Total Air Carrier Visitors	Average Visitor Spending Per Trip	Air Carrier Passenger Visitor Spending
Norfolk International	711,174	\$314.67	\$223,784,000
Richmond International	531,730	\$364.38	\$193,750,000
Roanoke Regional	133,904	\$596.22	\$79,836,000
Charlottesville-Albemarle	63,400	\$974.65	\$61,793,000
Newport News-Williamsburg Intl	94,284	\$238.21	\$22,459,000
Lynchburg Regional	26,754	\$739.79	\$19,792,000
Shenandoah Valley Regional	7,200	\$739.79	\$5,326,000
<b>Total</b>	<b>1,568,445</b>		<b>\$606,740,000</b>

Source: HNTB Analysis

Note: Totals may not add due to rounding.

Visitors Arriving by General Aviation

As shown in **Tables 2.10 and 2.11**, the number of estimated general aviation visitors for each airport was calculated by multiplying total arrival operations by the average number of people per aircraft, and multiplied again by the estimated number of true transient visitors.

The average number of people per aircraft was gathered from the General Aviation Visitors Survey and varied for general aviation operations at General Aviation airports and Air Carrier airports. General Aviation airports averaged 3.25 people per GA aircraft. Air Carrier airports averaged 4.5 people per GA aircraft.

The estimated number of true transient visitors was assumed to be a factor of runway length. Per 1998 Civil Air Patrol survey data, airports with primary runways greater than 4,000 feet were assumed to have 29 percent true transient operations; airports with primary runways less than 4,000 feet were assumed to have 31 percent true transient operations.

Table 2.10

## Virginia Economic Impact Study

**General Aviation Visitors at Air Carrier Airports**

Airport Name	2001 GA		Percent True Transient	Average People Per Aircraft	Number of GA Visitors
	2001 GA Operations	2001 GA Arrival Operations			
Newport News-Williamsburg Intl	132,233	66,117	0.29	4.45	85,323
Roanoke Regional	60,980	30,490	0.29	4.45	39,347
Charlottesville-Albemarle	52,271	26,136	0.29	4.45	33,728
Richmond International	48,593	24,297	0.29	4.45	31,355
Shenandoah Valley Regional	44,892	22,446	0.29	4.45	28,967
Norfolk International	43,733	21,867	0.29	4.45	28,219
Lynchburg Regional	41,151	20,576	0.29	4.45	26,553
Total	423,853	211,927			273,491

Source: HNTB Analysis

Table 2.11  
Virginia Economic Impact Study  
General Aviation Visitors at General Aviation Airports

Airport Name	2001 GA Operations	2001 GA Arrival Operations	Percent True Transient	Average People Per Aircraft	Number of GA Visitors
Accomack County	9,925	4,962	0.29	3.25	4,677
Blackstone Municipal	3,111	1,556	0.29	2	902
Blue Ridge	21,990	10,995	0.29	3.25	10,363
Bridgewater Air Park	11,189	5,594	0.31	1.5	2,601
Brookneal-Campbell County	741	371	0.31	2	230
Chase City Municipal	1,910	955	0.31	1.5	444
Chesapeake Regional	27,882	13,941	0.29	3.25	13,140
Chesterfield County	46,971	23,485	0.29	3.25	22,135
Crewe Municipal	3,740	1,870	0.31	1.5	870
Culpeper County	44,057	22,029	0.29	3.25	20,762
Danville Regional	16,171	8,086	0.29	3.25	7,621
Dinwiddie County Airport	33,110	16,555	0.29	3.25	15,603
Emporia-Greensville Regional	1,107	554	0.29	2	321
Falwell	6,448	3,224	0.31	1.5	1,499
Farmville Regional	9,784	4,892	0.29	3.25	4,611
Franklin Municipal	4,490	2,245	0.29	2	1,302
Front Royal-Warren County	9,949	4,974	0.31	2	3,084
Gordonsville Municipal	5,878	2,939	0.31	1.5	1,367
Grundy Municipal	3,735	1,867	0.31	1.5	868
Hampton Roads	56,090	28,045	0.31	3.25	28,255
Hanover County Municipal	27,060	13,530	0.29	3.25	12,752
Hartwood Field	4,130	2,065	0.31	1.5	960
Hummel Field	11,099	5,550	0.31	1.5	2,581
Ingalls Field	6,218	3,109	0.29	3.25	2,930
Lake Anna	371	185	0.31	1.5	86
Lawrenceville-Brunswick	1,929	965	0.31	1.5	449
Lee County (Pennington Gap)	1,967	984	0.31	1.5	457
Leesburg Executive	85,050	42,525	0.29	3.25	40,080
Lonesome Pine	8,524	4,262	0.29	3.25	4,017
Louisa County	14,185	7,092	0.29	2	4,114
Lunenburg County	371	185	0.31	1.5	86
Luray Caverns	3,336	1,668	0.31	2	1,034
Manassas Regional	136,363	68,181	0.29	3.25	64,261
Marks Municipal	4,393	2,197	0.29	2	1,274
Mecklenburg-Brunswick Rgnl	5,984	2,992	0.29	3.25	2,820
Middle Peninsula Regional	12,021	6,010	0.31	3.25	6,055
Mountain Empire	9,866	4,933	0.29	2	2,861
New Kent County	14,561	7,281	0.31	2	4,514
New London	22,749	11,375	0.31	1.5	5,289
New Market	13,116	6,558	0.31	1.5	3,050
New River Valley	9,052	4,526	0.29	3.25	4,266
Orange County	8,150	4,075	0.31	2	2,527
Shannon	28,400	14,200	0.31	3.25	14,306

Table 2.11 Continued

## Virginia Economic Impact Study

**General Aviation Visitors at General Aviation Airports**

Airport Name	2001 GA Operations	2001 GA Arrival Operations	Percent True Transient	Average People Per Aircraft	Number of GA Visitors
Smith Mountain Lake	4,799	2,399	0.31	1.5	1,116
Suffolk Municipal	31,268	15,634	0.29	3.25	14,735
Tangier Island	1,000	500	0.31	2	310
Tappahannock Municipal	5,380	2,690	0.31	1.5	1,251
Tazewell County	4,784	2,392	0.29	3.25	2,255
Twin County	6,359	3,180	0.29	2	1,844
Virginia Highlands	22,880	11,440	0.29	3.25	10,782
Virginia Tech	14,231	7,116	0.29	3.25	6,707
Wakefield Municipal	11,157	5,579	0.29	2	3,236
Warrenton-Fauquier	38,094	19,047	0.29	3.25	17,952
Waynesboro	11,745	5,873	0.31	1.5	2,731
William M. Tuck	7,043	3,522	0.29	3.25	3,319
Williamsburg-Jamestown	21,490	10,745	0.31	3.25	10,826
Winchester Regional	30,738	15,369	0.29	3.25	14,485
<b>Total</b>	<b>958,146</b>	<b>479,073</b>			<b>412,972</b>
Stafford Regional*	4,500	2,250	0.29	3.25	2,121
Lee County (Jonesville)*	1,000	500	0.29	3.25	471

Source: EDRG and HNTB Analysis

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

**Tables 2.12 and 2.13** detail the total visitor spending for visitors arriving via general aviation aircraft for both Air Carrier and General Aviation airports.

Table 2.12

## Virginia Economic Impact Study

**General Aviation Visitor Spending at Air Carrier Airports**

Airport Name	Number of GA Visitors	Average Visitor Spending Per Trip	General Aviation Passenger Visitor Spending
Charlottesville-Albemarle	85,323	\$133.19	\$11,364,000
Lynchburg Regional	39,347	\$133.19	\$5,241,000
Norfolk International	31,355	\$133.19	\$4,176,000
Newport News-Williamsburg Intl	33,728	\$133.19	\$4,492,000
Richmond International	28,967	\$133.19	\$3,858,000
Roanoke Regional	28,219	\$133.19	\$3,758,000
Shenandoah Valley Regional	26,553	\$133.19	\$3,537,000
<b>Total</b>	<b>273,491</b>		<b>\$36,426,000</b>

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

Table 2.13

## Virginia Economic Impact Study

**General Aviation Visitor Spending at General Aviation Airports**

Airport Name	Number of Annual GA Visitors	Average Visitor Spending Per Trip	General Aviation Passenger Visitor Spending
Accomack County	4,677	\$133.19	\$623,000
Blackstone Municipal	902	\$133.19	\$120,000
Blue Ridge	10,363	\$133.19	\$1,380,000
Bridgewater Air Park	2,601	\$75.00	\$195,000
Brookneal-Campbell County	230	\$133.19	\$31,000
Chase City Municipal	444	\$75.00	\$33,000
Chesapeake Regional	13,140	\$133.19	\$1,750,000
Chesterfield County	22,135	\$133.19	\$2,948,000
Crewe Municipal	870	\$75.00	\$65,000
Culpeper County	20,762	\$133.19	\$2,765,000
Danville Regional	7,621	\$133.19	\$1,015,000
Dinwiddie County Airport	15,603	\$133.19	\$2,078,000
Emporia-Greenville Regional	321	\$133.19	\$43,000
Falwell	1,499	\$75.00	\$112,000
Farmville Regional	4,611	\$133.19	\$614,000
Franklin Municipal	1,302	\$133.19	\$173,000
Front Royal-Warren County	3,084	\$133.19	\$411,000
Gordonsville Municipal	1,367	\$75.00	\$103,000
Grundy Municipal	868	\$75.00	\$65,000
Hampton Roads	28,255	\$133.19	\$3,763,000
Hanover County Municipal	12,752	\$133.19	\$1,698,000
Hartwood Field	960	\$75.00	\$72,000
Hummel Field	2,581	\$75.00	\$194,000
Ingalls Field	2,930	\$133.19	\$390,000
Lake Anna	86	\$75.00	\$6,000
Lawrenceville-Brunswick	449	\$75.00	\$34,000
Lee County (Pennington Gap)	457	\$75.00	\$34,000
Leesburg Executive	40,080	\$133.19	\$5,338,000
Lonesome Pine	4,017	\$133.19	\$535,000
Louisa County	4,114	\$133.19	\$548,000
Lunenburg County	86	\$75.00	\$6,000
Luray Caverns	1,034	\$133.19	\$138,000
Manassas Regional	64,261	\$133.19	\$8,559,000
Marks Municipal	1,274	\$133.19	\$170,000
Mecklenburg-Brunswick Rgnl	2,820	\$133.19	\$376,000
Middle Peninsula Regional	6,055	\$133.19	\$807,000
Mountain Empire	2,861	\$133.19	\$381,000
New Kent County	4,514	\$133.19	\$601,000
New London	5,289	\$75.00	\$397,000

Table 2.13 Continued

## Virginia Economic Impact Study

**General Aviation Visitor Spending at General Aviation Airports**

Airport Name	Number of Annual GA Visitors	Average Visitor Spending Per Trip	General Aviation Passenger Visitor Spending
New Market	6,607	\$75.00	\$496,000
New River Valley	4,266	\$133.19	\$568,000
Orange County	4,106	\$133.19	\$547,000
Shannon	14,306	\$133.19	\$1,905,000
Smith Mountain Lake	2,417	\$75.00	\$181,000
Suffolk Municipal	14,735	\$133.19	\$1,963,000
Tangier Island	504	\$133.19	\$67,000
Tappahannock Municipal	2,710	\$75.00	\$203,000
Tazewell County	2,255	\$133.19	\$300,000
Twin County	2,997	\$133.19	\$399,000
Virginia Highlands	10,782	\$133.19	\$1,436,000
Virginia Tech	6,707	\$133.19	\$893,000
Wakefield Municipal	5,258	\$133.19	\$700,000
Warrenton-Fauquier	17,952	\$133.19	\$2,391,000
Waynesboro	5,917	\$75.00	\$444,000
William M. Tuck	3,319	\$133.19	\$442,000
Williamsburg-Jamestown	10,826	\$133.19	\$1,442,000
Winchester Regional	14,485	\$133.19	\$1,929,000
<b>Total</b>	<b>427,424</b>		<b>\$54,877,000</b>
Stafford Regional*	2,121	\$133.19	\$282,000
Lee County (Jonesville)*	471	\$133.19	\$63,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

**Airport Dependent Impacts** are aggregated directly from the Airport Dependent Business and Corporate Based Aircraft Surveys and include local taxes, payroll, and local operating expenditures made by each responding business. Because this impact is not included in traditional economic impact analysis, it is not included in the total economic impact for each airport, but is provided separately as an indicator of the importance of airports to area businesses.

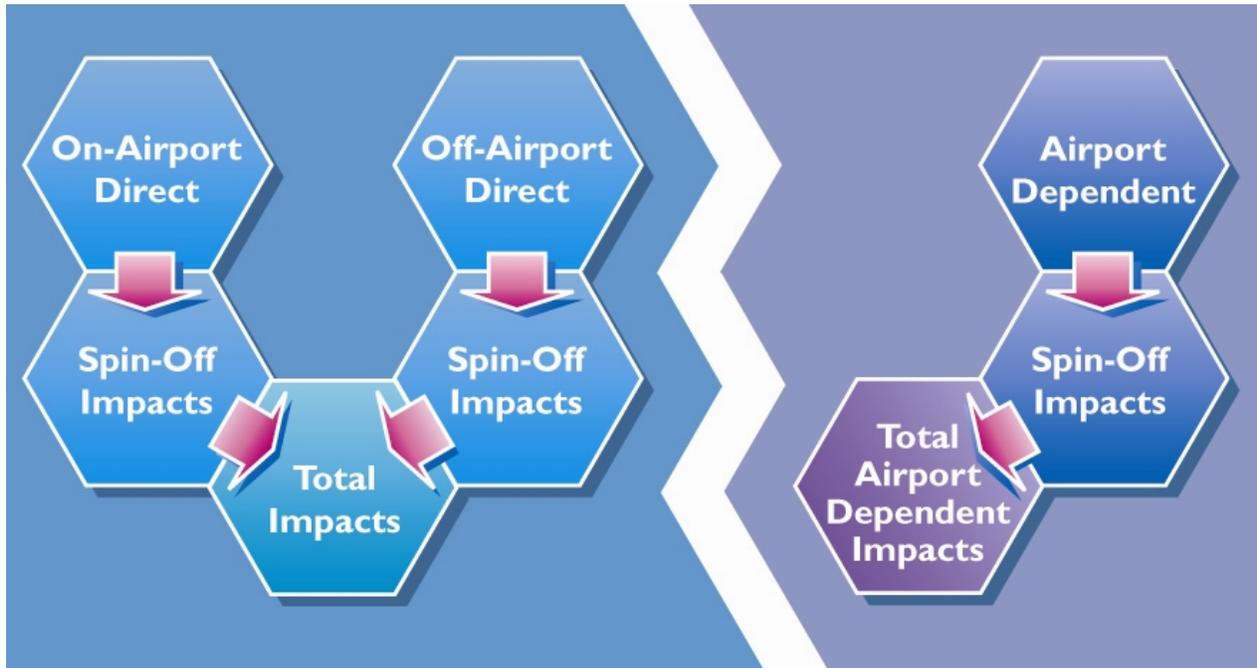
**Spin-Off Impacts (Multiplier Effects)** are determined by multiplying on-airport direct, off-airport direct (visitor spending), and airport dependent impacts by county and industry-specific multipliers. There are three different types of impact multipliers that may be used: employment, payroll, and output. Each is a different, separate measure of the recycling of dollars. Therefore, the figures may not be aggregated.

To quantify the effect of continued re-investment of output resulting from on-airport direct, off-airport direct (visitor spending), and airport dependent impacts, both County-specific and statewide Virginia IMPLAN multipliers were used. Separate multipliers for each major industry grouping that represented on-airport tenants and visitor expenditures were used in order to increase accuracy. Industry groupings included air transportation, eating and drinking places, Federal and State/local government, etc. All tables and statewide totals in this report reflect the use of statewide multipliers.

IMPLAN stands for “Impact Analysis for Planning” and is now the most widely used input-output economic modeling system in the US, with a client list of 500 public and private agencies including several federal agencies and numerous state agencies. It utilizes U.S. Commerce Department (“National Income and Product Accounts”) data on inter-industry technology relationships (also known as input-output structural matrices), countywide employment and income data from the Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS), and its own industry and county-specific estimates of local purchasing rates (“regional purchase coefficients”). It is enhanced over most other input-output models in that it also includes coverage of public sector activity and consumer activity (reflected in its “social accounting matrix”). The industry detail is at the level of 528 industries, and is based on categories of the US Bureau of Economic Analysis (BEA), which correspond to 3 and 4-digit groups in the Standard Industrial Classification (SIC) system.

As shown in **Figure 2-1**, Total Economic Impacts are the sum of on-airport direct, off-airport direct (visitor spending), and spin-off impacts (multiplier effect). To maximize the ability to directly compare Virginia economic impacts with impacts in other states, and other individual airports, airport dependent impacts are provided separately.

Figure 2-1  
Calculation of Total Economic Impacts



# Chapter Three

## STATEWIDE ECONOMIC IMPACTS OF AVIATION

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### 3.1 TOTAL IMPACTS

Total economic impacts are derived from the sum of on-airport direct impacts, off-airport direct impacts (visitor spending) and spin-off impacts (multiplier effect). As detailed in **Table 3.1**, the total economic impact of all Virginia airports, including Ronald Reagan Washington National Airport and Dulles International Airport is greater than \$14 billion. Total impacts by airport are detailed in **Tables 3.2-3.5**. **Table 3.2** depicts total impacts, alphabetically by airport. **Table 3.3** shows total impacts ranked by economic activity, **Table 3.4** shows total impacts ranked by total jobs, and **Table 3.5** shows total impacts ranked by wages.

Table 3.1

## Virginia Economic Impact Study

**Total Economic Impact for Virginia Public-Use Airports**

Type of Impact	Jobs	Wages	Economic Activity
On-Airport Direct	8,190	\$275,372,000	\$610,059,000
Off-Airport Direct (Visitor Spending)	17,103	\$266,432,000	\$695,768,000
Spin-Off	13,451	\$379,577,000	\$1,093,312,000
Total Economic Impact*	38,744	\$921,381,000	\$2,399,139,000
Airport Dependent Business	23,606	\$773,179,000	\$2,268,056,000
Ronald Reagan Washington National Airport (Virginia Impacts)	35,779	\$1,026,891,000	\$1,715,653,000
Dulles International Airport (Virginia Impacts)	65,961	\$2,122,560,000	\$4,368,960,000
Total Economic Impact for All VA Airports	164,091	\$4,844,011,000	\$10,751,808,000

Source: EDRG and HNTB Analysis

\* All airports except Ronald Reagan Washington National and Dulles International.

Note: Totals may not add due to rounding.

Note: Economic impacts for Ronald Reagan Washington National and Dulles International airports were provided by Martin Associates from their 2002 Economic Impact Study. With the assistance of Martin Associates, Virginia specific economic impacts were estimated by multiplying total impacts by the percent of employees located in Virginia. Total impacts for Ronald Reagan Washington National Airport are 62,700 jobs, \$1.97 billion in wages, and \$3.29 billion in economic activity. Total impacts for Dulles International Airport are 91,600 jobs, \$2.95 billion in wages, and \$6.07 billion in economic activity.

Table 3.2

## Virginia Economic Impact Study

**Total Airport Impacts - Alphabetical Listing**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	2,605	\$62,741,000	\$167,258,000
Lynchburg Regional	1,262	\$25,392,000	\$68,500,000
Newport News-Williamsburg International	2,459	\$55,491,000	\$148,124,000
Norfolk International	11,457	\$266,345,000	\$702,898,000
Richmond International	11,843	\$295,395,000	\$744,785,000
Roanoke Regional	4,148	\$94,981,000	\$252,728,000
Shenandoah Valley Regional	476	\$10,120,000	\$27,069,000
<b><u>General Aviation Airports</u></b>			
Accomack County	41	\$608,000	\$1,657,000
Blackstone Municipal	11	\$113,000	\$314,000
Blue Ridge	91	\$1,372,000	\$3,805,000
Bridgewater Air Park	123	\$3,464,000	\$8,910,000
Brookneal-Campbell County	1	\$21,000	\$57,000
Chase City Municipal	1	\$22,000	\$62,000
Chesapeake Regional	120	\$2,746,000	\$7,304,000
Chesterfield County	266	\$6,752,000	\$16,847,000
Crewe Municipal	3	\$44,000	\$121,000
Culpeper County	140	\$2,488,000	\$6,786,000
Danville Regional	74	\$1,650,000	\$4,323,000
Dinwiddie County	114	\$1,795,000	\$4,821,000
Emporia-Greenville Regional	18	\$206,000	\$567,000
Falwell	21	\$207,000	\$553,000
Farmville Regional	51	\$617,000	\$1,690,000
Franklin Municipal	23	\$379,000	\$992,000
Front Royal-Warren County	77	\$2,035,000	\$5,328,000
Gordonsville Municipal	8	\$202,000	\$529,000
Grundy Municipal	5	\$111,000	\$295,000
Hampton Roads	256	\$5,964,000	\$15,857,000
Hanover County Municipal	138	\$3,799,000	\$9,969,000
Hartwood Field	38	\$706,000	\$1,854,000
Hummel Field	13	\$181,000	\$486,000
Ingalls Field	16	\$344,000	\$922,000
Lake Anna	-	\$4,000	\$12,000
Lawrenceville-Brunswick	3	\$55,000	\$152,000
Lee County (Pennington Gap)	1	\$23,000	\$64,000
Leesburg Executive	617	\$16,966,000	\$40,582,000
Lonesome Pine	89	\$1,952,000	\$5,788,000
Louisa County	64	\$1,646,000	\$4,344,000

Table 3.2 Continued

## Virginia Economic Impact Study

**Total Airport Impacts - Alphabetical Listing**

Airport Name	Jobs	Wages	Economic Activity
Lunenburg County	-	\$4,000	\$12,000
Luray Caverns	17	\$160,000	\$432,000
Manassas Regional	921	\$32,137,000	\$84,214,000
Marks Municipal	10	\$147,000	\$413,000
Mecklenburg-Brunswick Regional	33	\$326,000	\$914,000
Middle Peninsula Regional	34	\$583,000	\$1,610,000
Mountain Empire	27	\$674,000	\$1,912,000
New Kent County	33	\$720,000	\$1,887,000
New London	15	\$271,000	\$738,000
New Market	18	\$367,000	\$987,000
New River Valley	43	\$662,000	\$1,811,000
Orange County	23	\$390,000	\$1,059,000
Shannon	97	\$2,240,000	\$5,960,000
Smith Mountain Lake	9	\$157,000	\$430,000
Suffolk Municipal	144	\$2,816,000	\$7,333,000
Tangier Island	5	\$45,000	\$125,000
Tappahannock Municipal	12	\$225,000	\$610,000
Tazewell County	21	\$351,000	\$947,000
Twin County	12	\$226,000	\$613,000
Virginia Highlands	113	\$3,024,000	\$7,033,000
Virginia Tech/Montgomery Executive	39	\$913,000	\$2,430,000
Wakefield Municipal	15	\$294,000	\$802,000
Warrenton-Fauquier	193	\$2,855,000	\$7,572,000
Waynesboro	16	\$179,000	\$479,000
William M. Tuck	25	\$583,000	\$1,555,000
Williamsburg-Jamestown	82	\$1,406,000	\$3,826,000
Winchester Regional	114	\$2,689,000	\$7,082,000
Totals	38,744	\$927,279,000	\$2,415,286,000
Stafford Regional*	22	\$566,000	\$1,492,000
Lee County (Jonesville)*	5	\$68,000	\$192,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.3

## Virginia Economic Impact Study

**Total Airport Impacts - Listing by Economic Activity**

<u>Airport Name</u>	<u>Economic Activity</u>	<u>Jobs</u>	<u>Wages</u>
<b><u>Air Carrier Airports</u></b>			
Richmond International	\$744,785,000	11,843	\$295,395,000
Norfolk International	\$702,898,000	11,457	\$266,345,000
Roanoke Regional	\$252,728,000	4,148	\$94,981,000
Charlottesville-Albemarle	\$167,258,000	2,605	\$62,741,000
Newport News-Williamsburg International	\$148,124,000	2,459	\$55,491,000
Lynchburg Regional	\$68,500,000	1,262	\$25,392,000
Shenandoah Valley Regional	\$27,069,000	476	\$10,120,000
<b><u>General Aviation Airports</u></b>			
Manassas Regional	\$84,214,000	921	\$32,137,000
Leesburg Executive	\$40,582,000	617	\$16,966,000
Chesterfield County	\$16,847,000	266	\$6,752,000
Hampton Roads	\$15,857,000	256	\$5,964,000
Hanover County Municipal	\$9,969,000	138	\$3,799,000
Bridgewater Air Park	\$8,910,000	123	\$3,464,000
Warrenton-Fauquier	\$7,572,000	193	\$2,855,000
Suffolk Municipal	\$7,333,000	144	\$2,816,000
Chesapeake Regional	\$7,304,000	120	\$2,746,000
Winchester Regional	\$7,082,000	114	\$2,689,000
Virginia Highlands	\$7,033,000	113	\$3,024,000
Culpeper County	\$6,786,000	140	\$2,488,000
Shannon	\$5,960,000	97	\$2,240,000
Lonesome Pine	\$5,788,000	89	\$1,952,000
Front Royal-Warren County	\$5,328,000	77	\$2,035,000
Dinwiddie County	\$4,821,000	114	\$1,795,000
Louisa County	\$4,344,000	64	\$1,646,000
Danville Regional	\$4,323,000	74	\$1,650,000
Williamsburg-Jamestown	\$3,826,000	82	\$1,406,000
Blue Ridge	\$3,805,000	91	\$1,372,000
Virginia Tech/Montgomery Executive	\$2,430,000	39	\$913,000
Mountain Empire	\$1,912,000	27	\$674,000
New Kent County	\$1,887,000	33	\$720,000
Hartwood Field	\$1,854,000	38	\$706,000
New River Valley	\$1,811,000	43	\$662,000
Farmville Regional	\$1,690,000	51	\$617,000
Accomack County	\$1,657,000	41	\$608,000
Middle Peninsula Regional	\$1,610,000	34	\$583,000
William M. Tuck	\$1,555,000	25	\$583,000

Table 3.3 Continued

## Virginia Economic Impact Study

**Total Airport Impacts - Listing By Economic Activity**

Airport Name	Economic Activity	Jobs	Wages
Orange County	\$1,059,000	23	\$390,000
Franklin Municipal	\$992,000	23	\$379,000
New Market	\$987,000	18	\$367,000
Tazewell County	\$947,000	21	\$351,000
Ingalls Field	\$922,000	16	\$344,000
Mecklenburg-Brunswick Regional	\$914,000	33	\$326,000
Wakefield Municipal	\$802,000	15	\$294,000
New London	\$738,000	15	\$271,000
Twin County	\$613,000	12	\$226,000
Tappahannock Municipal	\$610,000	12	\$225,000
Emporia-Greenville Regional	\$567,000	18	\$206,000
Falwell	\$553,000	21	\$207,000
Gordonsville Municipal	\$529,000	8	\$202,000
Hummel Field	\$486,000	13	\$181,000
Waynesboro	\$479,000	16	\$179,000
Luray Caverns	\$432,000	17	\$160,000
Smith Mountain Lake	\$430,000	9	\$157,000
Marks Municipal	\$413,000	10	\$147,000
Blackstone Municipal	\$314,000	11	\$113,000
Grundy Municipal	\$295,000	5	\$111,000
Lawrenceville-Brunswick	\$152,000	3	\$55,000
Tangier Island	\$125,000	5	\$45,000
Crewe Municipal	\$121,000	3	\$44,000
Lee County (Pennington Gap)	\$64,000	1	\$23,000
Chase City Municipal	\$62,000	1	\$22,000
Brookneal-Campbell County	\$57,000	1	\$21,000
Lake Anna	\$12,000	-	\$4,000
Lunenburg County	\$12,000	-	\$4,000
<b>Totals</b>	<b>\$2,399,139,000</b>	<b>38,744</b>	<b>\$921,381,000</b>
Stafford Regional*	\$1,492,000	22	\$566,000
Lee County (Jonesville)*	\$192,000	5	\$68,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.4

## Virginia Economic Impact Study

**Total Airport Impacts - Listed by Number of Jobs**

<u>Airport Name</u>	<u>Jobs</u>	<u>Economic Activity</u>	<u>Wages</u>
<b><u>Air Carrier Airports</u></b>			
Richmond International	11,843	\$744,785,000	\$295,395,000
Norfolk International	11,457	\$702,898,000	\$266,345,000
Roanoke Regional	4,148	\$252,728,000	\$94,981,000
Charlottesville-Albemarle	2,605	\$167,258,000	\$62,741,000
Newport News-Williamsburg International	2,459	\$148,124,000	\$55,491,000
Lynchburg Regional	1,262	\$68,500,000	\$25,392,000
Shenandoah Valley Regional	476	\$27,069,000	\$10,120,000
<b><u>General Aviation Airports</u></b>			
Manassas Regional	921	\$84,214,000	\$32,137,000
Leesburg Executive	617	\$40,582,000	\$16,966,000
Chesterfield County	266	\$16,847,000	\$6,752,000
Hampton Roads	256	\$15,857,000	\$5,964,000
Warrenton-Fauquier	193	\$7,572,000	\$2,855,000
Suffolk Municipal	144	\$7,333,000	\$2,816,000
Culpeper County	140	\$6,786,000	\$2,488,000
Hanover County Municipal	138	\$9,969,000	\$3,799,000
Bridgewater Air Park	123	\$8,910,000	\$3,464,000
Chesapeake Regional	120	\$7,304,000	\$2,746,000
Winchester Regional	114	\$7,082,000	\$2,689,000
Dinwiddie County	114	\$4,821,000	\$1,795,000
Virginia Highlands	113	\$7,033,000	\$3,024,000
Shannon	97	\$5,960,000	\$2,240,000
Blue Ridge	91	\$3,805,000	\$1,372,000
Lonesome Pine	89	\$5,788,000	\$1,952,000
Williamsburg-Jamestown	82	\$3,826,000	\$1,406,000
Front Royal-Warren County	77	\$5,328,000	\$2,035,000
Danville Regional	74	\$4,323,000	\$1,650,000
Louisa County	64	\$4,344,000	\$1,646,000
Farmville Regional	51	\$1,690,000	\$617,000
New River Valley	43	\$1,811,000	\$662,000
Accomack County	41	\$1,657,000	\$608,000
Virginia Tech/Montgomery Executive	39	\$2,430,000	\$913,000
Hartwood Field	38	\$1,854,000	\$706,000
Middle Peninsula Regional	34	\$1,610,000	\$583,000
New Kent County	33	\$1,887,000	\$720,000
Mountain Empire	27	\$1,912,000	\$674,000
William M. Tuck	25	\$1,555,000	\$583,000

Table 3.4 Continued

## Virginia Economic Impact Study

**Total Airport Impacts - Listed by Number of Jobs**

Airport Name	Jobs	Economic Activity	Wages
Mecklenburg-Brunswick Regional	33	\$914,000	\$326,000
Orange County	23	\$1,059,000	\$390,000
Franklin Municipal	23	\$992,000	\$379,000
Tazewell County	21	\$947,000	\$351,000
Falwell	21	\$553,000	\$207,000
New Market	18	\$987,000	\$367,000
Emporia-Greensville Regional	18	\$567,000	\$206,000
Luray Caverns	17	\$432,000	\$160,000
Ingalls Field	16	\$922,000	\$344,000
Waynesboro	16	\$479,000	\$179,000
Wakefield Municipal	15	\$802,000	\$294,000
New London	15	\$738,000	\$271,000
Hummel Field	13	\$486,000	\$181,000
Twin County	12	\$613,000	\$226,000
Tappahannock Municipal	12	\$610,000	\$225,000
Blackstone Municipal	11	\$314,000	\$113,000
Marks Municipal	10	\$413,000	\$147,000
Smith Mountain Lake	9	\$430,000	\$157,000
Gordonsville Municipal	8	\$529,000	\$202,000
Grundy Municipal	5	\$295,000	\$111,000
Tangier Island	5	\$125,000	\$45,000
Lawrenceville-Brunswick	3	\$152,000	\$55,000
Crewe Municipal	3	\$121,000	\$44,000
Lee County (Pennington Gap)	1	\$64,000	\$23,000
Chase City Municipal	1	\$62,000	\$22,000
Brookneal-Campbell County	1	\$57,000	\$21,000
Lake Anna	-	\$12,000	\$4,000
Lunenburg County	-	\$12,000	\$4,000
Totals	38,744	\$2,399,139,000	\$921,381,000
Stafford Regional*	22	\$1,492,000	\$566,000
Lee County (Jonesville)*	5	\$192,000	\$68,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.5

## Virginia Economic Impact Study

**Total Airport Impacts - Listed by Wages**

<u>Airport Name</u>	<u>Wages</u>	<u>Jobs</u>	<u>Economic Activity</u>
<b><u>Air Carrier Airports</u></b>			
Richmond International	\$295,395,000	11,843	\$744,785,000
Norfolk International	\$266,345,000	11,457	\$702,898,000
Roanoke Regional	\$94,981,000	4,148	\$252,728,000
Charlottesville-Albemarle	\$62,741,000	2,605	\$167,258,000
Newport News-Williamsburg International	\$55,491,000	2,459	\$148,124,000
Lynchburg Regional	\$25,392,000	1,262	\$68,500,000
Shenandoah Valley Regional	\$10,120,000	476	\$27,069,000
<b><u>General Aviation Airports</u></b>			
Manassas Regional	\$32,137,000	921	\$84,214,000
Leesburg Executive	\$16,966,000	617	\$40,582,000
Chesterfield County	\$6,752,000	266	\$16,847,000
Hampton Roads	\$5,964,000	256	\$15,857,000
Hanover County Municipal	\$3,799,000	138	\$9,969,000
Bridgewater Air Park	\$3,464,000	123	\$8,910,000
Virginia Highlands	\$3,024,000	113	\$7,033,000
Warrenton-Fauquier	\$2,855,000	193	\$7,572,000
Suffolk Municipal	\$2,816,000	144	\$7,333,000
Chesapeake Regional	\$2,746,000	120	\$7,304,000
Winchester Regional	\$2,689,000	114	\$7,082,000
Culpeper County	\$2,488,000	140	\$6,786,000
Shannon	\$2,240,000	97	\$5,960,000
Front Royal-Warren County	\$2,035,000	77	\$5,328,000
Lonesome Pine	\$1,952,000	89	\$5,788,000
Dinwiddie County	\$1,795,000	114	\$4,821,000
Danville Regional	\$1,650,000	74	\$4,323,000
Louisa County	\$1,646,000	64	\$4,344,000
Williamsburg-Jamestown	\$1,406,000	82	\$3,826,000
Blue Ridge	\$1,372,000	91	\$3,805,000
Virginia Tech/Montgomery Executive	\$913,000	39	\$2,430,000
New Kent County	\$720,000	33	\$1,887,000
Hartwood Field	\$706,000	38	\$1,854,000
Mountain Empire	\$674,000	27	\$1,912,000
New River Valley	\$662,000	43	\$1,811,000
Farmville Regional	\$617,000	51	\$1,690,000
Accomack County	\$608,000	41	\$1,657,000
Middle Peninsula Regional	\$583,000	34	\$1,610,000
William M. Tuck	\$583,000	25	\$1,555,000

Table 3.5 Continued

## Virginia Economic Impact Study

**Total Airport Impacts - Listed by Wages**

Airport Name	Wages	Jobs	Economic Activity
Orange County	\$390,000	23	\$1,059,000
Franklin Municipal	\$379,000	23	\$992,000
New Market	\$367,000	18	\$987,000
Tazewell County	\$351,000	21	\$947,000
Ingalls Field	\$344,000	16	\$922,000
Mecklenburg-Brunswick Regional	\$326,000	33	\$914,000
Wakefield Municipal	\$294,000	15	\$802,000
New London	\$271,000	15	\$738,000
Twin County	\$226,000	12	\$613,000
Tappahannock Municipal	\$225,000	12	\$610,000
Falwell	\$207,000	21	\$553,000
Emporia-Greensville Regional	\$206,000	18	\$567,000
Gordonsville Municipal	\$202,000	8	\$529,000
Hummel Field	\$181,000	13	\$486,000
Waynesboro	\$179,000	16	\$479,000
Luray Caverns	\$160,000	17	\$432,000
Smith Mountain Lake	\$157,000	9	\$430,000
Marks Municipal	\$147,000	10	\$413,000
Blackstone Municipal	\$113,000	11	\$314,000
Grundy Municipal	\$111,000	5	\$295,000
Lawrenceville-Brunswick	\$55,000	3	\$152,000
Tangier Island	\$45,000	5	\$125,000
Crewe Municipal	\$44,000	3	\$121,000
Lee County (Pennington Gap)	\$23,000	1	\$64,000
Chase City Municipal	\$22,000	1	\$62,000
Brookneal-Campbell County	\$21,000	1	\$57,000
Lake Anna	\$4,000	-	\$12,000
Lunenburg County	\$4,000	-	\$12,000
<b>Totals</b>	<b>\$921,381,000</b>	<b>38,744</b>	<b>\$2,399,139,000</b>
Stafford Regional*	\$566,000	22	\$1,492,000
Lee County (Jonesville)*	\$68,000	5	\$192,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

### 3.2 ON-AIRPORT DIRECT IMPACTS

As shown in **Table 3.6**, on-airport direct impacts are more than \$610 million. Approximately 8190 individuals are employed by airports or airport tenants, with a total payroll of more than \$275 million, and an average annual salary of approximately \$33,600.

Table 3.6

## Virginia Economic Impact Study

**On-Airport Direct Impacts**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	259	\$9,311,000	\$22,843,000
Lynchburg Regional	222	\$5,767,000	\$13,768,000
Newport News-Williamsburg International	619	\$19,114,000	\$45,825,000
Norfolk International	1867	\$69,987,000	\$154,133,000
Richmond International	3117	\$103,602,000	\$216,773,000
Roanoke Regional	637	\$21,487,000	\$50,266,000
Shenandoah Valley Regional	72	\$2,283,000	\$5,424,000
<b><u>General Aviation Airports</u></b>			
Accomack County	8	\$109,000	\$269,000
Blackstone Municipal	3	\$20,000	\$49,000
Blue Ridge	19	\$261,000	\$669,000
Bridgewater Air Park	60	\$2,000,000	\$4,616,000
Brookneal-Campbell County	0	\$0	\$0
Chase City Municipal	0	\$0	\$0
Chesapeake Regional	29	\$930,000	\$2,187,000
Chesterfield County	91	\$2,924,000	\$6,082,000
Crewe Municipal	0	\$0	\$0
Culpeper County	24	\$343,000	\$887,000
Danville Regional	16	\$576,000	\$1,315,000
Dinwiddie County	19	\$221,000	\$516,000
Emporia-Greenville Regional	8	\$106,000	\$263,000
Falwell	9	\$78,000	\$186,000
Farmville Regional	15	\$119,000	\$296,000
Franklin Municipal	8	\$157,000	\$362,000
Front Royal-Warren County	31	\$1,054,000	\$2,465,000
Gordonsville Municipal	2	\$78,000	\$183,000
Grundy Municipal	1	\$40,000	\$94,000
Hampton Roads	64	\$2,031,000	\$4,784,000
Hanover County Municipal	43	\$1,571,000	\$3,678,000

Table 3.6 Continued

## Virginia Economic Impact Study

**On-Airport Direct Impacts**

Airport Name	Jobs	Wages	Economic Activity
Hartwood Field	18	\$394,000	\$929,000
Hummel Field	3	\$30,000	\$68,000
Ingalls Field	3	\$45,000	\$106,000
Lake Anna	0	\$0	\$0
Lawrenceville-Brunswick	1	\$20,000	\$48,000
Lee County (Pennington Gap)	0	\$0	\$0
Leesburg Executive	257	\$8,230,000	\$16,304,000
Lonesome Pine	34	\$847,000	\$2,470,000
Louisa County	22	\$765,000	\$1,796,000
Lunenburg County	0	\$0	\$0
Luray Caverns	6	\$40,000	\$95,000
Manassas Regional	339	\$14,429,000	\$35,843,000
Marks Municipal	1	\$21,000	\$52,000
Mecklenburg-Brunswick Regional	7	\$47,000	\$116,000
Middle Peninsula Regional	1	\$24,000	\$59,000
Mountain Empire	6	\$250,000	\$650,000
New Kent County	7	\$181,000	\$415,000
New London	0	\$0	\$0
New Market	5	\$127,000	\$303,000
New River Valley	10	\$156,000	\$398,000
Orange County	5	\$98,000	\$234,000
Shannon	15	\$558,000	\$1,305,000
Smith Mountain Lake	3	\$60,000	\$148,000
Suffolk Municipal	35	\$819,000	\$1,989,000
Tangier Island	2	\$10,000	\$26,000
Tappahannock Municipal	4	\$97,000	\$235,000
Tazewell County	4	\$90,000	\$210,000
Twin County	1	\$36,000	\$84,000
Virginia Highlands	36	\$1,321,000	\$2,308,000
Virginia Tech/Montgomery Executive	9	\$325,000	\$760,000
Wakefield Municipal	0	\$0	\$0
Warrenton-Fauquier	59	\$715,000	\$1,687,000
Waynesboro	4	\$23,000	\$53,000
William M. Tuck	3	\$173,000	\$396,000
Williamsburg-Jamestown	25	\$451,000	\$1,147,000
Winchester Regional	22	\$821,000	\$1,892,000
<b>Totals</b>	<b>8,190</b>	<b>\$275,372,000</b>	<b>\$610,059,000</b>
Stafford Regional*	6	\$223,000	\$522,000
Lee County (Jonesville)*	1	\$16,000	\$40,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

### 3.3 OFF-AIRPORT DIRECT IMPACTS (VISITOR SPENDING)

As shown in **Table 3.7**, off-airport direct impacts are more than \$695 million. Approximately 17,100 individuals are employed by visitor industries, with a total payroll of more than \$266 million, and an average annual salary of approximately \$15,500.

Table 3.7

## Virginia Economic Impact Study

**Off-Airport Direct Impacts (Visitor Spending)**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	1485	\$25,930,000	\$66,284,000
Lynchburg Regional	605	\$8,964,000	\$23,321,000
Newport News-Williamsburg International	926	\$13,084,000	\$33,828,000
Norfolk International	5797	\$86,024,000	\$227,536,000
Richmond International	4654	\$75,874,000	\$197,905,000
Roanoke Regional	2092	\$32,536,000	\$85,100,000
Shenandoah Valley Regional	240	\$3,536,000	\$9,186,000
<b><u>General Aviation Airports</u></b>			
Accomack County	18	\$239,000	\$623,000
Blackstone Municipal	4	\$45,000	\$120,000
Blue Ridge	39	\$526,000	\$1,380,000
Bridgewater Air Park	5	\$74,000	\$195,000
Brookneal-Campbell County	1	\$12,000	\$31,000
Chase City Municipal	1	\$12,000	\$33,000
Chesapeake Regional	46	\$672,000	\$1,750,000
Chesterfield County	71	\$1,150,000	\$2,948,000
Crewe Municipal	2	\$25,000	\$65,000
Culpeper County	67	\$1,075,000	\$2,765,000
Danville Regional	31	\$387,000	\$1,015,000
Dinwiddie County	56	\$800,000	\$2,078,000
Emporia-Greensville Regional	1	\$16,000	\$43,000
Falwell	3	\$43,000	\$112,000
Farmville Regional	16	\$235,000	\$614,000
Franklin Municipal	5	\$66,000	\$173,000
Front Royal-Warren County	12	\$157,000	\$411,000
Gordonsville Municipal	3	\$40,000	\$102,000
Grundy Municipal	2	\$25,000	\$65,000
Hampton Roads	99	\$1,445,000	\$3,763,000
Hanover County Municipal	40	\$662,000	\$1,698,000

Table 3.7 Continued

## Virginia Economic Impact Study

**Off-Airport Direct Impacts (Visitor Spending)**

Airport Name	Jobs	Wages	Economic Activity
Hartwood Field	2	\$28,000	\$72,000
Hummel Field	5	\$74,000	\$194,000
Ingalls Field	7	\$151,000	\$390,000
Lake Anna	0	\$2,000	\$6,000
Lawrenceville-Brunswick	1	\$12,000	\$34,000
Lee County (Pennington Gap)	1	\$13,000	\$34,000
Leesburg Executive	105	\$2,133,000	\$5,338,000
Lonesome Pine	16	\$203,000	\$535,000
Louisa County	15	\$209,000	\$548,000
Lunenburg County	0	\$2,000	\$6,000
Luray Caverns	4	\$52,000	\$138,000
Manassas Regional	172	\$3,406,000	\$8,559,000
Marks Municipal	6	\$63,000	\$170,000
Mecklenburg-Brunswick Regional	14	\$139,000	\$376,000
Middle Peninsula Regional	23	\$305,000	\$807,000
Mountain Empire	11	\$144,000	\$381,000
New Kent County	14	\$235,000	\$601,000
New London	11	\$152,000	\$397,000
New Market	6	\$87,000	\$229,000
New River Valley	17	\$216,000	\$568,000
Orange County	9	\$127,000	\$337,000
Shannon	49	\$735,000	\$1,905,000
Smith Mountain Lake	2	\$32,000	\$84,000
Suffolk Municipal	55	\$814,000	\$1,963,000
Tangier Island	1	\$16,000	\$41,000
Tappahannock Municipal	3	\$35,000	\$94,000
Tazewell County	9	\$113,000	\$300,000
Twin County	7	\$93,000	\$246,000
Virginia Highlands	37	\$551,000	\$1,436,000
Virginia Tech/Montgomery Executive	16	\$209,000	\$550,000
Wakefield Municipal	11	\$165,000	\$431,000
Warrenton-Fauquier	57	\$933,000	\$2,391,000
Waynesboro	6	\$79,000	\$205,000
William M. Tuck	14	\$166,000	\$442,000
Williamsburg-Jamestown	23	\$340,000	\$887,000
Winchester Regional	53	\$744,000	\$1,929,000
Totals	17,103	\$266,432,000	\$695,768,000
Stafford Regional*	7	\$109,000	\$282,000
Lee County (Jonesville)*	2	\$24,000	\$63,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

### 3.4 SPIN-OFF IMPACTS (MULTIPLIER EFFECT)

As shown in **Table 3.8**, Spin-off impacts are almost \$1.1 billion. Approximately 13,500 individuals are employed due to spin-off impacts, with a total payroll of more than \$379 million, and an average annual salary of approximately \$28,000.

Table 3.8

## Virginia Economic Impact Study

**Spin-Off Impacts (Multiplier Impacts)**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	861	\$27,500,000	\$78,131,000
Lynchburg Regional	435	\$10,661,000	\$31,411,000
Newport News-Williamsburg International	914	\$23,293,000	\$68,471,000
Norfolk International	3,793	\$110,334,000	\$321,229,000
Richmond International	4,072	\$115,919,000	\$330,107,000
Roanoke Regional	1,419	\$40,958,000	\$117,362,000
Shenandoah Valley Regional	164	\$4,301,000	\$12,459,000
<b><u>General Aviation Airports</u></b>			
Accomack County	15	\$260,000	\$765,000
Blackstone Municipal	4	\$48,000	\$145,000
Blue Ridge	33	\$585,000	\$1,756,000
Bridgewater Air Park	58	\$1,390,000	\$4,099,000
Brookneal-Campbell County	-	\$9,000	\$26,000
Chase City Municipal	-	\$10,000	\$29,000
Chesapeake Regional	45	\$1,144,000	\$3,367,000
Chesterfield County	104	\$2,678,000	\$7,817,000
Crewe Municipal	1	\$19,000	\$56,000
Culpeper County	49	\$1,070,000	\$3,134,000
Danville Regional	27	\$687,000	\$1,993,000
Dinwiddie County	39	\$774,000	\$2,227,000
Emporia-Greensville Regional	9	\$84,000	\$261,000
Falwell	9	\$86,000	\$255,000
Farmville Regional	20	\$263,000	\$780,000
Franklin Municipal	10	\$156,000	\$457,000
Front Royal-Warren County	34	\$824,000	\$2,452,000
Gordonsville Municipal	3	\$84,000	\$244,000
Grundy Municipal	2	\$46,000	\$136,000
Hampton Roads	93	\$2,488,000	\$7,310,000
Hanover County Municipal	55	\$1,566,000	\$4,593,000

Table 3.8

## Virginia Economic Impact Study

**Spin-Off Impacts (Multiplier Impacts)**

Airport Name	Jobs	Wages	Economic Activity
Hartwood Field	18	\$284,000	\$853,000
Hummel Field	5	\$77,000	\$224,000
Ingalls Field	6	\$148,000	\$426,000
Lake Anna	0	\$2,000	\$6,000
Lawrenceville-Brunswick	1	\$23,000	\$70,000
Lee County (Pennington Gap)	0	\$10,000	\$30,000
Leesburg Executive	255	\$6,603,000	\$18,940,000
Lonesome Pine	39	\$902,000	\$2,783,000
Louisa County	27	\$672,000	\$2,000,000
Lunenburg County	0	\$2,000	\$6,000
Luray Caverns	7	\$68,000	\$199,000
Manassas Regional	410	\$14,302,000	\$39,812,000
Marks Municipal	3	\$63,000	\$191,000
Mecklenburg-Brunswick Regional	12	\$140,000	\$422,000
Middle Peninsula Regional	10	\$254,000	\$744,000
Mountain Empire	10	\$280,000	\$881,000
New Kent County	12	\$304,000	\$871,000
New London	4	\$119,000	\$341,000
New Market	7	\$153,000	\$455,000
New River Valley	16	\$290,000	\$845,000
Orange County	9	\$165,000	\$488,000
Shannon	33	\$947,000	\$2,750,000
Smith Mountain Lake	4	\$65,000	\$198,000
Suffolk Municipal	54	\$1,183,000	\$3,381,000
Tangier Island	2	\$19,000	\$58,000
Tappahannock Municipal	5	\$93,000	\$281,000
Tazewell County	8	\$148,000	\$437,000
Twin County	4	\$97,000	\$283,000
Virginia Highlands	40	\$1,152,000	\$3,289,000
Virginia Tech/Montgomery Executive	14	\$379,000	\$1,120,000
Wakefield Municipal	4	\$129,000	\$371,000
Warrenton-Fauquier	77	\$1,207,000	\$3,494,000
Waynesboro	6	\$77,000	\$221,000
William M. Tuck	8	\$244,000	\$717,000
Williamsburg-Jamestown	34	\$615,000	\$1,792,000
Winchester Regional	39	\$1,124,000	\$3,261,000
Totals	13,451	\$379,577,000	\$1,093,312,000
Stafford Regional*	9	\$234,000	\$687,000
Lee County (Jonesville)*	2	\$29,000	\$88,000

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

### 3.5 AIRPORT DEPENDENT IMPACTS

As shown in **Table 3.9**, airport dependent business impacts are more than \$2.26 billion. Approximately 23,600 individuals are employed due to spin-off impacts (multiplier effect), with a total payroll of more than \$773, million, and an average annual salary of approximately \$32,700. Airport dependent business impacts are reported only for the airports that received valid responses to the airport dependent business survey effort.

Table 3.9

## Virginia Economic Impact Study

**Airport Dependent Business Impacts**

Airport Name	Jobs	Wages	Economic Activity
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	1,640	\$52,977,000	\$158,006,000
Lynchburg Regional	4,015	\$109,574,000	\$311,960,000
Newport News-Williamsburg International	1,437	\$49,945,000	\$133,799,000
Norfolk International	3,523	\$107,991,000	\$314,665,000
Richmond International	4,697	\$171,549,000	\$498,382,000
Roanoke Regional	1,998	\$67,984,000	\$217,299,000
Shenandoah Valley Regional	778	\$20,733,000	\$67,041,000
<b><u>General Aviation Airports</u></b>			
Accomack County	-	-	-
Blackstone Municipal	-	-	-
Blue Ridge	98	\$2,475,000	\$7,015,000
Bridgewater Air Park	229	\$6,230,000	\$18,782,000
Brookneal-Campbell County	-	-	-
Chase City Municipal	-	-	-
Chesapeake Regional	-	-	-
Chesterfield County	796	\$24,665,000	\$65,940,000
Crewe Municipal	-	-	-
Culpeper County	644	\$18,272,000	\$59,595,000
Danville Regional	-	-	-
Dinwiddie County	87	\$4,107,000	\$14,437,000
Emporia-Greenville Regional	-	-	-
Falwell	-	-	-
Farmville Regional	592	\$13,997,000	\$53,061,000
Franklin Municipal	-	-	-
Front Royal-Warren County	-	-	-
Gordonsville Municipal	-	-	-
Grundy Municipal	-	-	-
Hampton Roads	10	\$285,000	\$852,000
Hanover County Municipal	10	\$346,000	\$965,000

Table 3.9

## Virginia Economic Impact Study

**Airport Dependent Business Impacts**

Airport Name	Jobs	Wages	Economic Activity
Hartwood Field	-	-	-
Hummel Field	-	-	-
Ingalls Field	4	\$50,000	\$131,000
Lake Anna	-	-	-
Lawrenceville-Brunswick	-	-	-
Lee County (Pennington Gap)	-	-	-
Leesburg Executive	1,203	\$67,624,000	\$176,719,000
Lonesome Pine	-	-	-
Louisa County	-	-	-
Lunenburg County	-	-	-
Luray Caverns	-	-	-
Manassas Regional	409	\$16,870,000	\$46,893,000
Marks Municipal	-	-	-
Mecklenburg-Brunswick Regional	538	\$13,544,000	\$49,669,000
Middle Peninsula Regional	-	-	-
Mountain Empire	14	\$416,000	\$1,351,000
New Kent County	-	-	-
New London	-	-	-
New Market	-	-	-
New River Valley	-	-	-
Orange County	-	-	-
Shannon	-	-	-
Smith Mountain Lake	-	-	-
Suffolk Municipal	646	\$17,344,000	\$51,661,000
Tangier Island	-	-	-
Tappahannock Municipal	-	-	-
Tazewell County	-	-	-
Twin County	-	-	-
Virginia Highlands	178	\$4,109,000	\$11,060,000
Virginia Tech/Montgomery Executive	52	\$1,892,000	\$8,105,000
Wakefield Municipal	8	\$200,000	\$668,000
Warrenton-Fauquier	-	-	-
Waynesboro	-	-	-
William M. Tuck	-	-	-
Williamsburg-Jamestown	-	-	-
Winchester Regional	-	-	-
Totals	23,606	\$773,179,000	\$2,268,056,000
Stafford Regional*	-	-	-
Lee County (Jonesville)*	-	-	-

Source: EDRG and HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

### 3.6 QUALITATIVE IMPACTS

While the economic linkage between an airport and on-airport tenants and travel-related industries is readily apparent, there are less obvious interdependencies between airport and their communities. Although difficult to quantify, both non-aviation-related companies and the general public throughout the Commonwealth depend on Virginia airports for a variety of uses including:

- Search and Rescue
- Air medical transport
- Public safety
- Agriculture
- Recreation
- Just in time shipping

While this qualitative benefits summary does not include every community benefit, it does provide a comprehensive overview of benefits that airports provide, beyond the quantitative economic impacts of airport tenants and visitors. Additional airport-specific detail is provided in the individual airport economic impact summary brochures located in Chapter Four.

### 3.7 IMPACTS PER BASED AIRCRAFT, NUMBER OF OPERATIONS, AND ENPLANEMENTS

Measures that can serve as useful indexes to compare economic impacts and benefits between airports are the ratios of economic benefits to based aircraft and aircraft operations.

As applied to Virginia airports these ratios are shown below. **Table 3.10** details total economic impact per air carrier enplanement. **Tables 3.11 and 3.12** detail total economic impact per operation. Table 3.11 is an alphabetic listing. Table 3.12 is ranked by impact per operation. **Tables 3.13 and 3.14** detail total economic impact per based aircraft. Table 3.13 is an alphabetic listing. Table 3.14 is ranked by impact per based aircraft.

Table 3.10

Virginia Economic Impact Study

**Total Economic Impact per Enplanement**

Airport Name	2001 Enplanements	Total Impact	Impact per Enplanement
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	154,634	\$167,258,000	\$1,082
Lynchburg Regional	63,699	\$68,500,000	\$1,075
Newport News-Williamsburg International	209,520	\$148,124,000	\$707
Norfolk International	209,520	\$702,898,000	\$3,355
Richmond International	1,208,477	\$744,785,000	\$616
Roanoke Regional	304,328	\$252,728,000	\$830
Shenandoah Valley Regional	18,947	\$27,069,000	\$1,429

Source: HNTB Analysis

Table 3.11

## Virginia Economic Impact Study

**Total Economic Impact per Operation  
Alphabetic Listing**

Airport Name	2001 Operations	Total Impact	Impact per Operation
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	75,491	\$167,258,000	\$2,216
Lynchburg Regional	54,885	\$68,500,000	\$1,248
Newport News-Williamsburg International	219,224	\$148,124,000	\$676
Norfolk International	119,309	\$702,898,000	\$5,891
Richmond International	144,107	\$744,785,000	\$5,168
Roanoke Regional	100,850	\$252,728,000	\$2,506
Shenandoah Valley Regional	49,687	\$27,069,000	\$545
<b><u>General Aviation Airports</u></b>			
Accomack County	9,925	\$1,657,000	\$167
Blackstone Municipal	3,111	\$314,000	\$101
Blue Ridge	21,990	\$3,805,000	\$173
Bridgewater Air Park	11,189	\$8,910,000	\$796
Brookneal-Campbell County	741	\$57,000	\$77
Chase City Municipal	1,910	\$62,000	\$32
Chesapeake Regional	27,882	\$7,304,000	\$262
Chesterfield County	46,971	\$16,847,000	\$359
Crewe Municipal	3,740	\$121,000	\$32
Culpeper County	44,057	\$6,786,000	\$154
Danville Regional	16,171	\$4,323,000	\$267
Dinwiddie County	33,110	\$4,821,000	\$146
Emporia-Greenville Regional	1,107	\$567,000	\$512
Falwell	6,448	\$553,000	\$86
Farmville Regional	9,784	\$1,690,000	\$173
Franklin Municipal	4,490	\$992,000	\$221
Front Royal-Warren County	9,949	\$5,328,000	\$536
Gordonsville Municipal	5,878	\$529,000	\$90
Grundy Municipal	3,735	\$295,000	\$79
Hampton Roads	56,090	\$15,857,000	\$283
Hanover County Municipal	27,060	\$9,969,000	\$368
Hartwood Field	4,130	\$1,854,000	\$449
Hummel Field	11,099	\$486,000	\$44
Ingalls Field	6,218	\$922,000	\$148
Lake Anna	371	\$12,000	\$32
Lawrenceville-Brunswick	1,929	\$152,000	\$79
Lee County (Pennington Gap)	1,967	\$64,000	\$33
Leesburg Executive	85,050	\$40,582,000	\$477
Lonesome Pine	8,524	\$5,788,000	\$679

Table 3.11 Continued

## Virginia Economic Impact Study

**Total Economic Impact per Operation  
Alphabetic Listing**

Airport Name	2001 Operations	Total Impact	Impact per Operation
Louisa County	14,185	\$4,344,000	\$306
Lunenburg County	371	\$12,000	\$32
Luray Caverns	3,336	\$432,000	\$129
Manassas Regional	136,363	\$84,214,000	\$618
Marks Municipal	4,393	\$413,000	\$94
Mecklenburg-Brunswick Regional	5,984	\$914,000	\$153
Middle Peninsula Regional	12,021	\$1,610,000	\$134
Mountain Empire	9,866	\$1,912,000	\$194
New Kent County	14,561	\$1,887,000	\$130
New London	22,749	\$738,000	\$32
New Market	13,116	\$987,000	\$75
New River Valley	9,052	\$1,811,000	\$200
Orange County	8,150	\$1,059,000	\$130
Shannon	28,400	\$5,960,000	\$210
Smith Mountain Lake	4,799	\$430,000	\$90
Suffolk Municipal	31,268	\$7,333,000	\$235
Tangier Island	1,000	\$125,000	\$125
Tappahannock Municipal	5,380	\$610,000	\$113
Tazewell County	4,784	\$947,000	\$198
Twin County	6,359	\$613,000	\$96
Virginia Highlands	22,880	\$7,033,000	\$307
Virginia Tech/Montgomery Executive	14,231	\$2,430,000	\$171
Wakefield Municipal	11,157	\$802,000	\$72
Warrenton-Fauquier	38,094	\$7,572,000	\$199
Waynesboro	11,745	\$479,000	\$41
William M. Tuck	7,043	\$1,555,000	\$221
Williamsburg-Jamestown	21,490	\$3,826,000	\$178
Winchester Regional	30,738	\$7,082,000	\$230
Totals	1,721,699	\$2,399,139,000	
Stafford Regional*	4,500	\$1,492,000	\$332
Lee County (Jonesville)*	1,000	\$192,000	\$192

Source: HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.12

## Virginia Economic Impact Study

**Total Economic Impact per Operation  
Ranked by Impact per Operation**

Airport Name	2001 Operations	Total Impact	Impact per Operation
<b><u>Air Carrier Airports</u></b>			
Norfolk International	119,309	\$702,898,000	\$5,891
Richmond International	144,107	\$744,785,000	\$5,168
Roanoke Regional	100,850	\$252,728,000	\$2,506
Charlottesville-Albemarle	75,491	\$167,258,000	\$2,216
Lynchburg Regional	54,885	\$68,500,000	\$1,248
Newport News-Williamsburg International	219,224	\$148,124,000	\$676
Shenandoah Valley Regional	49,687	\$27,069,000	\$545
<b><u>General Aviation Airports</u></b>			
Bridgewater Air Park	11,189	\$8,910,000	\$796
Lonesome Pine	8,524	\$5,788,000	\$679
Manassas Regional	136,363	\$84,214,000	\$618
Front Royal-Warren County	9,949	\$5,328,000	\$536
Emporia-Greensville Regional	1,107	\$567,000	\$512
Hartwood Field	4,130	\$1,854,000	\$449
Leesburg Executive	85,050	\$40,582,000	\$477
Hanover County Municipal	27,060	\$9,969,000	\$368
Chesterfield County	46,971	\$16,847,000	\$359
Louisa County	14,185	\$4,344,000	\$306
Virginia Highlands	22,880	\$7,033,000	\$307
Hampton Roads	56,090	\$15,857,000	\$283
Danville Regional	16,171	\$4,323,000	\$267
Franklin Municipal	4,490	\$992,000	\$221
Chesapeake Regional	27,882	\$7,304,000	\$262
Mountain Empire	9,866	\$1,912,000	\$194
Suffolk Municipal	31,268	\$7,333,000	\$235
Winchester Regional	30,738	\$7,082,000	\$230
Williamsburg-Jamestown	21,490	\$3,826,000	\$178
William M. Tuck	7,043	\$1,555,000	\$221
Virginia Tech/Montgomery Executive	14,231	\$2,430,000	\$171
Shannon	28,400	\$5,960,000	\$210
Tappahannock Municipal	5,380	\$610,000	\$113
New River Valley	9,052	\$1,811,000	\$200
Warrenton-Fauquier	38,094	\$7,572,000	\$199
Tazewell County	4,784	\$947,000	\$198
Gordonsville Municipal	5,878	\$529,000	\$90
Smith Mountain Lake	4,799	\$430,000	\$90
Falwell	6,448	\$553,000	\$86

Table 3.12 Continued

## Virginia Economic Impact Study

**Total Economic Impact per Operation  
Ranked by Impact per Operation**

Airport Name	2001 Operations	Total Impact	Impact per Operation
Orange County	8,150	\$1,059,000	\$130
Luray Caverns	3,336	\$432,000	\$129
New Kent County	14,561	\$1,887,000	\$130
Blue Ridge	21,990	\$3,805,000	\$173
Tangier Island	1,000	\$125,000	\$125
Farmville Regional	9,784	\$1,690,000	\$173
Grundy Municipal	3,735	\$295,000	\$79
Lawrenceville-Brunswick	1,929	\$152,000	\$79
New Market	13,116	\$987,000	\$75
Accomack County	9,925	\$1,657,000	\$167
Culpeper County	44,057	\$6,786,000	\$154
Mecklenburg-Brunswick Regional	5,984	\$914,000	\$153
Ingalls Field	6,218	\$922,000	\$148
Blackstone Municipal	3,111	\$314,000	\$101
Dinwiddie County	33,110	\$4,821,000	\$146
Twin County	6,359	\$613,000	\$96
Marks Municipal	4,393	\$413,000	\$94
Hummel Field	11,099	\$486,000	\$44
Middle Peninsula Regional	12,021	\$1,610,000	\$134
Waynesboro	11,745	\$479,000	\$41
Brookneal-Campbell County	741	\$57,000	\$77
Lee County (Pennington Gap)	1,967	\$64,000	\$33
Crewe Municipal	3,740	\$121,000	\$32
New London	22,749	\$738,000	\$32
Chase City Municipal	1,910	\$62,000	\$32
Lake Anna	371	\$12,000	\$32
Lunenburg County	371	\$12,000	\$32
Wakefield Municipal	11,157	\$802,000	\$72
Totals	1,721,699	\$2,399,139,000	
Stafford Regional*	4,500	\$1,492,000	\$332
Lee County (Jonesville)*	1,000	\$192,000	\$192

Source: HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.13

## Virginia Economic Impact Study

**Total Economic Impact per Based Aircraft  
Alphabetic Listing**

Airport Name	2000 Based Aircraft	Total Impact	Impact per Based Aircraft
<b><u>Air Carrier Airports</u></b>			
Charlottesville-Albemarle	93	\$167,258,000	\$1,798,473
Lynchburg Regional	47	\$68,500,000	\$1,457,447
Newport News-Williamsburg International	114	\$148,124,000	\$1,299,333
Norfolk International	107	\$702,898,000	\$6,569,140
Richmond International	108	\$744,785,000	\$6,896,157
Roanoke Regional	117	\$252,728,000	\$2,160,068
Shenandoah Valley Regional	87	\$27,069,000	\$311,138
<b><u>General Aviation Airports</u></b>			
Accomack County	25	\$1,657,000	\$66,280
Blackstone Municipal	7	\$314,000	\$44,857
Blue Ridge	56	\$3,805,000	\$67,946
Bridgewater Air Park	17	\$8,910,000	\$524,118
Brookneal-Campbell County	2	\$57,000	\$28,500
Chase City Municipal	5	\$62,000	\$12,400
Chesapeake Regional	70	\$7,304,000	\$104,343
Chesterfield County	112	\$16,847,000	\$150,420
Crewe Municipal	10	\$121,000	\$12,100
Culpeper County	111	\$6,786,000	\$61,135
Danville Regional	41	\$4,323,000	\$105,439
Dinwiddie County	81	\$4,821,000	\$59,519
Emporia-Greensville Regional	3	\$567,000	\$189,000
Falwell	16	\$553,000	\$34,563
Farmville Regional	24	\$1,690,000	\$70,417
Franklin Municipal	12	\$992,000	\$82,667
Front Royal-Warren County	24	\$5,328,000	\$222,000
Gordonsville Municipal	15	\$529,000	\$35,267
Grundy Municipal	10	\$295,000	\$29,500
Hampton Roads	147	\$15,857,000	\$107,871
Hanover County Municipal	69	\$9,969,000	\$144,478
Hartwood Field	9	\$1,854,000	\$206,000
Hummel Field	29	\$486,000	\$16,759
Ingalls Field	6	\$922,000	\$153,667
Lake Anna	1	\$12,000	\$12,000
Lawrenceville-Brunswick	5	\$152,000	\$30,400
Lee County (Pennington Gap)	5	\$64,000	\$12,800
Leesburg Executive	211	\$40,582,000	\$192,332
Lonesome Pine	20	\$5,788,000	\$289,400

Table 3.13 Continued

## Virginia Economic Impact Study

**Total Economic Impact per Based Aircraft  
Alphabetic Listing**

Airport Name	2000 Based Aircraft	Total Impact	Impact per Based Aircraft
Louisa County	34	\$4,344,000	\$127,765
Lunenburg County	1	\$12,000	\$12,000
Luray Caverns	9	\$432,000	\$48,000
Manassas Regional	315	\$84,214,000	\$267,346
Marks Municipal	4	\$413,000	\$103,250
Mecklenburg-Brunswick Regional	14	\$914,000	\$65,286
Middle Peninsula Regional	30	\$1,610,000	\$53,667
Mountain Empire	26	\$1,912,000	\$73,538
New Kent County	38	\$1,887,000	\$49,658
New London	58	\$738,000	\$12,724
New Market	33	\$987,000	\$29,909
New River Valley	24	\$1,811,000	\$75,458
Orange County	22	\$1,059,000	\$48,136
Shannon	141	\$5,960,000	\$42,270
Smith Mountain Lake	13	\$430,000	\$33,077
Suffolk Municipal	80	\$7,333,000	\$91,663
Tangier Island	-	\$125,000	\$0
Tappahannock Municipal	14	\$610,000	\$43,571
Tazewell County	10	\$947,000	\$94,700
Twin County	14	\$613,000	\$43,786
Virginia Highlands	55	\$7,033,000	\$127,873
Virginia Tech/Montgomery Executive	33	\$2,430,000	\$73,636
Wakefield Municipal	28	\$802,000	\$28,643
Warrenton-Fauquier	98	\$7,572,000	\$77,265
Waynesboro	26	\$479,000	\$18,423
William M. Tuck	19	\$1,555,000	\$81,842
Williamsburg-Jamestown	56	\$3,826,000	\$68,321
Winchester Regional	79	\$7,082,000	\$89,646
Totals	3,090	\$2,399,139,000	
Stafford Regional*	6	\$1,492,000	\$248,667
Lee County (Jonesville)*	14	\$192,000	\$13,714

Source: HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

Table 3.14

## Virginia Economic Impact Study

**Total Economic Impact per Based Aircraft  
Ranked by Impact per Based Aircraft**

Airport Name	2000 Based Aircraft	Total Impact	Impact per Based Aircraft
<b><u>Air Carrier Airports</u></b>			
Richmond International	108	\$744,785,000	\$6,896,157
Norfolk International	107	\$702,898,000	\$6,569,140
Roanoke Regional	117	\$252,728,000	\$2,160,068
Charlottesville-Albemarle	93	\$167,258,000	\$1,798,473
Lynchburg Regional	47	\$68,500,000	\$1,457,447
Newport News-Williamsburg International	114	\$148,124,000	\$1,299,333
Shenandoah Valley Regional	87	\$27,069,000	\$311,138
<b><u>General Aviation Airports</u></b>			
Bridgewater Air Park	17	\$8,910,000	\$524,118
Lonesome Pine	20	\$5,788,000	\$289,400
Manassas Regional	315	\$84,214,000	\$267,346
Hartwood Field	9	\$1,854,000	\$206,000
Front Royal-Warren County	24	\$5,328,000	\$222,000
Emporia-Greensville Regional	3	\$567,000	\$189,000
Leesburg Executive	211	\$40,582,000	\$192,332
Ingalls Field	6	\$922,000	\$153,667
Marks Municipal	4	\$413,000	\$103,250
Chesterfield County	112	\$16,847,000	\$150,420
Louisa County	34	\$4,344,000	\$127,765
Hanover County Municipal	69	\$9,969,000	\$144,478
Virginia Highlands	55	\$7,033,000	\$127,873
Hampton Roads	147	\$15,857,000	\$107,871
Danville Regional	41	\$4,323,000	\$105,439
Chesapeake Regional	70	\$7,304,000	\$104,343
Franklin Municipal	12	\$992,000	\$82,667
Tazewell County	10	\$947,000	\$94,700
Virginia Tech/Montgomery Executive	33	\$2,430,000	\$73,636
Suffolk Municipal	80	\$7,333,000	\$91,663
Mountain Empire	26	\$1,912,000	\$73,538
Winchester Regional	79	\$7,082,000	\$89,646
Williamsburg-Jamestown	56	\$3,826,000	\$68,321
William M. Tuck	19	\$1,555,000	\$81,842
Tappahannock Municipal	14	\$610,000	\$43,571
Warrenton-Fauquier	98	\$7,572,000	\$77,265
New River Valley	24	\$1,811,000	\$75,458
Falwell	16	\$553,000	\$34,563
Gordonsville Municipal	15	\$529,000	\$35,267

Table 3.14 Continued

## Virginia Economic Impact Study

**Total Economic Impact per Based Aircraft  
Ranked by Impact per Based Aircraft**

Airport Name	2000 Based Aircraft	Total Impact	Impact per Based Aircraft
Farmville Regional	24	\$1,690,000	\$70,417
New Kent County	38	\$1,887,000	\$49,658
Blue Ridge	56	\$3,805,000	\$67,946
Smith Mountain Lake	13	\$430,000	\$33,077
New Market	33	\$987,000	\$29,909
Accomack County	25	\$1,657,000	\$66,280
Orange County	22	\$1,059,000	\$48,136
Luray Caverns	9	\$432,000	\$48,000
Lawrenceville-Brunswick	5	\$152,000	\$30,400
Mecklenburg-Brunswick Regional	14	\$914,000	\$65,286
Blackstone Municipal	7	\$314,000	\$44,857
Twin County	14	\$613,000	\$43,786
Grundy Municipal	10	\$295,000	\$29,500
Culpeper County	111	\$6,786,000	\$61,135
Waynesboro	26	\$479,000	\$18,423
Dinwiddie County	81	\$4,821,000	\$59,519
Middle Peninsula Regional	30	\$1,610,000	\$53,667
Hummel Field	29	\$486,000	\$16,759
Lee County (Pennington Gap)	5	\$64,000	\$12,800
New London	58	\$738,000	\$12,724
Chase City Municipal	5	\$62,000	\$12,400
Crewe Municipal	10	\$121,000	\$12,100
Brookneal-Campbell County	2	\$57,000	\$28,500
Wakefield Municipal	28	\$802,000	\$28,643
Lake Anna	1	\$12,000	\$12,000
Lunenburg County	1	\$12,000	\$12,000
Shannon	141	\$5,960,000	\$42,270
Tangier Island	-	\$125,000	\$0
Totals	3,090	\$2,399,139,000	
Stafford Regional*	6	\$1,492,000	\$248,667
Lee County (Jonesville)*	14	\$192,000	\$13,714

Source: HNTB Analysis

Note: Totals may not add due to rounding.

\* Stafford Regional Airport opened 12/2001. The Lee County Airport (Jonesville) opened in 2002. An estimate of their 2002 impacts is provided for informational purposes, but is not included in state totals.

# **Chapter Four**

## **ECONOMIC IMPACTS BY AIRPORT**

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### **4.1 ECONOMIC IMPACTS BY AIRPORT**

The most useful information to an individual airport is the data that pertains specifically to that airport. To this end, an airport-specific brochure which details the economic impact of each airport was produced and distributed for each of Virginia's public-use airports. A copy of each tri-fold airport brochure is provided in this section.

# Chapter Five

## COMPARISON TO PREVIOUS STUDIES

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### 5.1 OVERVIEW

The purpose of this section is to compare system-wide studies of Virginia public use airports, which have been released in 1986, 1990, 1996 and 2003. For the latter three studies, the years that the Commonwealth's airport activities are measured precede the release dates by one or two years. To avoid confusion, throughout this comparison the four studies are referred to by the years that have been measured, 1986, 1988, 1995 and 2001. Original research was conducted in 1986, 1995 (for the 1996 release) and 2001 (for the 2003 release). The 1988 data (for the 1990 release) was derived by applying factors based on passenger volume and inflation to the 1986 findings.

The three primary studies of the Commonwealth's airport system were supplemented with analyses conducted on behalf of the Metropolitan Washington Airport Authority (the Authority) for Ronald Reagan Washington National Airport and Washington Dulles International Airport in unrelated projects. The most recent analysis of Authority airports is based on 2002 data. Therefore, the year 2002 will be used when referring to the most recent Authority study and 2001/02 will be used when comparing the most recent studies of entire network of Virginia airports.

The four studies employed different methodologies. Several important distinctions include:

- *The studies measured different aspects of airport impacts.* The 1986 and 1988 studies assessed on-airport operations and tenants, visitor spending, and included capital spending, off-airport freight forwarders and travel agents in the definitions of "primary impacts." The 1995 study limited primary impacts to airport operations, airport tenants and visitor spending.<sup>1</sup> The 2001 study discretely measured the impacts of airport operations, airport tenants, visitor spending and off airport businesses that rely on aviation services at public use airports. In the analysis below, the studies were adjusted to establish a common denominator of airport operations, airport tenants, and visitor spending.
- *The four studies employed three methods of accounting for "spin-off" impacts from primary economic activities.* In the 1986, 1988 and 1995 studies, 10 regions were used to estimate multiplier areas, and the regions are different in 1995 than in 1986 and 1988. For the 2001 study, specific regions were tailored for each of 65 airports studied in cooperation with the VA Department of Aviation. By developing more localized multipliers, the 2001 study is more useful to each airport. Generally, multiplier factors are higher in larger regions (such as when only ten regions are used for the entire state) than

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<sup>1</sup> The 1995 study does not separately account for the impacts of tenants on airport activities.

smaller regions (tailored to a single airport's primary impact area) because there are more goods and services available for purchase in bigger areas than smaller areas. For this comparison, statewide impacts are used and not the sum of spin-off impacts for each airport.

- *The multipliers used to develop state impacts were different in 1986 and 1988, 1995 and 2001.* The 1986 and 1988 studies used RIMS II. The 1995 and 2001 studies used different versions of IMPLAN multipliers, and the statewide multipliers for 1995 were significantly higher than those used in 2001. The implications of the different multipliers will be reviewed below. Research subsequent to the publication of 1995 findings indicate that the IMPLAN multipliers used in that study had a bias toward overstating impacts that are particularly pronounced in the lower paying jobs and part-time jobs that are often found at airports and industries that serve visitors.<sup>2</sup> IMPLAN has made major efforts to improve its model, and the accuracy of the 2001 study is increased because of these improvements.
- *Coupled with the different multipliers, the studies measured impacts of different industries.* All studies aggregated industries to develop blended multipliers. For example, federal government, state government and local government may be combined into a single government sector. The 2001 study was structured to provide the most accurate approach of the four studies to trace the impacts of direct spending in the economy. This various industry aggregations used in the studies are discussed below.
- *The number of airports, the locations of airports and the use of airports (whether general aviation only or supporting both general aviation and commercial service) changed throughout the 15 year research span of these reports.* These differences are particularly important when comparing the “bottom-lines” of individual airports.
- *Conditions beyond the control of individual airports or the Commonwealth's Department of Aviation result in different contexts for each study.* The fourth quarter of 2001 was under the shadow of the September 11 terrorist attacks in New York and at the Pentagon, located in Northern Virginia. Moreover, the national economy was in recession in 2001, further dampening air travel and spending.

## 5.2 ON-AIRPORT ECONOMIC ACTIVITY

*On-airport activities* are economic activities associated with direct spending for airport operations and by tenants of airports, exclusive of any spin-off (or multiplier) impacts. To develop as straightforward a comparison as possible among the four studies, capital expenditures, activities generated by travel agents and activities of off airport freight forwarders were deducted from the base reported as “primary” in the 1986 and 1988 studies.<sup>3</sup> This allows for a comparison of findings in the studies of jobs, wages paid and economic activity (business

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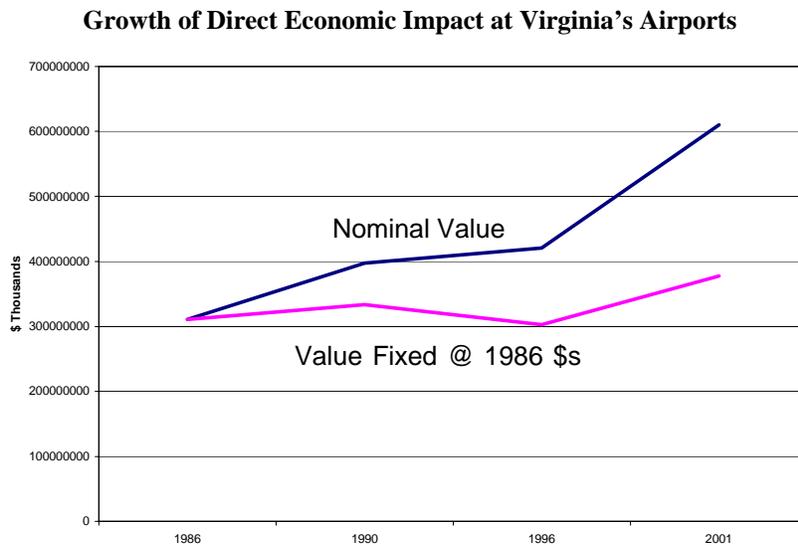
<sup>2</sup> See Stynes, Chang and Propst, *National Economic Impacts of CE Recreation Visitor Spending*, 2/16/98; and Chang, *Potential Bias of IMPLAN Type III Multipliers*, Michigan State University, 4/28/1998

<sup>3</sup> Data for Ronald Reagan Washington National Airport and Washington Dulles International Airport were not separately available. Therefore, ratios were assumed that are consistent with the overall profile of these two airports as a proportion of all of Virginia's commercial airports.

sales/budgets) at Virginia’s public use airports in 1986, 1988, 1995 and 2001 that were generated by airport operations and aviation related tenants.

Estimates of on-airport jobs, wages and economic activities at Virginia’s airports illustrate that the direct economic benefit of the airport system continues to grow. Economic activities generated at the Commonwealth’s public use airports have increased from \$311 million estimated in the 1986 system study to \$610 million in 2001. Moreover, when held to constant 1986 dollars, the 2001 real increase is to \$378 million, or roughly 21 percent. (See **Figure 5-1.**) Estimates of wages paid to workers on the Commonwealth’s airports increased by 67 percent in constant dollars, which in turn supports more than 3,700 additional jobs. The only negative indicator to report is that the average wage per job at the airports has decreased in real terms from about \$23,000 to under \$21,000, even as overall employment and aggregate payroll has increased. (See **Table 5.1.**)

Figure 5-1



Sources: Economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

Table 5.1

**Jobs and Total Wages Continue to Increase at Virginia Airports**

Study	Jobs	Nominal Value		Constant 1986 \$s	
		Total Wages	Wages per Job	Total Wages	Wages per Job
1986	4,431	\$102,127,000	\$23,048	\$102,127,000	\$23,048
1988	5,119	\$131,284,000	\$25,646	\$110,090,000	\$21,506
1995	5,752	\$154,612,000	\$26,880	\$111,191,000	\$19,331
2001	8,190	\$275,374,000	\$33,623	\$170,418,000	\$20,808

Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings Ronald Reagan Washington National Airport and Washington Dulles International Airport.

### 5.3 INITIAL VISITOR SPENDING

Initial spending is the actual spending by aviation visitors before any calculation of spin-off impacts, and is based on the following steps:

- a. Determine the number of visitors using commercial flights and using general aviation
- b. Calculate spending per visitor to Virginia. Each study calculated spending separately for commercial and GA visitors. This spending is total sales in Virginia directly generated by aviation visitors.
- c. Apply ratios of jobs-to-sales and wages-to-sales to determine jobs and wages directly generated by visitor spending. These ratios are produced by the econometric models used for each study.

Visitor spending totals per study vary based both on the number of assumed visitors and the approximate amount of spending by each visitor arriving by commercial flight or by general aviation. Moreover, ratios of jobs and wages to sales are derived from models, which also vary significantly across the four studies.

**5.3.1 Number of Visitors.** The four studies show an overall rise in commercial passenger enplanements of close to one-half million passengers, growing from 2.9 million enplanements in 1986 to 3.4 million in 2001. (See **Table 5.2**.) From 1986 to 1995, commercial enplanements increased by more than 223,000 persons and increased again by more than 270,000 through 2001. Each study estimated that about 45 percent of passenger enplanements represented visitors to Virginia, and about 55 percent represented Virginia residents.

General aviation operations at commercial and “general aviation-only” airports were higher in 1986 than in 2001. The studies of 1986, 1988 and 1995 document a steady increase from 1.4 million operations to 1.7 million operations. From 1986 to 2001, however, general aviation operations declined by more than 275,000 bringing the system-wide level under the 1986 benchmark. (See **Table 5.3**.)

Table 5.2

**Estimated Numbers of Commercial Air Visitors to Virginia**

Study	Commercial Enplanements	Change from Previous Study	Percent Visitors	Estimated Total Visitors	Change from Previous study
1986	2,944,000		45.0 percent	1,324,800	
1988	3,230,000	10 percent	45.0 percent	1,453,500	10 percent
1995	3,167,000	-2 percent	45.7 percent	1,446,997	-0.4 percent
2001	3,441,000	9 percent	44.8 percent	1,541,568	7 percent
Change 1986-2001		17 percent		16 percent	

Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings Ronald Reagan Washington National Airport and Washington Dulles International Airport.

Table 5.3

**Estimates of GA Operations and Visitors to Virginia**

Study	Total GA Ops	Passengers per GA Op	Total GA Passengers	Percent of Ops. True Itinerant	Total Estimated GA Visitors
1986	1,447,000	2.72	3,935,840	N/A	400,000
1988	1,545,000	2.72	4,202,400	N/A	427,091
1995	1,663,000	3.10	5,154,663	28 percent	460,315
2001	1,386,000	3.36	4,658,034	29 percent	679,718

Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

The studies indicate, however, that more general aviation visitors used Virginia's airports in 2001 than in previous years. Approximations of visitors differ from operations because estimates of true itinerant operations and passengers (including pilot) per operation vary. The 1986 study (and therefore the 1988 study) used a national study as a basis for assuming 2.72 passengers per all GA operations.<sup>4</sup> The 1995 study reported 3.1 passengers per operation for all GA operations based on a survey. In a more nuanced approach in 2001, GA pilots were surveyed in both commercial and GA-only airports. The numbers of GA visitors per operation were then segmented according to the profile of four classifications of airports, air carrier airports (4.45 passengers per operation), reliever and GA regional airports (3.25), community airports (2.0) and GA local service airports (1.50). These averages are consistent with the actual use of the airports as well as the profile of aircraft that use each type of airport.<sup>5</sup> None of the

<sup>4</sup> The 1986 study counted just 400,000 GA visitors, less than 30 percent of those estimated in 1995 and 2001.

<sup>5</sup> Sources for these estimates were GA pilot surveys and consultations with airport managers and VA DOA officials. Overall, the weighted average of passengers per GA operation for all airports is 3.36, and the weighted average of passengers per GA operation at GA only airports is 2.87.

prior studies distinguished passengers per operation at GA-only airports, including those at smaller local service and community airports, and larger commercial airports.

Note that GA operations and visitors arriving on commercial carriers in 2001 were affected by the terrorist attacks of September 11, which was at the outset of the fourth quarter of that year.

**5.3.2 Spending per Visitor.** In constant dollars, visitor spending estimates per trip were higher in the 1986 study than in 1995 and 2001 for visitors arriving by commercial flights and general aviation. One reason for this is that the 1986 study relied on the National Travel Survey and the OAG Travel Planner, whereas estimates in the latter two studies were based on passenger surveys in Virginia. Comparing the 1995 and 2001 studies in constant dollars shows spending estimates per air carrier visitors were \$51 lower in 2001 than 1995, but that estimates of spending per general aviation visit were \$31 higher than estimated in 1995. (See **Table 5.4.**)

Table 5.4

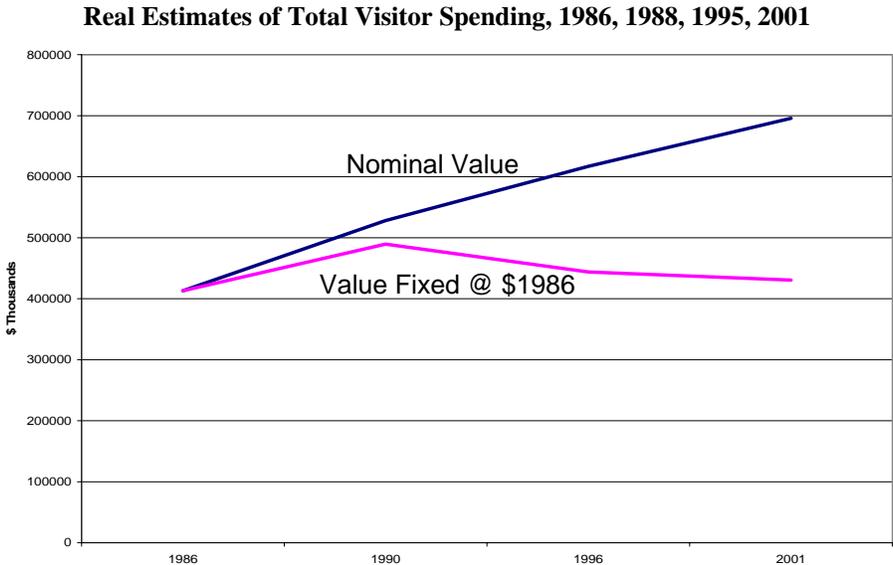
**Estimates of Spending per Commercial Air Visit and General Aviation  
Air Visit**

Study	Commercial Visits		General Aviation Visits	
	Nominal \$s	Constant 1986 \$s	Nominal \$s	Constant 1986 \$s
1986	\$341.54	\$342	\$115.00	\$115
1988	\$375.69	\$348	\$126.50	\$117
1995	\$403.12	\$290	\$ 71.36	\$ 51
2001	\$386.84	\$239	\$130.99	\$ 81

Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Reagan Ronald Reagan Washington National Airport and Washington Dulles International Airport.

**5.3.3 Total Visitor Spending and Impacts.** Real estimates of total visitor spending have been relatively stable from 1986 to 2001. Visitor spending accounted for about \$700 million in visitor spending in 2001, and in constant dollars these totals exceed those reported in the initial 1986 study by about 5 percent. The 1988 study reported a significant bump upward in the dollar volume of visitor spending, which has been corrected in subsequent studies. (See **Figure 5-2.**) Overall, the higher number of commercial and GA visitors serve to increase the impacts of visitor spending in 2001 compared to previous years, though these impacts are curbed by lower spending estimates per visit, especially by commercial visitors.

Figure 5-2

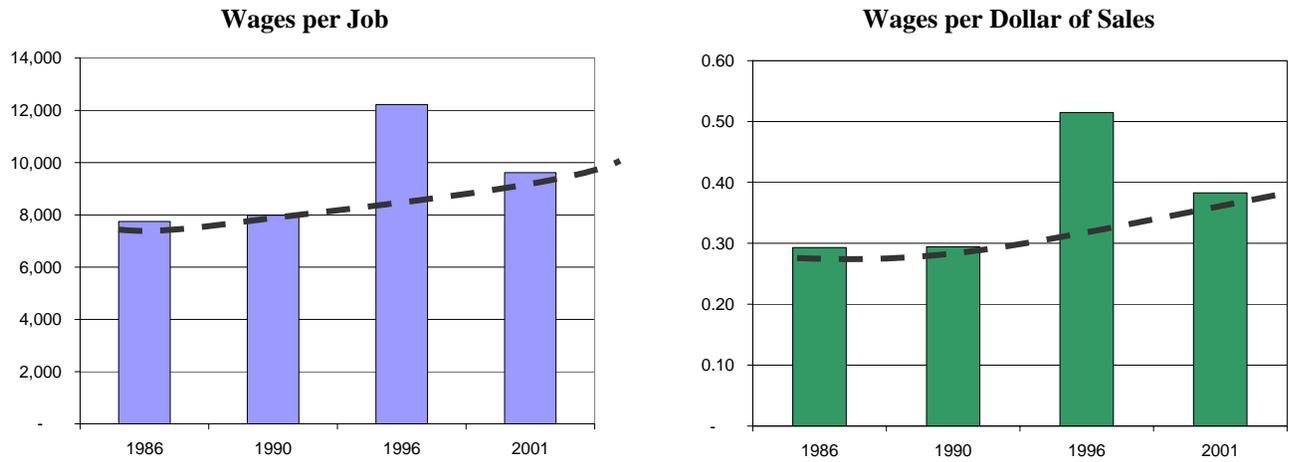


Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

Illustrated by **Figure 5-3**, the average wage per job and the ratio of sales to jobs are much higher in 1995 than the preceding studies, and the increase is moderated in 2001. The higher ratios of wages to visitor spending (sales) in 1995 drives the higher economic impacts derived from visitor spending for that study.

Figure 5-3

**Average Wage per Job and the Ratio of Wages to Visitor Spending (Sales) per Study**



Note: Dashed line illustrates trend excluding 1995, which included assumptions inconsistent with other studies.

Sources: economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

## 5.4 SPIN-OFF IMPACTS

The spin-off (multiplier) impacts in the Virginia economy that are generated from the Commonwealth's public use airports are presented in **Table 5.5** (except for Ronald Reagan Washington National Airport and Washington Dulles International Airport). The ratios of both "jobs to sales" and "wages to sales" used in the 2001 study are roughly mid-range between the ratios used in 1986/88 and 1995, as described below:

- **Sales per job:** the 2001 ratio of more than \$50,000 of sales per job fall between the 1986 results of \$98,000 and the \$36,000 findings in 1995.
- **Wages per \$1.00 of economic activity:** the 2001 study reports that workers in the Virginia economy receive \$.35 for every dollar of spin-off economic activity. These results fall between the 1986 findings that indicate that workers received just \$.17 in compensation per dollar and 1995 findings, which reported \$.44 of income per dollar of spin-off activity.

Table 5.5

### Estimates of Spin-Off Impacts (Excluding Direct Impacts)

Study	Employment	Income in 1986\$
1986	9,100	\$151,241,000
1988	10,400	\$159,910,000
1995	23,500	\$367,734,000
2001	13,500	\$234,906,000

Sources: Economic impact studies of Virginia airports released in 1986, 1990, 1996 and 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

## 5.5 OFF-AIRPORT DEPENDENT BUSINESSES

Virginia businesses use public use airports for passenger and freight services, even if many of these enterprises do not produce aviation related products or services. To measure the air-dependency of off-airport businesses on public use airports, the 2,000 largest businesses in the Commonwealth were surveyed, as were additional businesses identified by airport managers. This type of analysis was not matched in any of the preceding studies.

The 2001 Virginia Department of Aviation study also surveyed businesses in-state to determine the extent to which they rely on the Commonwealth's public use airports (exclusive of the Authority). These are businesses that are not directly aviation related, but rely on Virginia's public use airports for business travel and/or air freight services. The study documents that these non-aviation businesses rely on the Commonwealth's public use airports for more than \$1.1 billion of economic activity, including almost \$400 million paid to over 11,000 Virginia workers. Spin-off impacts throughout the Virginia economy double these impacts to more than \$2.2

billion of economic activity, which in-turn yields 23,000 jobs and almost \$800,000 in wages. (See **Table 5.6** below.) These data were compiled by a survey and do not include business use of Ronald Reagan Washington National Airport and Washington Dulles International Airport.<sup>6</sup> Please note that the \$ 1.1 billion of direct business sales attributable to public use airports are the actual results of the survey, and this study did not expand the findings from this sample to cover the whole Virginia economy.

The 1995 study surveyed non-aviation businesses, but presented a qualitative report and did not develop economic findings. Overall, the study estimated that over 500,000 jobs in Virginia “are related” to aviation (including Ronald Reagan Washington National Airport and Washington Dulles International Airport).

The 1986 and 1988 studies measured air-related sales (commissions), income and employment of travel agents and freight forwarders, but did not attempt to document more widespread business dependency on aviation. The 1986 study found that the aviation portion of travel agents and freight forwarders businesses were responsible for about \$62 million in sales, of which \$25 million were wages paid to over 1,600 workers.

Table 5.6

**Economic Impacts of Air-Dependent Businesses in Virginia that are Off-Airport**

	2001 Nominal \$s	1986 \$s
<b>Direct Impacts</b>		
Sales	\$1,155,425,000	\$715,046,000
Income	\$ 391,536,000	\$242,306,000
Employment	11,300	11,300
<b>Spin-off Impacts</b>		
Sales	\$1,112,632,000	\$688,563,000
Income	\$ 381,643,000	\$236,183,000
Employment	12,300	12,300
<b>Total Contribution to VA Economy</b>		
Sales	\$2,268,057,000	\$1,403,608,000
Income	\$ 773,179,000	\$ 478,489,000
Employment	23,600	23,600

**Note:** These data are underestimates that reflect the count of survey respondents and are not inflated to account for the overall VA economy.

Sources: HNTB and EDR Group, economic impact study of Virginia airports released in 2003. Calculations by EDR Group. These data do not include findings for Ronald Reagan Washington National Airport and Washington Dulles International Airport.

**Table 5.7** summarizes the combined economic contribution to Virginia made by Ronald Reagan Washington National Airport and Washington Dulles International Airport to the Virginia

<sup>6</sup>The survey instrument asked businesses to estimate the percent of their business activities that rely on GA, commercial air passenger and freight transportation at the Commonwealth’s public use airports. Reported results include only those portions that are reliant.

economy. Though showing slight declines from 1995, the overall contribution of the Authority airports to Virginia has increased by factors of almost 3 for employment and 4 for wages and economic activity from 1986, as reported in the four studies. The decline in 2001 might be attributable to the aftermath of the September 11 attacks.

Table 5.7

**Total Economic Contribution of Authority Airports to the Virginia Economy**

Study Year	Employment (including spin-off impacts)	Income (including spin-off impacts)	Sales (direct only – no spin-off impacts)
		Fixed 1986 dollars in thousands	
1986	34,252	525,476	979,344
1988	46,527	730,075	1,358,423
1995	109,740	1,906,307	4,247,251
2002	101,740	1,949,067	3,765,520

Sources: The U.S. Consumer Price Index, United States Bureau of Labor Statistics. Martin Associates, Summary 2002 Economic Impacts, Table 1-1; Economic Impact of Aviation in Virginia, 1996, Tables 11, 15, 19; Virginia Air Transportation System Plan: Economic Impact Study, 1990, Table 5.6-2; and Virginia Airports, an Economic Advantage, 1986, Table 5.1. See Tables ES-1 and ES-2 for a review of how VA impacts were calculated for IAD and DCA. Calculations by EDR Group and HNTB.

## 5.6 CONCLUSION

Trends over the past 16 years demonstrate the growing importance of Virginia's public use airports to economy of the Commonwealth. There is every reason to believe that the importance of air transportation will continue to grow as services increasingly become an export-economic sector that requires inter-regional, inter-state and international transportation, and just-in-time cargo delivery expands throughout the world economy.

Though economic impacts represented by Ronald Reagan Washington National Airport and Washington Dulles International Airport appear to have declined slightly in 2001 from 1995, the contributions of airports under the aegis of the Commonwealth's Department of Aviation are growing. Jobs, wages and economic activity (the latter two in constant dollars) are higher today than they were in 1986. Commercial enplanements are higher, and the Commonwealth is seeing more aviation visitors, though 2001 general aviation operations decreased in the context of a recession and the aftermath of the terrorist attacks of September 11.

Comparing the four studies also show that economic evaluation techniques have become more sophisticated over time. They have become more nuanced in terms of geographical impact areas and categories of impact that are measured. Accuracy has also increased as econometric tools have improved and the pool of modeling literature has expanded. These improvements should carry over to future aviation studies in Virginia.

The contribution of airport-related services to the Commonwealth's economy has increased from 1986 to the present after major differences in methodologies are adjusted,<sup>7</sup> but the peak results are reported in the 1995 study. (See **Table 5.8.**) From 1986 to 2001/02 economic activity generated by on-airport and visitor spending increased by 60% in real value adjusted for inflation. In addition, the increase from 1998 to 2001/02 is almost 22% in adjusted dollars. This is illustrated in **Figure 5-4.**

Table 5.8

**Economic Contribution of Public-Use Airports to Virginia**

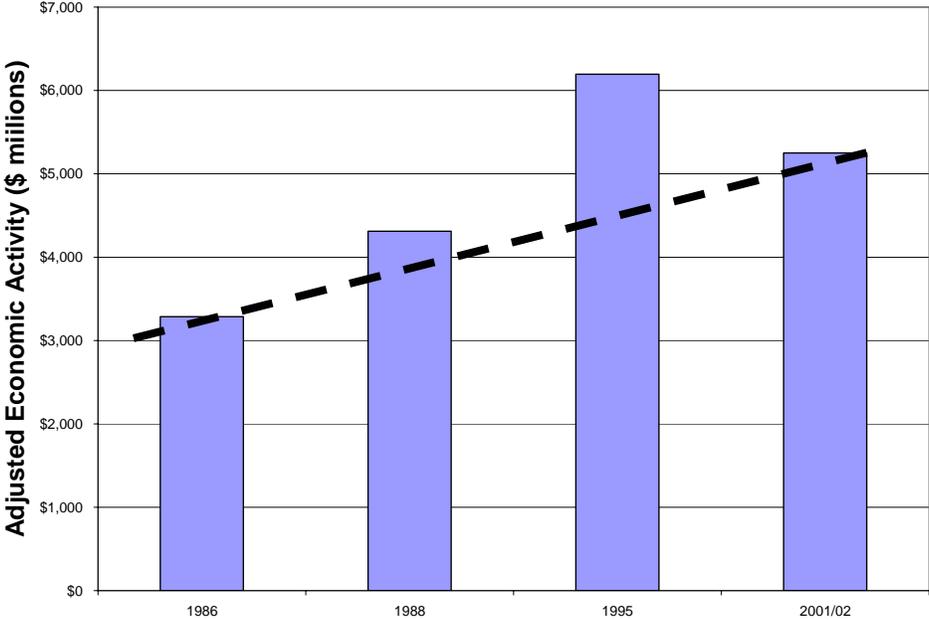
Year	Constant 1986 Dollars	
	Wages	Economic Activity
1986	\$1,056,178,000	\$3,287,398,000
1988	\$1,412,146,000	\$4,310,498,000
1995	\$2,885,328,000	\$6,196,534,000
2001/02	\$2,519,273,000	\$5,250,250,000

Sources: U.S. Consumer Price Survey, Bureau of Labor Analysis. EDR Group (for 2001), Martin Associates (for 2002), AirTech (for 1995) and SH&E (for 1986 and 1988).

<sup>7</sup> Data for the 2001/02 study do not include off-airport aviation reliant businesses. Adjustement were made to the 1986 and 1988 studies to exclude impacts of travel agents and off-airport freight forwarders. The 2002 The Authority study does not report spin-off business sales generated. Spin-off sales are reported for Ronald Reagan Washington National Airport and Washington Dulles International Airport in the overall system studies of 1986, 1988 and 1995. Spin-off impacts for employment and wages are reported in all studies, however. For the purpose of consistency spin-off business sales were deleted for this comparison.

Figure 5-4

Trend of Economic Contribution of Public-Use Airports to Virginia, 1986 – 2001/02



Sources: See Table 5.8 above. Adjustments were made so that each study reflected similar activities, including airport management, airport tenants and visitor spending (see footnote 7).

# Chapter Six

## SENSITIVITY ANALYSIS

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### 6.1 INTRODUCTION

The purpose of this chapter is to estimate aviation impacts of the terrorist attacks of September 11, 2001 in Virginia, and to calculate the effects of those impacts on the Commonwealth's economy in 2002. First, high and low scenarios are presented to illustrate the reduction in visitor spending and the resultant spin-off impacts that ripple throughout the Virginia economy. Second, a discussion at the end of this chapter reviews changes in jet fuel revenues collected by the Commonwealth as a consequence of the attacks.

The estimates of visitor spending are based on the reduction of activities at Ronald Reagan Washington National Airport (DCA) and Washington Dulles International Airport (IAD) in the year following the attack. DCA and IAD are the two commercial airports in Virginia that serve the District of Columbia metropolitan area, including parts of Virginia, Maryland and West Virginia, as well as the District.

It is, of course, difficult to disaggregate impacts of aviation that occurred due to "9/11" and those due to sluggish performances of the national and regional economies. In the discussion below, some of the fall-off in visitor traffic is attributed to the economy as well as to the aftermath of the attacks. In addition to the two Virginia airports, data for Baltimore-Washington International Airport (BWI) in Maryland is provided for comparison purposes, given its status as the third major commercial airport in metropolitan Washington D.C.

This analysis is composed of the following parts:

1. **General aviation activities.** As a consequence of September 11, GA traffic has been banned from DCA, and roughly 11 percent of the former DCA general aviation (GA) operations now use Maryland instead of Virginia airports.<sup>8</sup> This results in less visitor spending by itinerant GA arrivals.
2. **Commercial enplanements.** Enplanements in 2002 at DCA have declined at a greater rate than at IAD, and both have declined at greater rates than at BWI when measured against both enplanements in 2000 and average enplanements from 1995 to 2000.<sup>9</sup>
3. **Fuel Jet A Tax.** This is a net benefit to Virginia and is discussed after the analysis of visitor impacts. DCA is exempt from the Virginia Aviation Fuel Tax. Redirecting GA operations that had used DCA to other Virginia airports results in roughly \$300,000 of additional tax revenues to the Commonwealth's Aviation Special Fund.

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<sup>8</sup> Source: Signature Flight Support, the sole FBO at DCA.

<sup>9</sup> This analysis uses passenger numbers from April 2002 through March 2003 to avoid biasing this exercise based on the unique restriction imposed on Ronald Reagan Washington National Airport from September 11, 2001 to March 2002.

Assumptions gleaned from expert testimony and other studies that are used in this chapter are listed below.

- Signature Flight Support, the sole FBO at DCA, estimates that 85 percent of their former GA traffic that was served at Reagan-National Airport now goes to IAD, three percent to Manassas, one percent to Leesburg and 11 percent to BWI. In sum, 89 percent of general aviation operations that would have used DCA but for September 11 have been relocated to other airports in Virginia, with remaining operations relocated to airports outside of the Commonwealth.
- Methods used in previous studies of the Virginia airport system lead to an assumption that 52.1 percent of economic activities at DCA and 72 percent of economic activities at IAD accrue to the Commonwealth. To maintain consistency with these past efforts, the 2002 study uses this estimate and it is applied when appropriate in this chapter.

The following sections of this chapter are organized as follows:

- 6.2 Summary of findings of Visitor Spending Impacts
- 6.3 Economic effects of the high and low estimate
- 6.4 A detailed examination of data used for this analysis and how the high and low scenarios are developed
- 6.5 A review of tax impacts from the Jet A Fuel sales generated by General Aviation at DCA in 2000.

## 6.2 SUMMARY OF FINDINGS FOR VISITOR SPENDING IMPACTS

High and low scenarios for general aviation and commercial enplanements were developed to gauge how many aviation visitors no longer travel to Virginia due to the events of September 11. The key drivers of each design are found below.

### General Aviation:

- **High impacts** are based on extending annual 1998-2000 growth trends at DCA through 2002. Itinerant operations are assumed to be the average proportion of itinerant operations during the 1998-2000.
- **Low impacts** are based on average annual operations and the lowest annual rate of itinerant operations over the three-year span of 1998-2000.

### Commercial Enplanements:

- **High impacts** are based on comparing declines of enplanements in 2002 and 2000 at DCA and IAD to assessments of how each airport fared during the previous two national economic slumps (1987-91 and 1980-82).
- **Low impacts** are based on comparing the average annual enplanements at DCA and IAD from 1995 through 2000 with enplanements during 2002.

### Impacts on Virginia

The framework described above yields impact estimates of \$363 - \$752 million in 2002 visitor spending that are attributable to the attacks of September 11, 2001. Of these totals \$218 million - \$454 million are in the expected initial spending of visitors that would have arrived to the Commonwealth through DCA and IAD. **Table 6.1** presents estimates of negative impacts in Virginia stemming from fall offs at DCA and IAD of general aviation operations and commercial enplanements due to the events of September 11.

Table 6.1

#### Impacts of Reduced Visitor Spending Due to September 11 (2002 dollars)

	Initial Visitor Spending in VA	Spin-off Effects	Total Effects of September 11 on the VA Economy
<b>Jobs</b>			
Low Estimate	5,475	1,808	<b>7,283</b>
High Estimate	11,612	3,732	<b>15,344</b>
<b>Wages</b>			
Low Estimate	\$90,147,000	\$53,723,000	<b>\$143,870,000</b>
High Estimate	\$188,517,000	\$110,806,000	<b>\$299,323,000</b>
<b>Business Sales</b>			
Low Estimate	\$218,496,000	\$144,264,000	<b>\$362,760,000</b>
High Estimate	\$453,916,000	\$297,847,000	<b>\$751,763,000</b>

Source: Spin-off effects are calculated through the IMPLAN Model. Calculations by EDR Group

### 6.3 ECONOMIC IMPACTS IN VIRGINIA

These scenarios reflect aviation visitors arriving through DCA and IAD would have generated visitor spending that. As shown in **Table 6.1**, the overall band of annual economic impacts to the Commonwealth is \$363 - \$752 million, as initial spending by visitors generates additional business sales by companies that serve visitors, as well as spending of wages by workers in the visitor industries.

Spending by visitors is heavily weighted toward the services and retail trade sectors, but the economic ripples of visitor spending are felt in all sectors of the Commonwealth's economy. At the high end of these estimates, losses of business sales include \$67 million in finance, insurance and real estate, \$35 million in transportation, communications and utilities and nearly \$34 million in manufacturing, as well as \$339 million in services and \$241 million in the retail sector. As demonstrated in **Table 6.2**, the difference in proportions between the high and low estimates is that lower scenario shows a slightly higher ratio of spending for lodging services and less for retail, including food and beverage. For each sector, the proportional difference between the two scenarios is less than 2 percent.

Table 6.2

**Impacts of Visitor Spending Loss in the Virginia Economy by Sector**

Sector	High Impact Scenario		Low Impact Scenario	
	Total Loss Attributed to 9/11	Percent by Sector	Total Loss Attributed to 9/11	Percent by Sector
Agriculture	\$3,551,000	0.5%	\$1,728,000	0.5%
Mining	\$719,000	0.1%	\$349,000	0.1%
Construction	\$11,833,000	1.6%	\$5,783,000	1.6%
Manufacturing	\$33,593,000	4.5%	\$16,256,000	4.5%
Transportation, Communications & Public Utilities	\$35,049,000	4.7%	\$17,079,000	4.7%
Retail Trade	\$240,657,000	32.0%	\$111,167,000	30.6%
Wholesale Trade	\$12,049,000	1.6%	\$5,838,000	1.6%
Finance, Insurance & Real Estate	\$67,401,000	9.0%	\$32,681,000	9.0%
Hotel & Lodging	\$202,357,000	26.9%	\$104,482,000	28.8%
Other Services	\$136,311,000	18.1%	\$63,399,000	17.5%
Government	\$7,769,000	1.0%	\$3,770,000	1.0%
Other	\$474,000	0.1%	\$228,000	0.1%
Totals	\$751,763,000	100.0%	\$362,760,000	100.0%

Source: Martin Associates, MWAA, 2002 Virginia Aviation Study, IMPLAN

## 6.4 DETAILED DATA AND THE DEVELOPMENT OF ESTIMATES

### 6.4.1 General Aviation

In the aftermath of September 11, GA operations were prohibited at DCA. As depicted in **Table 6.3**, during 2000, the number GA operations at IAD and DCA were similar, with over 59,000 operations at each airport. However, operations at DCA had increased by over 14 percent in the three years from 1998 through 2000, while GA operations at IAD decreased by almost 10 percent during the same period. Itinerant operations as a percentage of total GA operation at DCA were 95 percent in 1998, 78 percent in 1999 and 75 percent in 2000, averaging 83 percent over the three years.

Table 6.3

**Total GA Operations at DCA and IAD**

	<b>IAD</b>	<b>DCA</b>	<b>Total</b>
1998	65,838	51,808	117,646
1999	64,419	60,790	125,209
2000	59,405	59,292	118,697
Change 1998-2000	-9.8%	14.4%	0.9%
2002	81,775	N/A	N/A

Sources: MWAA Final Draft Aviation Activity Forecasts for Washington Dulles International Airport - October 2000 (HNTB), MWAA Activity Forecasts for Ronald Reagan Washington National Airport - 2002 (HNTB), FAA ATADS data and HNTB Analysis.

- **Low Estimate:** The low-estimate is calculated as 11 percent of the midpoint of (1) average number of GA operations at DCA from 1998 through 2000, and (2) extended trends if the changes at DCA from 1998-2000 were carried forward through 2002. To estimate the number of itinerant operations, this estimate assumes the lowest annual rate of such operations observed during the 1998-2000 period.

Annual GA operations at DCA during 1998-2000 averaged 57,297. If the 1998-2000 trends continued at the airport through the year 2002, there would have been 67,857 operations.<sup>10</sup> Applying the 11 percent benchmark of potential GA operations at DCA that no longer use Virginia airports yields between 6,303 and 7,464 operations. The midpoint is 6,883. Using an assumption that 75 percent of 2002 GA operations would have been itinerant (the lowest annual rate of the three year period) results in an estimate of 5,163 itinerant GA operations for this scenario.

- **High Estimate:** Annual GA operations at IAD and DCA combined averaged 120,517 during 1998-2000. However, if the 1998-2000 trends continued at both airports through the year 2002, there would have been 121,458 operations at both airports.

Allowing for 4 percent of total expected operations diverting to Manassas and Leesburg (per estimate of Signature Flight Support), the shortfall to VA in 2002 range from 15,241 to 15,711 operations after accounting for the Commonwealth's share of impacts (assumed at 52.1 percent of the total, as discussed above). The midpoint is 15,476 operations.

Assuming that 83 percent of operations would have been itinerant (the 1998-2000 annual

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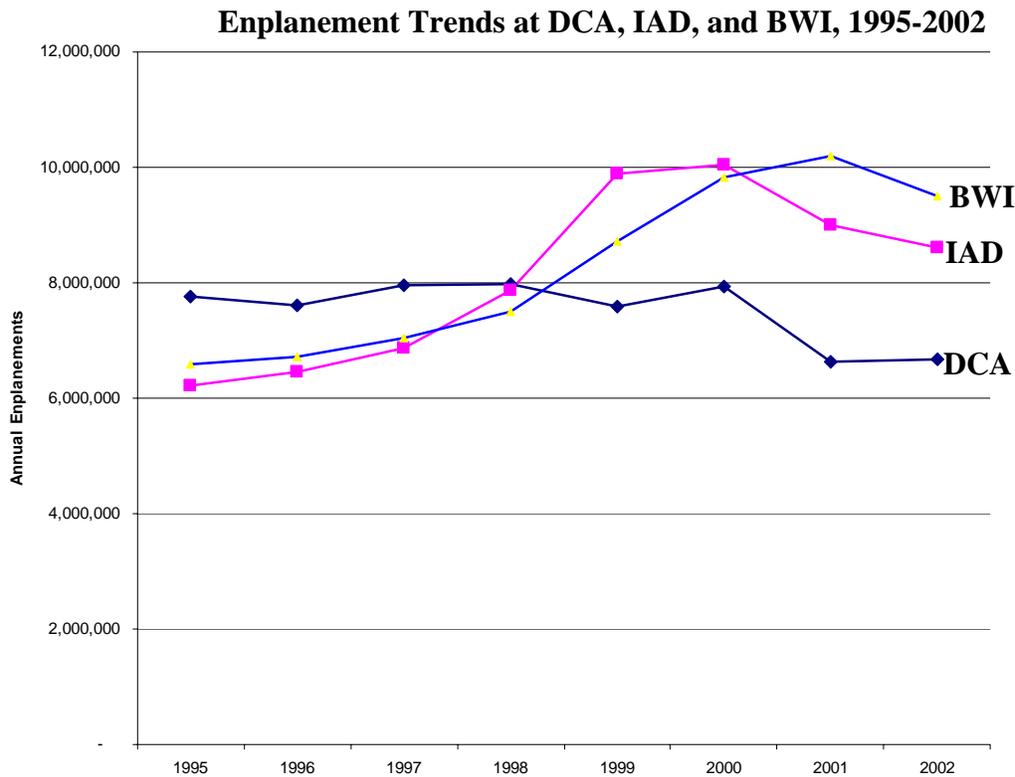
<sup>10</sup> The trends extended projection of 67,857 operations at DCA approach the maximum feasible general aviation operations at the airport. Prior to September 11, the FAA allocated 12 general aviation slots per hour at DCA from 7 AM through 9 PM. These 15 hours amount to 180 slots per day, or 65,700 per year. In good weather the FAA Air Traffic Control would permit more operations in than there were slots, as allowed by the rule. Thus, 67,857 operations in a year would have been possible. (Source: General Counsel, Washington Metropolitan Airport Authority.)

average at DCA) results in an estimate of 12,845 itinerant operations that do not use Virginia airports due to September 11.

### 6.4.2 Commercial Aviation

Through 1997, commercial passenger traffic at DCA was significantly higher than at IAD or BWI, but by 2002 enplanements at DCA have fallen behind the other two metropolitan airports. (See **Figure 6-1**). Starting 1997 through 2000, enplanements at IAD and BWI grew rapidly, while the level at DCA held steady. In 1998, passenger levels at all three airports were relatively even, and by 2000 enplanements at IAD and BWI exceeded DCA by 2.1 million and 1.9 million, respectively.<sup>11</sup>

**Figure 6-1**



Sources: Sources: [www.mwaa.com](http://www.mwaa.com), and the Maryland Aviation Administration. Note: Enplanement totals for DCA and IAD are estimates based on 50 percent of passenger totals reported on the Metropolitan Washington Airports Authority web site.

<sup>11</sup> A major reason for the strong performance of BWI is the presence and expansion of Southwest Airlines at the airport. Southwest began service at BWI in 1993 and has expanded in both service and facilities in subsequent years. (See [www.bwiairport.com](http://www.bwiairport.com).)

### Enplanements in 2002 Compared to 2000

Commercial enplanements were stable at DCA in the years 1995 to 2000. Enplanements in 2000 were 2.5 percent above 1995 levels, as annual enplanements averaged 7.81 million and ranged between 7.59 million and 7.99 during each of those six years. In contrast, 2000 enplanements at IAD were 62 percent above 1995, and enplanements at BWI increased by 49 percent. Enplanements in 2002 were below 2000 levels at both airports, by 14.3 percent at IAD and 3.2 percent at BWI. Both are less pronounced declines than the 15.9 percent drop-off at DCA, despite the steep growth at IAD and BWI compared to the flat trend at DCA through 2000.

### Enplanements in 2002 Compared to Average Annual Enplanements, 1995-2000

As shown in **Table 6.4**, both IAD and BWI served more enplanements in 2002 than the average annual totals during the years 1995 to 2000, while the decline at DCA in 2002 exceeded 14 percent of its 1995-2002 annual average. This drop-off is especially eye-catching given the steadiness of annual enplanements at DCA during the 1995-2000-time span.

Table 6.4

#### Enplanements at DCA, IAD and BWI, 1995-2000 and 2002

Year & Averages	DCA	IAD	BWI
1995	7,753,122	6,221,829	6,581,509
1996	7,613,250	6,447,014	6,715,961
1997	7,953,503	6,878,931	7,047,153
1998	7,985,153	7,873,171	7,504,114
1999	7,592,674	9,898,665	8,718,832
2000	7,944,100	10,052,347	9,817,230
2001	6,632,694	9,001,160	10,187,558
2002	6,680,952	8,617,582	9,504,767
Total percent change 1995-2000	2.5%	61.6%	49.2%
Percent Change 2000 to 2002	-15.9%	-14.3%	-3.2%
Average 1995-2000	7,806,967	7,895,326	7,730,800
Percent Change Average 1995-2000 to 2002	-14.4%	9.1%	22.9%

Sources: [www.mwaa.com](http://www.mwaa.com), and the Maryland Aviation Administration.

Note: Enplanements for IAD and DCA are based on 50 percent of annual passengers. "2002" enplanements for DCA are 50 percent of the total of monthly passenger data from April 2002 through March 2003.

**High Scenario.** The high estimate is constructed from the difference between 2000 and 2002 enplanements at DCA and IAD.

This estimate assumes 6.15 percent of the 2000 to 2002 air passenger decline at DCA is due to the sluggish economy and that the remaining portion of the decline is a consequence of the attacks of September 11. However, also assumed is that the entire 14.3 percent drop-off of enplaned passengers at IAD is caused by September 11. The reasoning behind these assumptions is based on the performance of each airport during the past two recessions:

- Enplanements at DCA fell 3.9 percent from 1987 through 1991 and 8.4 percent from 1980-1982. The 6.15 percent assumption used in this scenario is the midpoint the rate of decrease observed during these previous economic downturns; and.
- Enplanements at IAD were stable during the past two slumps. From 1987-1991, enplanements increased by 0.1 percent, and during the 1980-1982 period, enplanements decreased by 0.01 percent.

Thus, this estimate assumes that 9.75 percent of the 2000-2002/3 decline of enplanements at DCA is attributable to September 11, and 6.15 percent of the decline would have happened anyway due to the recent economic downturn. In addition, the 14.3 percent decline seen at IAD is attributed to September 11.

Past studies are used to calculate the proportion of enplaned passengers who are visitors to Virginia. A June 2003 study commissioned by the Metropolitan Washington Airport Authority, estimates that visitors comprise 53 percent of enplanements at DCA and 41 percent at IAD.<sup>12</sup> Finally, as noted earlier, past studies of the Commonwealth's airport system use a methodology estimates a Virginia share of economic impacts at 52.1 percent of DCA impacts and 72 percent of IAD impacts. Calculations are shown in **Table 6.5**.

Table 6.5

**Calculation of Enplanements for High Scenario**

Step	Visitors
2000 Enplanements at DCA	7,944,100
Percent difference 2000-2002/3	-15.90%
Percent difference attributed to economy	-6.15%
Percent difference attributed to "9/11"	-9.75%
Number Enplanements attributed to "9/11"	(774,550)
Visitor share @ 53%	(410,512)
<b>Subtotal: DCA Impacts in VA @ 52.1 percent (used by past airport system studies)</b>	<b>(210,182)</b>
2000 Enplanements at IAD	10,052,347
Percent difference 2000-2002	-14.3%
Percent difference attributed to "9/11"	-14.3%
Number Enplanements attributed to "9/11"	(1,437,486)
Visitor share @ 41%	(589,369)
<b>Subtotal: IAD Impacts in VA @ 72 percent (used by past airport system studies)</b>	<b>(424,346)</b>
<b>Total Commercial Visitor Loss to Virginia Attributed to 9/11 – High Scenario</b>	<b>(634,528)</b>

Sources: [www.mwaa.com](http://www.mwaa.com), calculations by EDR Group

<sup>12</sup> Martin Associates, The Local and Regional Economic Impacts of Ronald Reagan Washington National and Washington Dulles International Airports, prepared for the Metropolitan Washington Airports Authority, June 9, 2003, p.36.

**Low Scenario.** This estimate is based on the comparison of 2002/3 enplanements at DCA with the average enplanements at the airport from 1995 through 2000. (See **Table 6.6**) In this estimate, the 2002 underperformance of 14.4 percent of enplanements at DCA is assumed to be a consequence of September 11. Underlying this assumption is:

- The virtually unchanging annual level of enplanements at DCA from 1995 through 2000, making the dramatic decline to 2002/3 significant. Annual enplanements in the years immediately prior to the past two economic slumps were not nearly as stable as the totals in the years 1995 through 2000; and
- The level of enplanements at both IAD and BWI were higher in 2002 than their annual averages from 1995 through 2000.

The difference at DCA between 2002 and 1995-2000 average annual enplanements is a fall-off of 1,366,166 enplanements. Applying the estimated visitor share of 53 percent and the “Virginia impact factor” of 52.1 percent produces an estimated drop in visitors to the commonwealth of 310,000. Calculations are shown in **Table 6.6**.

Table 6.6

**Calculation of Enplanements for Low Estimate**

Step	Visitors
1995-2000 annual average enplanements at DCA	7,806,967
Percent difference 1995-00 annual average - 2002	-14.4%
Number Enplanements attributed to "9/11"	(1,124,203)
Visitor share @ 53%	(595,828)
<b>Impacts in VA @ 52.1%</b> (used by past airport system studies)	(310,426)

Source: [www.mwaa.com](http://www.mwaa.com), calculations by EDR Group

### 6.4.3 Direct Impacts of Low and High Scenarios

Estimates of annual visitor spending impacts in Virginia resulting from September 11 range between \$218 million and \$454 million, as shown in **Table 6.7**.

Table 6.7

**Calculation of High and Low Impacts of Visitor Spending in Virginia**

	Low Estimate	High Estimate
<b>1. General Aviation</b>		
Itinerant operations that no longer use VA airports	5,163	12,845
Fewer visitors to VA <sup>1</sup>	22,975	57,160
<b>Subtotal: GA Visitor Spending Shortfall in VA<sup>2</sup></b>	<b>\$3,060,000</b>	<b>\$7,613,000</b>
<b>2. Commercial Enplanements</b>		
Commercial Visitors that do not use IAD or DCA due to September 11.	310,426	634,528
<b>Subtotal: Visitor Spending of Commercial Visitors Shortfall to VA<sup>3</sup></b>	<b>\$215,436,000</b>	<b>\$446,303,000</b>
<b>Total Direct Visitor Shortfall in VA</b>	<b>\$218,496,000</b>	<b>\$ 453,916,000</b>

Sources: [www.mwaa.com](http://www.mwaa.com), The Local and Regional Economic Impacts of Ronald Reagan Washington National and Washington Dulles International Airports, June 2003. Calculations by EDR Group.

<sup>1</sup> These estimates employ GA survey data from the 2002 Virginia Airport system Study: GA flights to commercial airports carry an average of 4.45 passengers per operation, including pilots.

<sup>2</sup> Each visitor spends an average of \$133.19 per visit.

<sup>3</sup> The above referenced study estimates visitor spending at \$708 for visitors arriving at IAD and \$694 for visitors arriving through DCA.

## 6.5 FUEL TAX

DCA is exempt from Virginia's Aviation Fuel Tax. Following September 11, GA operations have been prohibited at DCA, and have therefore been redirected to other Virginia airports, where Aviation Fuel Tax is charged. This transfer of GA activity is adding an estimated \$270,000 to \$312,000 per year into the Aviation Special Fund. To establish a range of impacts, this study uses the GA operation totals of 2000 and the potential operations of 2002, which are based on observed trends from 1998 through 2000

### Background

Jet fuel sales tax revenues had been increasing in Virginia prior to September 11, 2001, and have dramatically grown since that date. Revenues increased from \$2.6 million to \$3.2 million from Fiscal Year 1998 through FY 2001. In FY 2002, the year that included the terrorist attacks, the Commonwealth's revenues for jet fuel sales tax exceeded \$3.44 million, and increased again to nearly \$4.75 million the following year, as shown in **Table 6.8**.<sup>13</sup>

<sup>13</sup> The fiscal year is July 1 –June 30. FY 2003 is unedited. Due to data availability, this study uses calendar year 2003 instead of FY 2003.

Table 6.8

**Changes in Virginia Jet Fuel Tax  
Revenues, 1998 - 2003**

FY 1998	\$2,591,506
FY 1999	\$2,979,471
FY 2000	\$3,183,302
FY 2001	\$3,178,204
FY 2002	\$3,447,215
CY 2003	\$4,753,158

Fiscal Year years are July 1-June 30; 2003 is not audited and reported as a calendar year.

Sources: Department of Aviation Audits, FY 1998 – FY 2002, Auditor of Public Accounts, Commonwealth of Virginia, Monthly Fuel Tax Reports of the Virginia Department of Motor Vehicles.

Estimating how much of the increase from FY 2001 to 2003 can be attributed to September 11 and the subsequent curtailment of GA activities at Reagan-National Airport involves drawing together the Commonwealth's tax policies and rates, estimates of the scale of operations that are no longer carried out at DCA, fuel for general aviation that was sold at DCA in 2000 (the last complete year that GA was allowed) and the proportion of former DCA operations that now use Virginia airports. Details of these calculations are below.

**VA Tax Policies.** Fuel tax is collected directly by the Commonwealth from Licensed Aviation Consumers by the Virginia Department of Motor Vehicles.

**Tax Rates.** For the first 100,000 gallons purchased in a fiscal year, Licensed Aviation Consumers are charged \$.05 per gallon. The rate is \$.005 per gallon for additional fuel purchased in that year.<sup>14</sup>

**Operations and Fuel Sales at DCA in 2000.** In 2000, 6.1 million gallons of fuel were purchased by the FBO of DCA and 59,292 GA operations were conducted.<sup>15</sup> This analysis assumes that GA "aviation consumers" at DCA were small users who purchase less than 100,000 gallons of jet fuel per year.<sup>16</sup> Therefore, in 2000, the Commonwealth would have realized \$305,000, or five cents on the gallon, if Reagan-National Airport **was not exempt** from the jet aviation fuel tax.

**Trends Extended at DCA to 2002/3:** There were 51,808 GA operations at DCA in 1998 and 59,292 in 2000. If the growth trend continued through 2002, DCA would have hosted 67,857

<sup>14</sup> Source: Virginia Department of Motor Vehicles

<sup>15</sup> Source for fuel sales is Signature Flight Support. Operations are from Activity Forecasts for Ronald Reagan Washington National Airport - 2002 (HNTB)

<sup>16</sup> This is based on observations of DOA staff.

operations. For the purpose of this analysis, the 102.9gallons per-operation in 2000<sup>17</sup> will be assumed to be stable for 2002, implying approximately 7.0 million gallons of fuel that would have been used based on presumed 2002 DCA operations. Trends extended to 2002 are shown on **Table 6.9**.<sup>18</sup>

Table 6.9

**Estimated Gallons of Aviation Fuel Used at DCA**

Year	Operations	Gallons (Rounded to 100,000)
1998	51,808	5,300,000
2000	59,292	6,100,000
2002 (1998 – 2000 trends extended)	67,857	7,000,000

Gallons are calculated based on an assumed sale of 102.88 gallons per operation.

Source: Signature Flight Support for 2000 gallons, MAAA Final Draft Aviation Activity Forecasts for Ronald Reagan Washington National Airport. Calculations by EDR Group.

**Distribution of DCA General Aviation Operations.** Since September 11, GA operations that would have been carried out at DCA have had to use other airports. According to information obtained from Signature Flight Support, the only FBO at DCA, 89 percent of that traffic now uses Virginia airports (85 percent to IAD and 4 percent to Manassas and Leesburg, combined) and 11 percent use BWI, which does not add tax revenues to the Commonwealth.

DCA is exempt from the Commonwealth's jet fuel tax. By closing the airport to general aviation, GA operations that in the past used Reagan-National moved to Dulles, Leesburg and Manassas airports, where fuel tax is assessed, as well as out of state to BWI. The result has been additional tax revenues for Virginia. This chapter presents two potential ways of defining these additional revenues:

- (1) Assuming that the amount of fuel used for GA at DCA in 2000 remains constant through 2002 for operations that *would have used DCA in 2002/3*; and
- (2) Assuming that GA operations at DCA would have increased by the same rate they did increase from 1998-2000, and that fuel consumption would have increased at a corresponding rate.

<sup>17</sup> 6.1 million gallons sold at Reagan- National in 2000 divided by the 59,292 GA operations that year equals 102.88 gallons per operation. In turn the 102.88 gallons per operation multiplied by 67,857 operations in 2002 (assumed by trends extended) equals 6,981,173 gallons of jet fuel.

<sup>18</sup> Note, although fuel taxes are calculated on a fiscal year, calendar years are assumed for these data to coordinate operations, fuel sales and tax revenues.

Revenues calculated for both assumptions assume that Virginia is collecting 89% of potential revenues, with the remainder redirected to Maryland. The estimated range of tax revenues being realized by Virginia due to the rerouting of DCA's general aviation activity is presented in **Table 6.10**.

Table 6.10

**Estimates of Annual Fuel Tax Revenues Realized by Virginia Due to Curtailing GA Operations at DCA**

Basis for Estimate	Constant 2000	Extended Trends
Gallons of Fuel Sold	6,100,000	7,000,000
89 percent used by VA FBOs	5,429,000	6,230,000
Revenues to VA at \$.05 per Gallon of Fuel	271,450 <sup>1</sup>	\$311,500

Sources: Signature Flight Support and VA DMV. Calculations by EDR Group. Extended trends are rounded to an even 7 million.

**Jet Fuel Tax Summary.** In 2000, Signature Flight Support sold 6.1 million gallons of jet fuel to general aviation customers at Reagan National Airport. The airport is exempt from the Virginia Aviation Fuel Tax. If, however, the tax was charged at DCA, it would have resulted in \$305,000 for the Commonwealth. In the post September 11, 2001 era, Signature Flight Support estimates that 89% of former GA traffic at DCA has relocated to other Virginia airports, which collect the fuel tax. If, three years later, these GA customers again purchased 6.1 million gallons of fuel in 2002, than Virginia's Aviation Special Fund would have received \$271,450 due to relocation of flights from DCA due to September 11.

Assuming that general aviation operations and fuel sales would have grown from 2000-2002 at the same 14.4 percent observed from 1998 through 2000, roughly seven million gallons of fuel would have been sold at DCA in 2002. As a consequence of September 11, 2001 attacks, 89 percent of these potential GA operations and corresponding fuel sales have been disbursed to other Virginia airports, accounting for an estimated \$311,500 in revenue to Virginia's Aviation Special Fund that otherwise would not have been collected due to the tax-exempt status of DCA.

# Chapter Seven

## SCENARIO ANALYSIS

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### 7.1 OVERVIEW

This overview presents findings under a scenario that assumes implementation of the 2020 Virginia Air Transportation System Plan. To provide meaningful comparisons to current conditions, the scenario only pertains to airports that were fully operational in 2001 and estimates the difference between the actual 2001 economic impacts, and impacts of the recommended improvements when assuming 2001 conditions.<sup>19</sup> Per the recommendations given in the System Plan, this scenario examines the economic impacts of implementing:

- Instrument Approach Procedure (IAP) upgrades at 14 airports; and
- Runway extensions at 12 airports, with 5 airports recommended to receive both navigational and runway improvements. (See **Table 7.1.**)

The scenario is described and reported below. The following sections detail methodology for developing the scenario. Subparts of the scenario include analyses of IAP improvements and runway extensions. Lastly, the conclusion presents the scenario in the context of the regional impacts for the 2001 base case.

### 7.2 SCENARIO

*Visitor spending* will be affected by both IAP and runway improvements. The recommended IAP upgrades will allow for more operations by allowing takeoffs and landings during a wider range of weather conditions than are now possible. Runway extensions will allow airports to service larger airplanes than can now be accommodated by increasing the size of aircraft that can use these airports.<sup>20</sup> Extended runways that allow for larger aircraft will likely lead to an increase of passengers per aircraft as larger airplanes are either substituted for smaller planes or are used in addition to smaller planes. For the 12 airports where runway extensions are recommended, 11 show recommendations to extend their primary runway to 5,500 feet, while the recommendation for Manassas Regional is to extend its primary runway from 5,500 feet to 6,200 feet. Virginia airports slated for runway extensions and IAP improvements under the 2020 Air Transportation System Plan are shown in **Table 7.1.**

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<sup>19</sup> Accordingly, impacts of System Plan recommendations for airports programmed to open in future years, Lee and Tappahannock, or the recently opened Stafford airport, which is in its “ramp-up” phase, are not included in this scenario.

<sup>20</sup> Longer runways may provide the distance required by larger business jet aircraft or charters to take off while fully loaded or come into compliance with insurance requirements for runway lengths matched for certain types of aircraft.

*On-airport sales* will also increase due to IAP and runway improvements. The increase in operations assumed from IAP upgrades will generate demand for on-airport FBO related services and other aviation services provided by airport tenants. Further, both IAP and runway improvements will bring more passengers to Virginia airports, resulting in increased sales at retail and food services establishments.

Table 7.1

**IAP and Runway Improvements Recommended in the 2020  
Virginia Air Transportation System Plan**

Airport	Improvement	
	IAP	Runway
Accomack	X	
Blue Ridge		X
Chesapeake	X	
Culpeper	X	X
Dinwiddie		X
Farmville	X	X
Front Royal	X	
Hampton Roads	X	X
Hanover	X	X
Leesburg	X	
Lonesome Pine	X	
Louisa		X
Manassas		X
Mecklenburg-Brunswick		X
Middle Peninsula	X	X
Shannon	X	
Tazewell	X	
Virginia Highlands		X
Virginia Tech		X
Warrenton-Fauquier	X	
William Tuck	X	

**Results.** If the recommended IAP upgrades and runway extensions were in place for the 2001 system wide economic impact analysis, impacts in 2001 based on assumptions made for this scenario show:

- \$14.5 million in additional business sales in the Commonwealth, generating 264 jobs and \$5.5 million in workers wages and salaries.
- A total of \$13 million in regional business sales generated by the 21 airports, including \$5 million in wages, supporting 250 jobs.

- The recommended IAP improvements add nearly \$3.3 million to the regional economies of the 14 designated airports, including on-airport direct sales, off-airport visitor spending, and spin-off (i.e., multiplier) impacts.
  - About \$2.1 million are in additional on-airport sales due to the 12,000 additional operations that the airports will be able to accommodate and about \$1.2 million will be in visitor spending.
  - This economic activity will yield almost \$1.3 million in wages and 54 jobs. Roughly 49 jobs, \$1.1 million in wages and \$3 million of business sales will be additional statewide benefits. In this scenario, 2,400 operations (and the resulting impacts for statewide totals) are assumed to be redistributed within Virginia, accounting for state totals being lower than the sum of individual airport impacts.
- The recommended runway expansions would add nearly \$11 million to the regional economies of the 12 designated airports, primarily because longer runways will be able to accommodate larger aircraft that can seat more passengers, increasing the number of visitors to Virginia.<sup>21</sup> In addition two of the airports house retail tenants and it is likely that sales at these establishments will increase as more passengers use the airports.
  - In this scenario, spending by the additional visitors due to the runway expansions is estimated at \$6.5 million, and will generate an additional \$4.1 million in local area spin-off impacts. Combined, this \$10.6 million includes \$4 million in wages and accounts for over 200 local jobs. Impacts to all of Virginia, including initial visitor spending and the Commonwealth-wide “spin-offs” are \$12.1 million in business sales, \$4.5 in wages and 222 jobs.
  - Retailing at Manassas Regional and Hampton Roads airports are estimated to generate an additional \$180,000 of on-airport sales (\$110,000 at Manassas Regional and \$70,000 at Hampton Roads), generating \$99,000 in local spin-offs and \$138,000 in Virginia wide spin-offs. In total, for Virginia, the increased retail sales will yield \$318,000, producing \$137,000 in wages and eight jobs.

**Table 7.2** reports findings detailing how the Virginia Air Transportation System Plan would have affected each airport recommended for improvements had they been in-place for the 2001 system-wide economic impact analysis.

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<sup>21</sup> All visitors are assumed as new to Virginia.

Table 7.2

**Total Economic Benefits Generated from IAP Upgrades and Runway Expansions Recommended in Virginia's 2020 Airport System Plan. (All dollars are in thousands.)**

Airport	Direct On-Airport Impacts			Spin-off Impacts on the Regional Economy			Total Regional Economic Growth		
	Jobs	Wages	Sales	Jobs	Wages	Sales	Jobs	Wages	Sales
Accomack	0	\$ 1	\$ 3	0	\$ 1	\$ 3	0	\$ 2	\$ 6
Blue Ridge	9	\$ 121	\$ 319	3	\$ 79	\$ 231	12	\$ 200	\$ 550
Chesapeake	1	\$ 21	\$ 49	0	\$ 12	\$ 34	1	\$ 33	\$ 83
Culpeper	16	\$ 257	\$ 661	5	\$ 137	\$ 395	21	\$ 393	\$ 1,055
Dinwiddie	13	\$ 185	\$ 480	4	\$ 124	\$ 359	17	\$ 309	\$ 838
Farmville	4	\$ 57	\$ 148	3	\$ 109	\$ 296	7	\$ 165	\$ 445
Front Royal	4	\$ 127	\$ 298	1	\$ 15	\$ 44	4	\$ 142	\$ 342
Hampton Roads	27	\$ 412	\$ 1,043	10	\$ 273	\$ 775	37	\$ 685	\$ 1,817
Hanover	10	\$ 207	\$ 519	8	\$ 213	\$ 624	19	\$ 421	\$ 1,143
Leesburg	6	\$ 157	\$ 364	0	\$ 1	\$ 3	6	\$ 158	\$ 367
Lonesome Pine	0	\$ 3	\$ 7	0	\$ 0	\$ 1	0	\$ 3	\$ 7
Louisa	15	\$ 209	\$ 548	3	\$ 98	\$ 338	18	\$ 307	\$ 885
Manassas	42	\$ 840	\$ 2,085	12	\$ 436	\$ 1,120	54	\$ 1,276	\$ 3,205
Mecklenburg-Brunswick	3	\$ 32	\$ 87	1	\$ 16	\$ 44	4	\$ 48	\$ 131
Middle Peninsula	5	\$ 71	\$ 187	1	\$ 31	\$ 95	6	\$ 102	\$ 282
Shannon	0	\$ 14	\$ 33	0	\$ 0	\$ 1	0	\$ 15	\$ 34
Tazewell	0	\$ 1	\$ 2	3	\$ 18	\$ 53	3	\$ 19	\$ 55
Virginia Highlands	9	\$ 127	\$ 331	3	\$ 79	\$ 224	12	\$ 207	\$ 556
Virginia Tech	16	\$ 209	\$ 550	5	\$ 114	\$ 336	21	\$ 323	\$ 886
Warrenton-Fauquier	3	\$ 42	\$ 100	0	\$ 3	\$ 10	4	\$ 46	\$ 109
William Tuck	0	\$ 7	\$ 16	4	\$ 97	\$ 227	4	\$ 104	\$ 242
<b>Airport and Regional Totals</b>	<b>183</b>	<b>\$ 3,100</b>	<b>\$ 7,829</b>	<b>66</b>	<b>\$ 1,856</b>	<b>\$ 5,211</b>	<b>250</b>	<b>\$ 4,956</b>	<b>\$ 13,039</b>
<i>Additional Impacts to Virginia</i>	<i>181</i>	<i>\$ 3,046</i>	<i>\$ 7,699</i>	<i>83</i>	<i>\$ 2,403</i>	<i>\$ 6,778</i>	<i>264</i>	<i>\$ 5,449</i>	<i>\$ 14,477</i>

### 7.3 SEGMENTS OF THE SCENARIO

The following subsections provide detail of the methodologies and assumptions used to construct the scenario.

### 7.3.1 Impacts of Navigational Instrumentation Upgrades

As an element of the scenario, an analysis was conducted for 14 airports to measure the potential impacts of recommended navigational improvements. Assumptions used to develop the scenario are described below.

**Additional Operations.** This scenario assumes that 12,000 additional operations will occur at airports recommended for IAP upgrades. This total was derived by the following steps:

- Ten years of weather data were examined for each airport. The primary data analyzed was the the percentage of time that weather conditions would allow planes to land if the new recommended approach minimums were in place. This data was compared to current conditions to determine the *incremental* increase in potential operations.
- 2001 GA operations were increased by the percent of additional operations suggested by the weather data. This was done by adding observations of weather conditions where: (1) landings are possible; (2) landing would be possible if the upgrades were in place, and (3) landings would not be possible even if the upgrades were in place. Of this sum, the percent of observations where landings would be possible with the upgrades (#2) were multiplied against GA operations in 2001 to derive estimates of operations gained by the IAP improvements. (See **Table 7.3.**)

Table 7.3

#### Additional Operations Possible With Recommended IAP Upgrades

Airport	GA Ops Under Existing IAP	Weather Conditions that Allow Additional Landings with Recommended IAP (Percent of observations)	Additional Ops Assumed by Scenario	Operations Assumed by Scenario
Accomack County	9,925	1.2%	121	10,046
Chesapeake Regional	27,882	2.2%	626	28,508
Culpeper County	44,057	2.5%	1,111	45,168
Farmville Regional	9,784	2.2%	218	10,002
Front Royal-Warren County	9,949	12.1%	1,202	11,151
Hampton Roads	56,090	2.3%	1,292	57,382
Hanover County Municipal	27,060	3.5%	936	27,996
Leesburg Executive	85,050	3.0%	2,590	87,640
Lonesome Pine	8,524	3.5%	298	8,822
Middle Peninsula Regional	12,021	2.3%	276	12,297
Shannon	28,400	2.5%	716	29,116
Tazewell County	4,784	1.1%	52	4,836
Warrenton-Fauquier	38,094	5.9%	2,246	40,340
William M. Tuck	7,043	4.0%	281	7,324
<b>Totals</b>	<b>368,663</b>	<b>3.2%</b>	<b>11,965</b>	<b>380,628</b>
Sources: 1993-2002 Count of WX CAT, VATSP Forecasts. Analysis by EDR Group.				

**Impacts on the economies of the airport impact regions and the Commonwealth.** All impacts are assumed to be new impacts on regions. To estimate statewide impacts, airports were divided into two classifications, discussed below and shown in **Table 4**.

**Airports on Virginia’s borders with Maryland, West Virginia, Kentucky, Tennessee or North Carolina.** At these airports, all impacts are assumed to be additional, new benefits to the Commonwealth’s economy; and

- **Airports that do not border a neighboring state.** For impacts of IAP improvements specified at these interior airports, 50 percent are assumed to represent new operations in Virginia and 50 percent are now diverted to other airports in the Commonwealth, and therefore do not represent additional impacts in Virginia (although they are counted as additional impacts for the airport-specific region within Virginia).

Table 7.4

**Location of 14 VA Airports Recommended for IAP Upgrades**

Border Airports		Interior Airports
Accomack	Lonesome Pine	Culpeper
Chesapeake	Shannon	Farmville
Front Royal	Tazewell	Hanover
Hampton Roads	William Tuck	Middle Peninsula
Leesburg		Warrenton-Faquier

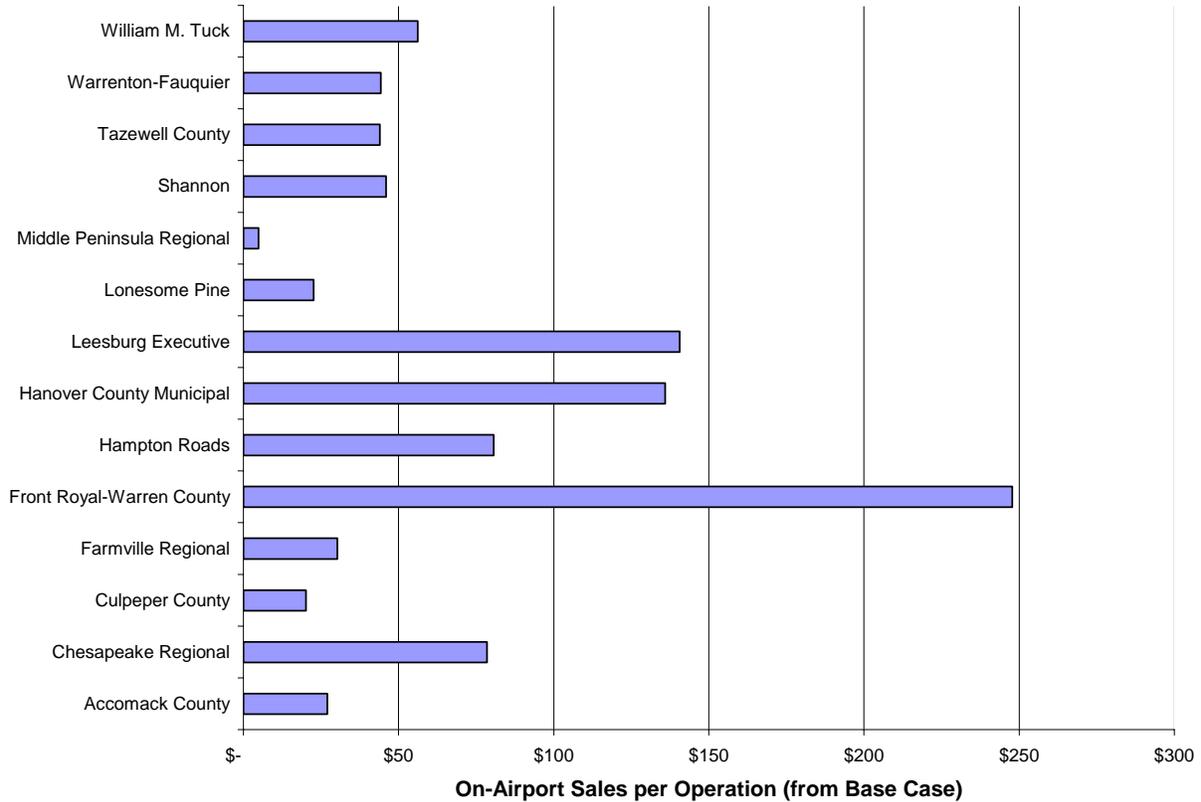
**Increase of on-airport sales.** Increased operations at airports will increase on-airport sales. Additional airplanes will require parking, fuel, repair and maintenance services in addition to those already provided. Moreover, pilots and passengers on these operations will make purchases at airport concessions and from tenants. To estimate on-airport impacts, revenues of FBOs and tenants that provide aviation services, retailing and food services were calculated on a per-operation basis,<sup>22</sup> and this ratio was applied to the additional operations assumed if the recommended IAP upgrades were in place.

Sales per operations vary from \$5 at Middle Peninsula to \$248 at Front Royal. Leesburg and Hanover airports also generate more than \$100 of sales per operation, while Accomack, Culpeper, Farmville and Lonesome Pine, in addition to Middle Peninsula, generate sales of \$30 or less. The spread of sales per operation is illustrated in **Figure 7-1** below.

<sup>22</sup> Calculations included airport management, FBOs and tenants.

Figure 7-1

**FBO and Tenant Sales of Air Services, Retail and Food Services per Operation at Airports Recommended for IAP Upgrades**



The economic impacts from the additional operations expected from the IAP improvements are estimated at:

- \$1.1 million in direct sales;
- 33 jobs among the airport regions and \$833,000 in wages generated from direct sales and spin-off impacts in local economies; and
- \$1.9 million of new statewide benefits including 29 jobs and \$716,000 in workers wages.

**Table 7.5** shows the direct impact on each airport with a recommended IAP upgrade, and the spin-off impacts on the impact region of each airport.

Table 7.5

**Regional Impacts From Additional On-Airport Activity (All dollars are in thousands)**

Airport	Direct On-Airport Impacts			Spin-off Impacts on the Regional Economy			Total Regional Economic Growth		
	Jobs	Wages	Sales	Jobs	Wages	Sales	Jobs	Wages	Sales
Accomack County	0	\$1	\$3	0	\$1	\$3	0	\$2	\$6
Chesapeake Regional	1	\$21	\$49	0	\$12	\$34	1	\$33	\$83
Culpeper County	1	\$9	\$22	0	\$4	\$12	1	\$13	\$34
Farmville Regional	0	\$3	\$7	2	\$74	\$202	2	\$77	\$209
Front Royal-Warren County	4	\$127	\$298	1	\$15	\$44	4	\$142	\$342
Hampton Roads	1	\$45	\$104	1	\$30	\$89	2	\$75	\$193
Hanover County Municipal	1	\$54	\$127	4	\$91	\$276	6	\$146	\$404
Leesburg Executive	6	\$157	\$364	0	\$1	\$3	6	\$158	\$367
Lonesome Pine	0	\$3	\$7	0	\$0	\$1	0	\$3	\$7
Middle Peninsula Regional	0	\$1	\$1	0	\$3	\$7	0	\$3	\$8
Shannon	0	\$14	\$33	0	\$0	\$1	0	\$15	\$34
Tazewell County	0	\$1	\$2	3	\$18	\$53	3	\$19	\$55
Warrenton-Fauquier	3	\$42	\$100	0	\$3	\$10	4	\$46	\$109
William M. Tuck	0	\$7	\$16	4	\$97	\$227	4	\$104	\$242
<b>Totals of Airport Regional Impacts</b>	18	\$484	\$1,133	15	\$349	\$960	33	\$833	\$2,094
<b>Additional Impacts to Virginia</b>	<b>15</b>	<b>\$430</b>	<b>\$1,004</b>	<b>14</b>	<b>\$286</b>	<b>\$856</b>	<b>29</b>	<b>\$716</b>	<b>\$1,860</b>

**7.3.2 Impacts of Runway Extensions**

This part of the scenario analysis provides details and assumptions made concerning the impacts of extending the primary runway of 11 airports to 5,500 feet and Manassas Regional Airport from 5,700 to 6,200 feet, as recommended under the 2020 Virginia Air Transportation System Plan. Assumptions for constructing the analysis are described below.

**Adjusting the average passengers per GA operation to 4 for each of the 12 airports.** Longer runways will allow for additional, larger planes, which can carry more passengers. Using four passengers per plane is justified by survey data of larger airports.<sup>23</sup> Ten of the 12 airports recommended for runway lengthening are classified as general reliever airports and two, Louisa County and Virginia Tech/Montgomery Executive, are classified as GA Community airports. Survey data for reliever airports puts the average number of passengers per GA operation at 3.25, so the assumption of 4 passengers represents an increase of 0.75 persons per operation. Visitor impacts of community airports were calculated at an average of 2 passengers per GA operation, following consultations with the Commonwealth's Department of Aviation and based on the current runway and observed aircraft profile. Under this scenario, the number of passengers per aircraft is doubled to four. **Figure 7-2**, below, illustrates the distribution among airports of the

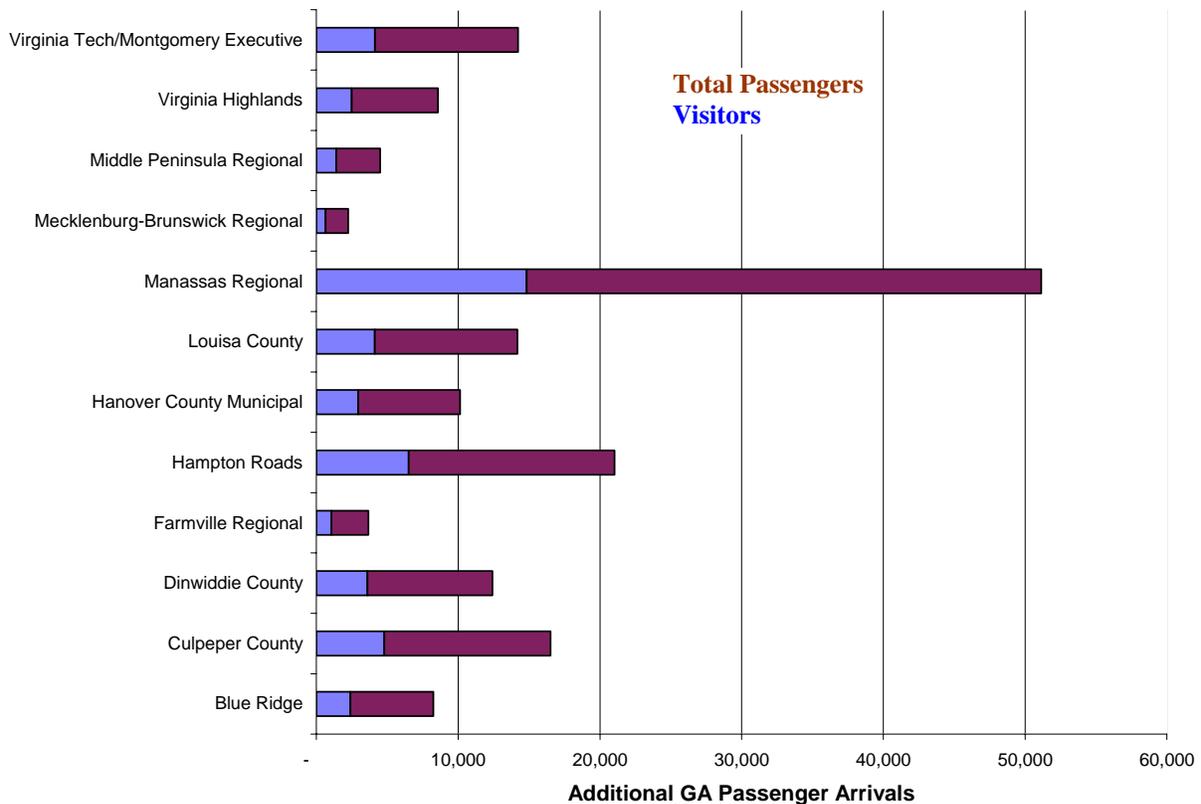
<sup>23</sup> 42 survey responses for airports with primary runways of 5500 feet show an average of 4.17 passengers per GA operation. These results include commercial airports as well as GA only airports.

estimated additional passengers and additional visitors that would be accommodated by the recommended runway lengthenings. In summary:

- With the assumption of 4 passengers per GA operation, the 12 airports recommended for runway expansions would accommodate 167,000 additional passengers, of which 49,000 would be visitors.<sup>24</sup>
- The primary beneficiary under this scenario is Manassas Regional Airport, which is expected to receive 14,800 of the new visitors or over 30 percent of the total; the second largest increase would be at Hampton Roads Airport with 6,500 additional visitors.
- Mecklenburg-Brunswick Regional Airport shows the lowest projected increase of visitors at 651, followed by Farmville and Middle Peninsula airports with 1,000 and 1,400, respectively.

Figure 7-2

**Additional GA Passengers and Visitors with Runway Extensions Recommended by the Air Transportation System Plan (Based on 2001 Data)**



The 49,000 additional visitors will generate an average of roughly \$247 per person, including spin-off affects in the Commonwealth, as summarized below:

<sup>24</sup> Total operations at the airport would serve 334,000, of which half (167,000) are assumed to be arrivals and half are assumed to be departures. This scenario uses the same assumptions as in the 2001 Virginia Air Transportation System Plan regarding the percentage of itinerant versus local GA operations.

- The additional 49,000 visitors shows additional visitor spending in Virginia of \$6.5 million, generating an additional \$5.6 million in spin-off business sales statewide.
- Commonwealth-wide, the total of \$12.1 of business sales supports for 222 jobs and \$4.5 million in additional wages.

Of these statewide numbers, initial visitor spending and the sum of regional spin-off impacts account for \$10.6 million of business sales, almost \$4 million in wages and 211 jobs.

**Increasing sales at airports to account for additional passengers.** Two airports, Manassas Regional and Hampton Roads reported retail tenants (none of the airports targeted for runway extensions reported food services). In this scenario, the ratio of retail sales per total GA passenger in 2001 is applied to the presumed additional passengers made possible by the expansions of these airports' primary runways. In total:

- Additional on-airport direct sales are estimated at \$180,000, producing \$88,000 in wages and 5 jobs.
- Virginia-wide impacts, including spin-off affects, are \$318,000 in sales, that in turn generate 8 jobs and \$137,000 in wages.

The projected increase in on-airport retail sales at Manassas Regional Airport and Hampton Roads Airport total \$180,000 in direct sales, supporting \$88,000 in additional wages and 5 jobs. With the impact of regional spin-offs, total localized impacts are estimated to be \$279,000 in business sales, of which \$124,000 are workers wages, accounting for 6 additional jobs. By airport:

- Direct and regional spin-off impacts generated at Manassas Regional are 2 new jobs, \$74,000 in wages and \$162,000 of business activity.
- Direct and regional spin-off impacts generated at Hampton Roads are 4 jobs, \$50,000 in wages and \$117,000 of business activity.

**Table 7.6**, below, shows the estimated economic benefits associated with the runway lengthenings recommended in the 2020 Virginia Air Transportation System Plan.

Table 7.6

**Regional and Commonwealth Economic Benefits From Implementing Runway Expansions Recommended in the 2020 Air System Plan (All dollars are in thousands)**

Airport	Initial Visitor Spending and On-Airport Retail			Spin-offs Affects			Total Economic Benefit		
	Jobs	Wages	Sales	Jobs	Wages	Sales	Jobs	Wages	Sales
Blue Ridge	9	\$121	\$319	3	\$79	\$231	12	200	550
Culpeper County	15	\$248	\$638	5	\$133	\$383	20	381	1,021
Dinwiddie County	13	\$185	\$480	4	\$124	\$359	17	309	838
Farmville Regional	4	\$54	\$142	1	\$34	\$94	5	88	236
Hampton Roads	26	\$368	\$938	9	\$243	\$686	35	611	1,624
Hanover County Municipal	9	\$153	\$392	4	\$122	\$347	13	275	739
Louisa County	15	\$209	\$548	3	\$98	\$338	18	307	885
Manassas Regional	42	\$840	\$2,085	12	\$436	\$1,120	54	1,276	3,205
Mecklenburg-Brunswick Regional	3	\$32	\$87	1	\$16	\$44	4	48	131
Middle Peninsula Regional	5	\$70	\$186	1	\$28	\$88	6	99	275
Virginia Highlands	9	\$127	\$331	3	\$79	\$224	12	207	556
Virginia Tech/Montgomery Executive	16	\$209	\$550	5	\$114	\$336	21	323	886
<b>Totals of Airports</b>	<b>166</b>	<b>2,616</b>	<b>6,695</b>	<b>51</b>	<b>1,507</b>	<b>4,250</b>	<b>217</b>	<b>4,123</b>	<b>10,946</b>
<i>Statewide Impacts</i>	<i>166</i>	<i>2,616</i>	<i>6,695</i>	<i>69</i>	<i>\$2,117</i>	<i>\$5,922</i>	<i>235</i>	<i>4,733</i>	<i>12,618</i>

Based on 2001 Airport Analysis.

Manassas Regional Airport and Hampton Roads totals include estimated on-airport retail.

## 7.4 CONCLUSION

The IAP and runway improvements would have increased overall business sales for the regional economies of the 21 airports by an aggregate 7 percent.<sup>25</sup> Given the assumptions made in this scenario, estimates for 11 airports show increases more than 10 percent above the airport regions base case totals and the increase of 10 airports is less than 10 percent. **Figure 7-3** illustrates the relationship by airport between the base case regional economic impacts (business sales) calculated as part of the 2001 system-wide study and the business sales this scenario estimates will be generated by the 2020 Air Transportation System Plan.

The airport showing the greatest percentage increase is Virginia Tech/Montgomery Executive, with an increase of 42 percent above its regional total in the base case. Virginia Tech is one of the two community airports where the assumed number of passengers per GA operation doubled from two to four. Farmville Regional Airport has the second largest increase at 29 percent, followed by Louisa County Airport – another GA - Community airport – at 23 percent. At the

<sup>25</sup> This is the sum of on-airport direct spending, initial visitor spending, and spin-off impacts.

other end of the spectrum, Shannon, Accomack and Lonesome Pine airports each show estimated increases of less than 1 percent above the airports' regional base case.

Of the 11 airports where estimated regional impacts above the base case exceed 10 percent:

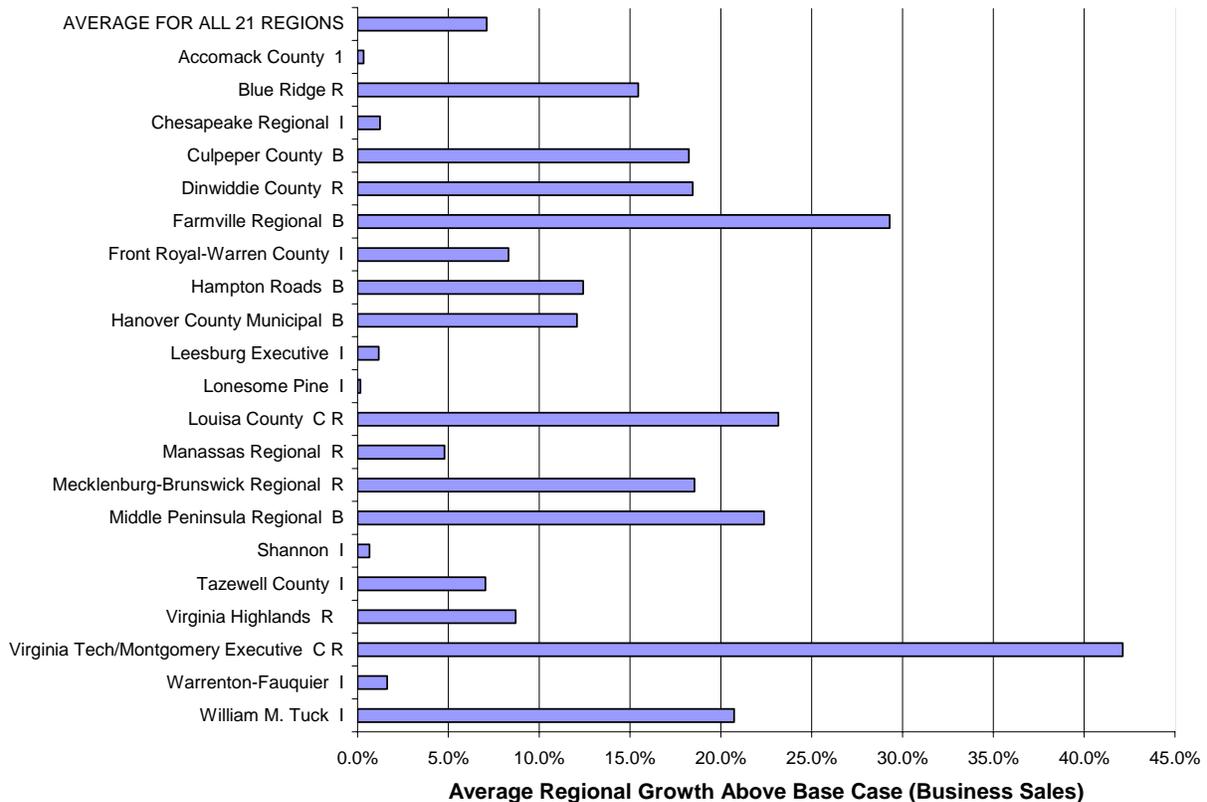
- Two are GA - Community airports that are recommended in the Virginia System Plan for runway expansions to 5,500 feet;
- Five are recommended for both runway expansions and navigational improvements;
- Three are recommended for runway expansions only; and
- One is recommended for only an IAP upgrade.

Of the 10 airports that show regional impacts less than 10 percent of the regional base case:

- Two are recommended for runway expansions; and
- Eight are recommended for IAP upgrades.

Figure 7-3

**Percent Increase Above Base Case of Regional Business Sales Generated by Recommended Navigational and Runway Improvements (Based on 2001 Data).**



Key: C – Designated GA-Community airport; B – Recommended for both IAP upgrades and runway improvements; R – Recommended for Runway Improvements; and I – Recommended for IAP upgrades.

# **Appendix A**



## AIRPORT MANAGERS SURVEY

Thank you for your participation in this important study. Please provide the information requested below. If available, also include a copy of your most recent annual report and copies of any past studies conducted concerning the economic impact of your airport.

1. Airport Name: \_\_\_\_\_  
Location: \_\_\_\_\_  
Manager (Contact): \_\_\_\_\_

2. How many people did your business employ in 2001? Full-time employees \_\_\_\_\_  
Part-time employees \_\_\_\_\_

3. How much revenue did the airport collect in 2001 from:

Landing fees \$ \_\_\_\_\_

Fuel flowage fees \$ \_\_\_\_\_

Tie-down fees \$ \_\_\_\_\_

Aircraft parking fees \$ \_\_\_\_\_

Hangar rentals \$ \_\_\_\_\_

Terminal space rent \$ \_\_\_\_\_

Commercial concessionaire  
revenue (other than rent) \$ \_\_\_\_\_

Other sources (please specify) \$ \_\_\_\_\_

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4. Please identify any air taxi or charter operators that operate at your airport. If available, please provide contact information.

<u>Company Name</u>	<u>Air Taxi or Charter</u>	<u>Contact</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Other than those listed above in **Question 4**, please list all **FBO's, tenants and businesses located at your airport**. If available, please include contact information.

<u>Company Name</u>	<u>Type of Firm</u>	<u>Contact</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

6. Please list **local businesses** of which you are aware that rely on your airport, especially those that do not own aircraft. If available, please include contact information.

<u>Company Name</u>	<u>Type of Firm</u>	<u>Contact</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

7. Please report your total capital expenditures over the last 3 years:

\$ \_\_\_\_\_ in 1999    \$ \_\_\_\_\_ in 2000    \$ \_\_\_\_\_ in 2001

**Operating Expenditures**

8. Please report the total payroll paid to all employees at this airport: \$ \_\_\_\_\_

9. Other than payroll, please estimate how much the airport spent for all other operating expenses in 2001: \$ \_\_\_\_\_

10. If this is a privately owned airport, what were the total 2001 taxes (local & state) paid to your locality and to the Commonwealth of Virginia: \$ \_\_\_\_\_

11. How were your expenditures distributed among the firms that supplied your airport? (just a rough estimate, according to your experience and judgment):

	<u>Firms In Virginia</u>	<u>Firms Outside Virginia</u>
Operating Materials (Working Capital)	(\$ or %) _____	(\$ or %) _____
Services	(\$ or %) _____	(\$ or %) _____
Capital Equipment	(\$ or %) _____	(\$ or %) _____
Construction labor	(\$ or %) _____	(\$ or %) _____
Other Expenditure	(\$ or %) _____	(\$ or %) _____

12. Are there any facility inadequacies that are constraining you from your full desired business use of the airport? What is the inadequacy, and what would your firm do differently if remedied?

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13. If the improvements listed in **Question 12** are made, do you expect changes in the fleet mix of operations and of based aircraft at your airport?

Yes       No

If Yes, please estimate the changes that you anticipate:

Change in Based Aircraft (+/-) :

a. Propeller/Reciprocating \_\_\_\_\_ b. Turboprop \_\_\_\_\_ c. Turbojet \_\_\_\_\_

Additional Aircraft Operations (+/-):

a. Local GA \_\_\_\_\_ b. Itinerant GA \_\_\_\_\_ c. Commercial \_\_\_\_\_

- 14.** This study is also concerned with the many quality-of-life benefits that airports provide, which are often not measurable in dollar terms. As an airport manager, you have a unique perspective on the ways in which your airport supports the local quality of life by contributing to the health, safety, recreation, and economic well-being of your community.

Please check all applicable activities/attributes at your airport.

- |  |  |
|--|--|
| <input type="checkbox"/> Recreational flying and/or parachuting                    | <input type="checkbox"/> Shipping of perishable goods        |
| <input type="checkbox"/> Ballooning  | <input type="checkbox"/> Model aircraft flying               |
| <input type="checkbox"/> Pres. of open space/wetlands/ woodlands                   | <input type="checkbox"/> Agricultural spraying               |
| <input type="checkbox"/> Career training / Education                               | <input type="checkbox"/> Freight / Cargo activity            |
| <input type="checkbox"/> Search & Rescue   | <input type="checkbox"/> Traffic / News reporting            |
| <input type="checkbox"/> Flight training   | <input type="checkbox"/> Corporate / Business activity       |
| <input type="checkbox"/> Emergency medical aviation                                | <input type="checkbox"/> Environmental patrol                |
| <input type="checkbox"/> Gateway for VIP / High profile visitors                   | <input type="checkbox"/> Aerial photography / Surveying      |
| <input type="checkbox"/> Staging area for community events                         | <input type="checkbox"/> Museums                             |
| <input type="checkbox"/> Aerial inspections  | <input type="checkbox"/> Police / Law enforcement            |
| <input type="checkbox"/> Aerial advertising / Banner towing                        | <input type="checkbox"/> Location for community facil./util. |
| <input type="checkbox"/> Promotional activities i.e., open houses, air shows, etc. | <input type="checkbox"/> Public charters                     |
| <input type="checkbox"/> Other (please describe)                                   |  |
- 

- 15.** Please provide very brief descriptions (ex., "Channel 8 news helicopter" or "Annual June Air Show") regarding the above checked activities:

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16. This study is also concerned with the many qualitative benefits that airports provide the communities they serve, that may not be measurable directly in dollar terms. You have a unique perspective on the ways in which your airport supports the local quality of life. Please use the space below to discuss any special attributes of this airport, or ways in which it is special or important to the community it serves.

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17. Has your airport felt a measurable impact from the September 11, 2001 terrorist attacks?

Yes  No

<u>Impact</u>	<u>Change (+/-)</u>
GA Operations	_____
Commercial Operations	_____
Commercial Enplanements	_____
Airport Revenue	_____
Airport Employment	_____
Other: _____	_____

*Please provide or refer us to documentation of these impacts, if available (ex: monthly tower counts before/after 9/11)*

Comments:

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18. Has your airport felt an impact from the on-going 'aviation insurance crisis' (the non-availability or steep increase in price of general aviation insurance in the past few years)?

Yes  No

If so, please comment, **especially on any FBO's or other businesses that have been forced to close, or activity such as flight instruction that has stopped**, and any measures you have taken in response:

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19. If possible, please provide or suggest where we may find historical records of the price of 100LL and Jet A at your airport since January 2000, or the most recent available.

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**Thank you for your time and assistance.**

**Your participation is crucial to the success of this study.**





# AIRPORT TENANT SURVEY

**Thank you for your participation in this important study. Please provide the following information:**

**1. Business Information**

Airport at which your business is located: \_\_\_\_\_

Business Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

**2. Type of Business:** \_\_\_\_\_

**3. How many people did your business employ in 2001?** Full-time employees \_\_\_\_\_

Part-time employees \_\_\_\_\_

**4. Operating Expenditures**

Please report the total payroll paid to all employees at this airport: \$ \_\_\_\_\_

Other than payroll, please estimate how much your business spent for all other operating expenses in 2001: \$ \_\_\_\_\_

**5. Gross Sales**

Please estimate the gross sales of your business at this airport in 2001: \$ \_\_\_\_\_

If the exact revenue figure is not available, please estimate the range:

- |  |   |
|--|---|
| <input type="checkbox"/> \$25,000 or less      | <input type="checkbox"/> \$100,000 to \$200,000   |
| <input type="checkbox"/> \$25,000 to \$50,000  | <input type="checkbox"/> \$200,000 to \$500,000   |
| <input type="checkbox"/> \$50,000 to \$75,000  | <input type="checkbox"/> \$500,000 to \$1 million |
| <input type="checkbox"/> \$75,000 to \$100,000 | <input type="checkbox"/> Over \$1 million         |

**6. Please provide the total 2001 taxes (local & state) paid by your business to your locality and to the Commonwealth of Virginia:** \$ \_\_\_\_\_

**7. Are there any facility inadequacies that are constraining you from your full desired business use of the airport? What is the inadequacy, and what would your firm do differently if remedied?**

\_\_\_\_\_

\_\_\_\_\_

**Thank you for your time and assistance.**

**Your participation is vital to the success of this study.**





## AIRPORT-DEPENDENT BUSINESS SURVEY

Thank you for your participation in this important study. Please provide the following information:

1. Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_  
Contact Name: \_\_\_\_\_

2. What is your firm's primary product or service? \_\_\_\_\_

3. How many people did your business employ in 2001? Full-time employees \_\_\_\_\_  
Part-time employees \_\_\_\_\_

4. What were your total sales for 2001, or for the latest available period? \$ \_\_\_\_\_

If the exact revenue figure is not available, please estimate the range:

- |  |   |
|--|---|
| <input type="checkbox"/> \$25,000 or less      | <input type="checkbox"/> \$100,000 to \$200,000   |
| <input type="checkbox"/> \$25,000 to \$50,000  | <input type="checkbox"/> \$200,000 to \$500,000   |
| <input type="checkbox"/> \$50,000 to \$75,000  | <input type="checkbox"/> \$500,000 to \$1 million |
| <input type="checkbox"/> \$75,000 to \$100,000 | <input type="checkbox"/> Over \$1 million         |

5. Please provide the total 2001 taxes (local and state) **paid by your business** to your locality and to the Commonwealth of Virginia: \$ \_\_\_\_\_

6. How does your company use Virginia's airports? Please check as many as apply:

- To ship in supplies, raw materials, and/or intermediate goods  
 To ship (out) your products  
 To transport company personnel  
 To transport customers and business associates  
 Other (please specify): \_\_\_\_\_

7. What percentage of your business activity depends on your local airport:

\_\_\_\_\_ %

8. Please list the airports within Virginia on which your business relies, and indicate approximately how often you use them each year.

<u>Airport Name</u>	<u>Times per Year</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

9. What would be your reaction if your most frequently-used airport were no longer available? (check as many as apply)

- Substitute other modes such as bus, truck, rail
- Use next closest airport (please name airport)
- Make fewer trips
- Relocate business
- Other (please specify)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Are there any airport facility inadequacies that are limiting you from your full desired use of a Virginia airport? What is the inadequacy and what would your firm do differently if remedied?

- Yes       No

If yes, please describe:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

11. Have the September 11 terrorist attacks, through the effect on the national aviation system, significantly and negatively impacted your business? Please check all that apply.

This business **reduced employment** by \_\_\_\_\_ full-time equivalent positions

This business suffered a **loss in sales** of approximately \$\_\_\_\_\_

This business faced **an increase in costs** of approximately \$\_\_\_\_\_

Please comment on these business consequences, especially, how long you expect them to persist:

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12. Has your business and/or aviation activity been affected by the ongoing 'aviation insurance crisis,' the sudden unavailability or jump in the cost of general aviation-related insurance?

Yes       No

If yes, please comment:

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**Thank you for your time and cooperation.**

**Your participation is crucial to the success of this study.**





1. Please identify the airport where you received this survey: \_\_\_\_\_

2. Are you:  Arriving  Departing

3. What is the purpose of your trip?  
 Business  Personal  Vacation  
 Convention

4. *If your trip is business related*, please answer the following questions:

What is the major product or service provided by your company? \_\_\_\_\_

What is the major product or service provided by the company you are visiting? \_\_\_\_\_

5. *If your trip is business-related:*

The study staff understands that corporate security policy or business considerations may prevent you from revealing specific information about your travel. If possible, however, please provide the following information. Once again, *all survey responses will be held in strict confidence.*

Your company: \_\_\_\_\_

Address: \_\_\_\_\_

Company you are visiting: \_\_\_\_\_

Address: \_\_\_\_\_

6. How many nights did you, or will you spend in Virginia during this trip? \_\_\_\_\_

If staying one or more nights, please indicate the type of lodging:

- Commercial lodging (Hotel/motel, B&B, short-term condo rental)
- Private residence

7. Approximately how much money did you, or will you spend during this trip for the following purposes?

*Please list only those expenditures made in the state of Virginia.* If traveling as a family, please estimate the total expenditures made by everyone.

Lodging: \$ \_\_\_\_\_

Food & beverage \$ \_\_\_\_\_

Local transportation \$ \_\_\_\_\_  
(rental car, taxis, etc.)

Entertainment \$ \_\_\_\_\_

Other (please specify) \$ \_\_\_\_\_

8. If traveling as a family, how many are traveling, aside from yourself? \_\_\_\_\_

9. How many times per year do you fly into this particular airport? \_\_\_\_\_

10. How would your trip today have been affected if this airport were not available to you?

A: I would still be visiting (would have visited) my destination, and:

I would have flown through another airport.

Name of airport: \_\_\_\_\_

I would have traveled by another mode.  
Mode (automobile, train, etc.) \_\_\_\_\_

B: I would not be visiting/have visited my destination on this trip, and:

I would be visiting/have visited a destination elsewhere in Virginia.

Name of alternate destination: \_\_\_\_\_

I would not be visiting/have visited a Virginia destination.

11. Beyond your trip today, how would your business, personal, or vacation travel generally be affected if you did not have access to Virginia airports?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



1. Please identify the airport where you received this survey: \_\_\_\_\_  
\_\_\_\_\_

2. Are you:  Arriving  Departing

3. How many people, including the pilot, were or will be traveling on your plane? \_\_\_\_\_

4. What is the purpose of your trip?

- Business  Leisure  
 Flight training

5. *If your trip is business related*, please answer the following questions:

What is the major product or service provided by your company? \_\_\_\_\_  
\_\_\_\_\_

What is the major product or service provided by the company you are visiting? \_\_\_\_\_  
\_\_\_\_\_

6. *If your trip is business-related:*

The study staff understands that corporate security policy or business considerations may prevent you from revealing specific information about your travel. If possible, however, please provide the following information. Once again, *all survey responses will be held in strict confidence.*

Your company: \_\_\_\_\_  
\_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Company you are visiting: \_\_\_\_\_  
\_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

7. How many nights did you, or will you spend in Virginia during this trip? \_\_\_\_\_

If staying one or more nights, please indicate the type of lodging:

- Commercial lodging (Hotel/motel, B&B, short-term condo rental)  
 Private residence

8. Approximately how much money did you, or will you spend during this trip for the following purposes?

*Please list only those expenditures made in the state of Virginia.* If traveling as a family, please estimate the total expenditures made by everyone.

Lodging: \$ \_\_\_\_\_

Food & beverage \$ \_\_\_\_\_

Local transportation (rental car, taxis, etc.) \$ \_\_\_\_\_

Entertainment \$ \_\_\_\_\_

Aircraft Services (fuel, maintenance, etc.) \$ \_\_\_\_\_

Other (please specify) \$ \_\_\_\_\_  
\_\_\_\_\_

9. If traveling as a family, how many are traveling, aside from yourself? \_\_\_\_\_

10. How many times per year do you fly into this particular airport? \_\_\_\_\_

11. Do you fly to other Virginia airports on a regular basis?  Yes  No

If yes, please list the Virginia airports and the number of your annual trips.

<u>Airport Name or ID Code</u>	<u>Annual Trips</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

12. How would your trip today have been affected if this airport were not available to you?

A: I would still be visiting (would have visited) my destination, and:

I would have flown through another airport.  
Name of airport: \_\_\_\_\_  
\_\_\_\_\_

I would have traveled by another mode.  
Mode (automobile, train, etc.) \_\_\_\_\_  
\_\_\_\_\_

B: I would not be visiting/have visited my destination on this trip, and:

I would be visiting/have visited a destination elsewhere in Virginia.  
Name of alternate destination: \_\_\_\_\_  
\_\_\_\_\_

I would not be visiting/have visited a Virginia destination.



**Study Performed by:**

**HNTB**

**EDRG**

**SH&E**

**Ken Weeden & Associates**

**For more information, contact:**

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**Department of Aviation**

**5702 Gulfstream Road**

**Richmond, VA 23259-2422**

**800-292-1034 (VA Only)**

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