



# COMPETITIVE ANALYSIS OF VIRGINIA'S AVIATION INDUSTRY



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*Note: The opinions stated in this report are those of the Performance Management Group and do not necessarily reflect those of all entities and individuals who contributed to the report.*

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# EXECUTIVE SUMMARY

Virginia's Air Transportation System is a network of 66 public-use airports supporting a range of commercial and general aviation services. Virginia's airports are economic engines, technology magnets, and tourism gateways. They generate over \$28.8 Billion in economic activity, support over 259,000 jobs, and provide access to more than 8.5 million visitors annually. The *Competitive Analysis of Virginia's Aviation Industry* looks for ways to be even more competitive and grow the Virginia Commonwealth's aviation industry by comparing Virginia's Air Transportation System with its counterparts in key states to identify areas of achievement, risk, and potential improvement.

The Federal Aviation Administration (FAA) primarily defines the United States' aviation operations by three regulatory codes: FAA Part 121, Part 135, and Part 91. FAA Part 121 regulates all scheduled air carrier services, FAA Part 135 regulates general operations relating to air charter and air taxi services, and FAA Part 91 encompasses the remainder of general aviation operations that are not covered by the previous two classifications.

This study represents a collaborative effort between the Performance Management Group (PMG) at Virginia Commonwealth University, industry associations, and individual industry experts. Coordination and support was also provided by the Virginia Department of Aviation (DOAV). The report focuses heavily on thirteen states, classified into three categories for comparison – contiguous, comparable, and competitor. Virginia holds a number of competitive advantages over the study states including distinct advantages in the following areas:

- Weather reporting systems
- Integrated approach procedures
- General aviation terminals
- Paved aircraft aprons
- Stable, diversified and dedicated special funding for the aviation system

These services and amenities have a substantial effect on aircraft operator safety and security, and are main factors in deciding where to base aircraft and aviation businesses.

Virginia lags behind a number of the key states in the following areas:

- Land use protection for airports
- Percentage of airports equipped with 5,000-foot runways
- Readily available commercial hangars
- Availability of 100LL and Jet A fuel at airports

## ***Strategies for Moving Forward***

The following recommendations are intended to guide investment in Virginia's Air Transportation System and are based upon the analysis contained within this study. The strategies are listed in order of priority.

### ***1. Aviation Program Funding - Ensure adequate aviation program funding by maintaining the Airport Capital Program and Aviation Special Fund to provide and maintain robust statewide aviation infrastructure and support business development and expansion.***

- Runways** – Explore with the FAA the potential for further development of the runway infrastructure at appropriate airports lacking 5,000-foot runways. Surpassing the 5,000 foot runway threshold opens the airport to enhanced Part 135 business aviation, providing better access and services, while boosting a community's economic potential.
- Hangars** – Work with airport sponsors and localities to increase awareness of the opportunities and funding available to construct hangars at the remaining six airports without such facilities.
- Fuel** – Work with airport sponsors to promote and equip public-use airports with 24-hour or call out Avgas fueling stations, while increasing jet fuel availability at those airports with the capabilities to support jet operations.
- Terminals** – While Virginia has an advantage in this area, advanced aviation technologies such as NextGen will provide more business opportunities for the Commonwealth's airports and communities. Facilities such as conference rooms, Wi-Fi and a business atmosphere should be promoted at Virginia airports. Virginia airports may represent a first and last impression of the Commonwealth and a deciding factor when determining if a busi-

ness is going to invest in the state. Virginia should continue to construct and refurbish terminals to encourage business growth.

## **2. Aviation Technology - Establish Virginia as a leader in NextGen and new aviation technologies.**

### **A. NextGen**

#### **I. Early implementation of mature technologies –**

Pursue Virginia as an early adopter of technologies that improve airport throughput and access to provide communities more opportunities for business and economic development.

**II. Test bed for maturing technologies –** Continue to work with the FAA to develop NextGen testing programs and demonstrations in the Commonwealth.

**III. Research consortium –** Collaborate with the aviation and space community, universities, and industry to establish a Virginia Aviation and Space Research Consortium to promote Virginia in the research of emerging technologies.

**B. Unmanned Aerial Systems (UAS) –** Incorporate UAS development, manufacturing, testing and support into Virginia’s aviation and space portfolio. UAS are a growing component of military aviation and NextGen research, and Virginia should support this research as part of its strategy to become a leader in emerging technology testing and implementation.

## **3. Promotion - Promote the benefits and competitive standing of Virginia’s Air Transportation System in its support for airports, businesses, and tourism. Virginia airports are economic engines, technology magnets, and tourism gateways for the Commonwealth.**

**A. Business Charter and Air Taxi Services –** Highlight DOAV’s user-based funding programs and technical services to Part 135 and Fixed Base Operators alike.

**B. High-Technology Business –** Continue to embark on an enhanced business aviation campaign to raise awareness of the capabilities of air charter and air taxi to provide businesses and residents increased mobility and efficiency in traversing the state. The

message should center on the airports’ capacity as technology magnets and economic engines that drive economic development in the surrounding regions.

**C. Tourism –** Promotional efforts should also address the role that Virginia’s Air Transportation System plays in advancing the Commonwealth’s tourism industry, a major component of Virginia’s economic vitality.

**D. Land Use Protection –** Promote compatible land use around airports and ensure adequate land use regulations are in place to protect airport operations and infrastructure investments from the threat of encroachment by incompatible uses.

## **4. Continuing Analysis - Conduct further research and analysis in the effort to better position Virginia’s Air Transportation System as a preferred transportation choice among Virginia businesses and citizens.**

In addition to the land use protection, hangar, terminal, runway, and fueling facility analysis outlined in earlier recommendations, research should be conducted in the following subject areas:

**A. Education –** Promote an implementation plan for the recommendations outlined in the *Virginia Aviation and Space Workforce Analysis and Strategy Development* report.

**B. Access –** DOAV should continue to explore airport access issues through the multimodal planning effort. Work should begin to relieve existing access problems and to prevent future airport access problems. A thorough transportation analysis with the goal to remediate ground access issues at the Commonwealth’s commercial service airports is necessary in ensuring that these airports continue to offer businesses and residents convenient and timely access to domestic and international locations.

**C. Cargo –** Virginia should explore ways in which the Commonwealth can better accommodate domestic and international cargo shipments within its major commercial hubs.

# 1. INTRODUCTION

## 1.1 BACKGROUND

Aviation in the Commonwealth is a key provider of economic opportunities for Virginia's communities. The *Virginia Airport System Economic Impact Study* of 2011 showed that Virginia's Airport System supports \$28.8 billion in economic activity in the Commonwealth and over 259,000 jobs. The Federal Aviation Administration (FAA) forecasts significant growth in the aviation industry over the next 20 years and it is important that the Commonwealth be a leader, providing well-paying jobs to support the growing workforce and the communities in which these workers live.<sup>1</sup> A strong aviation system can provide the infrastructure for a prosperous Commonwealth.

The Virginia Department of Aviation (DOAV) contracted the Performance Management Group (PMG) at Virginia Commonwealth University, a full-service, public consulting firm within the L. Douglas Wilder School of Government and Public Affairs, to perform a competitive analysis of the Virginia aviation industry.

This report is the fifth installment in the DOAV's comprehensive analysis of the Commonwealth's aviation and space industry. The four previous reports are:

1. *Virginia's Aerospace Industry: An Economic Impact Analysis* (2010)
2. *Virginia Airport System Economic Impact Study* (2011)
3. *Competitive Analysis of Virginia's Space Industry* (2012)
4. *Virginia Aviation and Space Workforce Analysis and Strategy Development* (2012)<sup>2</sup>

## 1.2 SCOPE

This report explores Virginia's legislative and tax policies, incentive measures, and workforce and educational development efforts as they relate to aviation business retention and expansion. PMG compared these against other key states' aviation incentive policies, legislative policies, and occupational and industrial structures. This analysis pro-

1 "FAA Forecast Fiscal Years 2011-2031," Retrieved from [http://www.faa.gov/about/office\\_org/headquarters\\_offices/apl/aviation\\_forecasts/aerospace\\_forecasts/2011-2031/media/2011%20Forecast%20Doc.pdf](http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2011-2031/media/2011%20Forecast%20Doc.pdf)

2 All reports can be accessed at the Performance Management Group's website: <http://www.pmg.vcu.edu>.

vides the basis for recommendations to equip Virginia to become even more nationally competitive for future public and private-sector investment in jobs to support the Commonwealth's citizens and communities.

This report examines the aviation industry in Virginia, comparing it to other contiguous, comparable, and competitor states as defined below in Table 1.1. The goal of this report is to provide a comprehensive overview of Virginia's competitive standing to identify areas of achievement, risk, and potential improvement. The aviation industry is multidimensional, encompassing facets of air transportation, manufacturing, engineering and service.

## 1.3 INDUSTRY DEFINITION

Aviation is a highly technical industry that overlaps with the space industry in a number of ways; however, it is important to distinguish between the two because, while they share certain functions such as manufacturing, they operate independently. There is no national standard definition for the aviation industry, so it is defined by the FAA definitions and codes that are relevant to this study. Aviation, therefore, is defined as activities related to mechanical flight, which include the operation, maintenance, design and production of fixed and rotary wing aircraft.<sup>3</sup> More specifically, this study explores:

- General Aviation:
  - Air Charter and Air Taxi Commercial Services – FAA Part 135
  - General Operations – FAA Part 91
- Scheduled Air Carrier – FAA Part 121
- Military Aviation Operations

TABLE 1.1: STATES INCLUDED IN THE COMPETITIVE ANALYSIS

CONTIGUOUS STATES	COMPARABLE STATES	COMPETITOR STATES
Aviation is an especially mobile industry. Aircraft owners and operators relocate aircraft across county and state borders to take advantage of more aviation-friendly tax and legislative policies. <ul style="list-style-type: none"><li>• Kentucky</li><li>• Maryland</li><li>• North Carolina (Also determined to be a Competitor State)</li><li>• Tennessee</li><li>• West Virginia</li></ul>	Comparable states encompass a similar number of public-use air carrier/reliever and GA airports, as well as have a dedicated airport revenue fund similar to Virginia's. <ul style="list-style-type: none"><li>• Arizona</li><li>• Colorado</li><li>• Louisiana</li><li>• Missouri</li><li>• Washington</li></ul>	Competitor states are those with which Virginia often competes for aviation-related economic development initiatives. <ul style="list-style-type: none"><li>• Alabama</li><li>• Georgia</li><li>• North Carolina</li><li>• South Carolina</li></ul>

3 Competitiveness of Virginia's Aviation Industry Steering Committee determined industry definition.

## 2. COMPETITIVENESS OF VIRGINIA'S AVIATION LANDSCAPE

Virginia's aviation industry is divided into three overarching categories: Scheduled Air Carrier (FAA Part 121), General Aviation - Air Charter/Air Taxi (FAA Part 135) and General Aviation - General Operations (FAA Part 91) that, when analyzed concurrently, constitute the bulk of aviation operations.

**Scheduled Air Carrier Service (FAA Part 121)** – Virginia has nine airports that are designated by the *Virginia Air Transportation System Plan* (VATSP) as Commercial Service. These airports provide travelers with regularly scheduled airline service to domestic and international locations. Due to the role they serve, these airports are certified by the FAA to Part 139 airport standards, which entail the highest level of safety, including on-site crash, fire, & rescue capabilities.<sup>4</sup>

**General aviation (GA)** – General aviation refers to all civil aviation outside of scheduled passenger airlines and military aviation.<sup>5</sup> General Aviation for the purposes of this report is broken down into two major categories, FAA Part 135 refers to air charter/air taxi operations, and FAA Part 91 to all other general operations.

**General Aviation - Air Charter/Air Taxi (FAA Part 135)** – All 66 of Virginia's public-use airports provide access to the National Airspace System (NAS) and communities throughout the Commonwealth. FAA Part 135 regulated aircraft operators offer nonscheduled commercial air services referred to as air charters or air taxis. Charter and air taxi services are typically offered in aircraft with as few as four seats, but are often flown in business aircraft that usually have a six to ten seat configuration. This type of service allows a traveler to conduct trips on a point-to-point basis thereby providing

4 For all specifications, see the FAA's "14 CFR Part 121 Air Carrier Certification," available at [http://www.faa.gov/about/initiatives/atos/air\\_carrier](http://www.faa.gov/about/initiatives/atos/air_carrier) [accessed December 7, 2011]

5 "Report to Congress: Improving General Aviation Security," December 2011 Noise Pollution Clearinghouse, <http://www.nonoise.org/library/generalav/> (accessed 13 January 2012).

air access to all public-use airports and most communities within the Commonwealth. It also provides the capability to access multiple locations in the Commonwealth in a single day that, due to time constraints, may otherwise be impossible by automobile.

**General Aviation - General Operations (FAA Part 91)** – General operations represent the broadest category of aviation activities. Part 91 operations include business aircraft operations not covered by FAA Part 135, as well as recreational flight.<sup>6</sup> Furthermore, Part 91 includes all police, Medevac, traffic reporting, crop dusting, aerial photogrammetric services, and other forms of business activities not pertaining to fees for passenger carriage.<sup>7</sup> VATSP designates 57 GA airports in Virginia, allowing over 99% of the population to be within a thirty-minute drive of this caliber airport.

**Department of Defense/Military Aviation Operations** – The final category that is especially relevant to Virginia's aviation industry is defense and military-related aviation. Virginia supports roughly 26,000 uniformed, civilian, and contract employees with functions relating to military aerospace.<sup>8</sup> The Commonwealth encompasses 11 installations with military aviation operations. These installations are discussed in more detail in Section 2.4.

The following subsections provide a snapshot of Virginia's aviation industry landscape through the analysis of each of the industry facets. This snapshot sets the foundation for subsequent analysis of the parameters that measure the industry's competitiveness – nationally and internationally.

6 Federal Aviation Administration, *Certification Information for Operating Under Part 135* (PDF file), n.d., available at [http://www.faa.gov/licenses\\_certificates/airline\\_certification/media/n135toc.pdf](http://www.faa.gov/licenses_certificates/airline_certification/media/n135toc.pdf) [accessed December 7, 2011]

7 For complete information about Part 91, visit FAA website, "Title 14, Part 91: General Operating and Flight Rules": <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=3efaad1b0a259d4e48f1150a34d1aa77&rgn=div5&view=text&node=14:2.0.1.3.10&idno=14> [December 8, 2011]

8 PMG, "Virginia's Aerospace Industry: An Economic Impact Analysis," November 2010. Available on DOAV website.



## 2.1 SCHEDULED AIR CARRIER OPERATIONS - FAA PART 121

Scheduled air carrier operations, FAA Part 121, regulates all commercial airlines offering scheduled passenger services out of the United States' various commercial airport classifications. Aircraft and airport operations regulated under Part 121 represent the largest facet of the aviation industry in the United States and Virginia. Virginia's commercial airport hubs contributed \$20.5 billion in economic activity in 2010.<sup>9</sup> As shown in table 2.1, Part 121 aircraft operate out of nine airports – Charlottesville-Albemarle, Lynchburg Regional, Newport News-Williamsburg International, Norfolk International, Richmond International, Ronald Reagan Washington National, Roanoke Regional, Shenandoah Valley Regional, and Washington-Dulles International.

TABLE 2.1: VIRGINIA COMMERCIAL SERVICE AIRPORT SERVICES AND IMPACT INFORMATION							
Airport	Economic Impact	# of Jobs Supported	Regional	National	Internat.	Services	# of Daily Departures (2010) <sup>10</sup>
Charlottesville-Albemarle (CHO) <sup>11</sup>	\$128.7M	1,267	✓			4 regional carriers, 6 destinations	18
Lynchburg Regional (LYH) <sup>12</sup>	\$109.2M	911	✓			1 regional carrier	7
Newport News-Williamsburg International (PHF) <sup>13</sup>	\$373.6M	3,382	✓	✓		6 national carriers	26
Norfolk International (ORF) <sup>14</sup>	\$1.07B	10,269	✓	✓	✓	7 major carriers <sup>15</sup>	83
Richmond International (RIC) <sup>16</sup>	\$1.08B	10,910	✓	✓	✓	7 domestic airlines, 2 international providers, 21 destinations <sup>17</sup>	82
Roanoke Regional (ROA)	\$216.1M	2,189	✓			4 regional carriers, 9 destinations	26
Ronald Reagan Washington National (DCA) <sup>18</sup>	\$7.3B	82,675	✓	✓		77 destinations	365*
Shenandoah Valley Regional (SHD) <sup>19</sup>	\$26.2M	252	✓			1 regional	3
Washington Dulles International (IAD) <sup>20</sup>	\$10.1B	96,980	✓	✓	✓	82 nonstop U.S. destinations, 48 nonstop international destinations	400*
Economic Impact and Job Figures sourced to, ICF SH&E, "Virginia Airport System Economic Impact Study."							
*Denotes figures from Metropolitan Washington Airport Authority (MWAA) website, <a href="http://www.mwaa.com">http://www.mwaa.com</a>							

9 Virginia Department of Aviation (DOAV), *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), p. 14, report prepared by ICF SH&E, 2011, available online at <http://tinyurl.com/7usgrfl> [accessed December 2, 2011]

10 DOAV, *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), Appendix E: Airport Economic Impact Summaries.

11 Charlottesville-Albemarle website for more information: [http://www.gocho.com/index.php/general\\_aviation](http://www.gocho.com/index.php/general_aviation)

12 See Lynchburg Regional Airport website for more information: <http://www.lyncburgva.gov/index.aspx?page=85>

13 DOAV, *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), p. 56.

14 Norfolk International Airport, *Master Plan Update* (PDF file), para. 2, prepared by Jacobs Consultancy, December 2008, available at <http://www.norfolkairport.com/images/stories/airport-information/master-plan-update/ORFMasterPlanUpdate2008.pdf> [accessed December 2, 2011]

15 Ibid.

16 DOAV, *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), p. 56.

17 Richmond International Airport, *Master Plan* (PDF file), Chapter 1: p. 2, n.d., prepared by Kutchins & Groh, L.L.C., [http://www.flyrichmond.com/Site\\_Downloads/Master\\_Plan\\_Downloads/01\\_Introduction.pdf](http://www.flyrichmond.com/Site_Downloads/Master_Plan_Downloads/01_Introduction.pdf) [accessed December 2, 2011]

18 Ronald Reagan Washington International, "Flight information," <http://www.metwashairports.com/reagan/1261.htm> [accessed December 7, 2011]

19 DOAV, *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), p. 14.

20 Ibid.

## 2.2 GENERAL AVIATION—AIR TAXI/AIR CHARTER—FAA PART 135

FAA Part 135 regulated aircraft are at the foundation of business development throughout much of the Commonwealth. In recent years, the connections between Part 135 aircraft service and business operations have become more of a focal point in policymakers' economic development efforts. Virginia, via a program pursued by the Virginia SATSLab, Inc. (VSATS), has in place the first iteration of an internet-accessed customer reservations tool for air taxi and charter services.

VirginiaAirTaxi.com is a web portal that provides a user-friendly interface enabling travelers to price and book air travel via Part 135 service providers from any of the over 5,000 GA airports in the nation. In 2011, the Air Taxi/Air Charter Association (ATXA) introduced for "beta testing" a booking service via one of the world's largest Global Distribution Systems (GDS) connecting to thousands of travel agents and on-line travel agents.<sup>21</sup> This provides easier access for businesses and individuals to schedule air taxi flights from local airports.<sup>22</sup>

Originally designed for the emerging air taxi industry, VirginiaAirTaxi.com also seeks the participation of long-time established small aircraft charter services. The web portal will be able to handle inquiries from all types of business in the nonscheduled air service sector. VSATS is monitoring the testing of this system and if successful, DOAV will be hosting a Part 135/air taxi summit in 2012, to promote this option of air travel in the business community.

## 2.3 GENERAL AVIATION—GENERAL OPERATIONS—FAA PART 91

FAA Part 91 regulates the operation of all aircraft, but most specifically all aviation activity outside of scheduled air carrier and military operations. Virginia benefits from 66 airports offering services to the public, 57 of which are general aviation airports supporting Virginia's business, personal, and recreational needs.

Virginia's general aviation airports contributed \$728 million in economic activity to the state economy in 2010.<sup>23</sup> At the heart of this activity is the business-related aviation made possible by the Commonwealth's network of public-use airports. As the National Business Aviation Association (NBAA) reports:

*"Business aviation reaches 10 times the number of U.S. airports (over 5,000 public-use facilities) than the airlines do. The majority of U.S. airline flights only go to and from 70 major airports, and the total number of U.S. destinations*

21 See Air Taxi / Air Charter Association (ATXA) website for more information: <<http://www.atxa.com>>

22 Ibid.

23 DOAV, *Virginia Airport System Economic Impact Study: Executive Summary* (PDF file), p. 3.

*served by air carriers has declined."*<sup>24</sup>

In some cases, general-use airports provide the only means for businesses to conduct operations in a cost-effective and efficient manner. In recent years, Virginia, in line with a number of other states, has begun to approach investment in public-use, GA airports as a driver to entice business development throughout the Commonwealth. Virginia's efforts to equip all public-use airports with instrument approach procedures (IAPs) and weather reporting are two such examples of this.

*Helicopter Operations* - Beyond the network of general aviation airports, Virginia's Air Transportation System offers substantial infrastructure to support helicopter operations throughout the state. The Commonwealth encompasses 65 hospital heliports, evidence of the strong public benefit associated with Medevac and general helicopter operation. Virginia was also the first to create a statewide helicopter association, Virginia Helicopter Association (VHA), to promote helicopter operations, training and safety according to Helicopter Association International (HAI). VHA was also one of the first organizations to join the Virginia Volunteer Pilots Group to provide helicopter transport to Virginians during emergencies.

Aside from operations within the Northern Virginia Special Flight Rules Area (SFRA), an area which restricts helicopter operations for security purposes, Virginia as a whole is not restrictive in its rotary aircraft policy and acknowledges these benefits in its support for helicopter operators. It is noted however, that a number of Virginia localities have adopted or are considering zoning ordinances that may inhibit helicopter operations beyond the regulations and guidance provided by the FAA. Members of the Virginia General Assembly are considering legislation that will ensure safe helicopter operations in accordance with the FAA guidelines and thereby expand services to Virginia citizens and opportunities for helicopter businesses.

## 2.4 MILITARY

Virginia hosts a variety of military aviation assets belonging to all four branches of service under the Department of Defense, and the Coast Guard under the Department of Homeland Security. Although these assets include Army and Marine Corps helicopter units, the presence of Air Combat Command and the First Fighter Wing at Joint Base Langley-Eustis and the Master Jet Base at Naval Air Station Oceana make combat aviation the primary focal point of military aviation in the Commonwealth.

24 National Business Aviation Association, "Business Aviation: Just the Facts," 2010 NBAA Business Aviation Fact Book, bullet #7, available at <http://www.nbaa.org/business-aviation/fact-book/facts/> [accessed December 5, 2011]

Most military aviation in Virginia is located in Hampton Roads. Naval Air Station (NAS) Oceana, in Virginia Beach, hosts five carrier air wings (over 100 aircraft) and Naval Station Norfolk is home to the Navy's Air Cargo Transport Hub. NAS Oceana is home to 10,987 military personnel and 3,407 civilians with an annual payroll of roughly \$1 billion.<sup>25</sup>

Joint Base Langley-Eustis (Hampton and Newport News) is the home station for Air Combat Command, the 1<sup>st</sup> Fighter Wing, and the Army Aviation Logistics School.<sup>26</sup> The 1<sup>st</sup> Fighter Wing incorporates 20 F-15 and 42 F-22 aircraft. The Army Aviation Logistics School trains incoming soldiers to maintain and load cargo on the Army's fleet of helicopters. In all, Joint Base Langley-Eustis houses 14,500 military personnel and 5,500 civilian workers, though not all perform aviation-related functions.<sup>27</sup>

Naval Air Station Norfolk (Chambers Field) encompasses 134 aircraft in 17 squadrons. It is the Navy's Air Cargo Transport Hub. Also located at Chambers Field is the Aircraft Intermediate Maintenance Detachment (AIMD), which provides the first line of component repair support for the Atlantic

Fleet's Airborne Early Warning Wing, Helicopter Tactical Wing, USMC helicopter squadrons, USN reserve squadrons, and other operating units both afloat and ashore. AIMD has nine officers and 650 enlisted personnel.<sup>28</sup>

Virginia's military aviation assets are not, however, confined to Hampton Roads. The Defense Supply Center in Richmond houses the Defense Logistics Agency, supporting more than 1,300 major weapons systems as the military's primary source for roughly 1.3 million repair parts and operating supply items.<sup>29</sup> More than 444,000 of these repair parts and supply items are aviation-oriented, ranging from airframe and landing gear to flight safety equipment and fighter, cargo, and bomber aircraft engines.

The President's helicopter fleet, encompassing more than 30 aircraft, is stationed at Marine Corps Base Quantico in Stafford, Virginia. A fixed-wing and helicopter Coast Guard unit is based out of Ronald Reagan Washington National Airport. Finally, Fort Pickett has recently become a primary staging facility for Unmanned Aerial Systems (UAS) research and development.<sup>30</sup>

25 Information contributed by Virginia National Defense Industrial Authority (VNDIA).

26 Ibid.

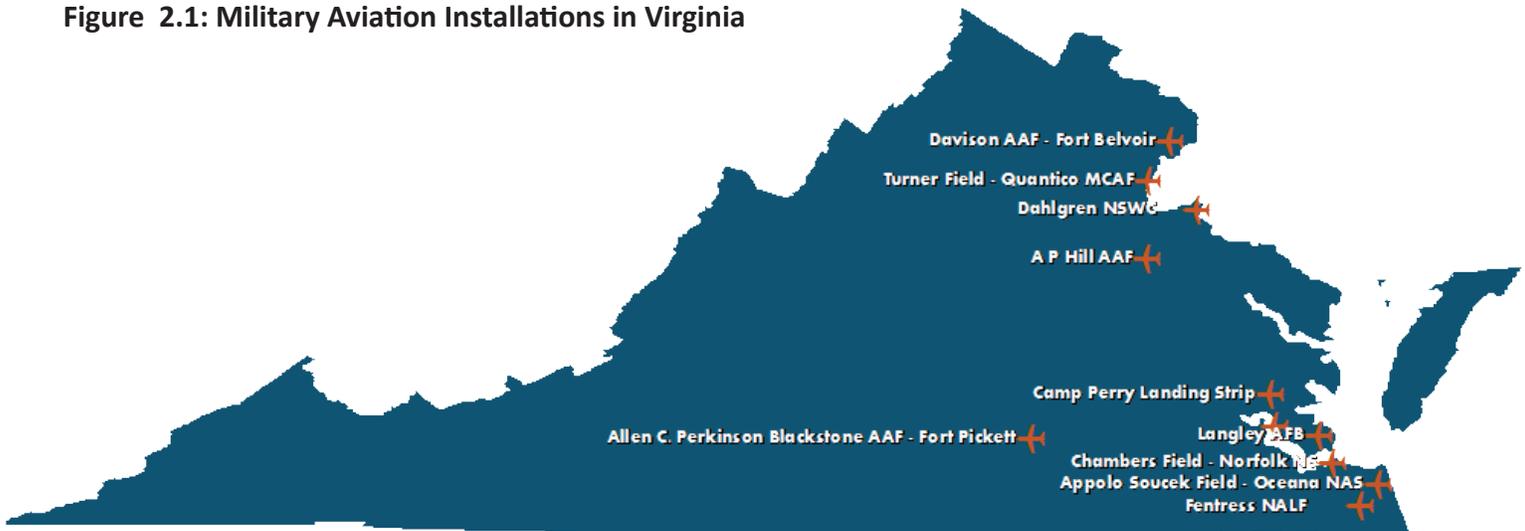
27 Ibid.

28 Ibid.

29 Ibid.

30 Ibid.

**Figure 2.1: Military Aviation Installations in Virginia**



\*Figure by the Performance Management Group

### 3. COMPETITIVENESS OF VIRGINIA’S AVIATION INFRASTRUCTURE

*Airport Infrastructure:*

The VATSP addresses airports as either Commercial Service or General Aviation. The VATSP categorizes commercial and general aviation airports in five groups: commercial service, relievers, general aviation regional, general aviation community, and local service. Each serves a different function, shown in Table 3.1.

**TABLE 3.1: VIRGINIA AIR TRANSPORTATION SYSTEM PLAN: AIRPORT DESIGNATIONS**

Airport Type	Function
COMMERCIAL SERVICE	Provide scheduled air carrier and/or commuter service to domestic and, in some cases, international destinations for surrounding communities.
RELIEVER	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.
GENERAL AVIATION REGIONAL	Service areas for Regional airports are often multi-jurisdictional due to geographic isolation or the relative scarcity of other airport services and facilities. They serve a large market area, providing a full range of aviation facilities and services to the general aviation flying public, including jet fuel, instrument approaches, full service fixed based operations, corporate hangars and general aviation terminal facilities.
GENERAL AVIATION COMMUNITY	Provide general aviation facilities and services to business and recreational users. They typically serve their respective communities or a smaller market area. Services include aircraft rental, flight training, and aviation gasoline (AvGas) sales.
LOCAL SERVICE	Generally low activity facilities that provide limited general aviation facilities to their respective communities. They typically have development constraints that preclude substantial expansion, including airspace conflicts, environmental concerns, topography, competing aeronautical services, surrounding land use patterns and ownership status.

Source: Virginia Air Transportation System Plan- Virginia Department of Aviation

**Figure 3.1: Virginia Air Transportation System - Airport Roles**



\*Figure courtesy of Virginia Airport Operators Council

### 3.1 AIRPORT ACCESS

An aviation system is only as effective as its means of access. Virginia’s goal is to provide all citizens access to one of the nine public-use, commercial service airports within a 45 minute drive, and less than a 30 minute drive to a general aviation airport.<sup>31</sup> Currently, 87% of the population can access a commercial services airport in a 45-minute period, not factoring traffic congestion or any other impediment.<sup>32</sup> When general aviation airports are included in these calculations, 99% of the population is within a 30-minute drive to at least one of Virginia’s 66 public-use airports. Virginia’s aviation system provides Virginia’s businesses and citizens access to the greater NAS. Accessibility to the public is a major factor in an airport’s ability to be an effective alternate means of transportation. Airports primarily rely on a strong network of roadways to connect to their customers. Critical is not only the number and placement of the highways, but also the level of congestion experienced to and from the airport.

Virginia is actively addressing commercial service airport access issues associated with traffic congestion. The *Governor’s Multimodal Strategic Plan for the Commonwealth of Virginia* outlines measures to plan for a statewide multimodal transportation network.<sup>33</sup> The congestion associated

31 DOAV. *Virginia’s Flight to 2025: An Aviation Vision for the Commonwealth* (PDF FILE), p. 3, 2011, available at <http://www.doav.virginia.gov/Downloads/Studies/Vision%202025/Vision%202025.pdf> [accessed December 5, 2011]

32 87% refers to Virginians living within 37.5 miles around Virginia and contiguous states’ commercial services airports. The 37.5-mile buffer was determined based on traveling 45 minutes at an average speed of 50 mph.

33 Office of Intermodal Planning and Investment, *Governor’s Multimodal Strategic Plan For the Commonwealth of Virginia* (PDF file), Prepared by Multimodal Strategic Transportation Planning Team, December 2010, available at <http://>

with automobile use, especially in relation to the Commonwealth’s primary commercial airports, is becoming a hindrance or liability to future economic growth. The following airports currently experience ground access issues:

*Norfolk International Airport (ORF):* Access to Norfolk International is especially hindered by traffic congestion associated with the Interstate 64 to Norview Avenue interchange. Non-airport traffic and business patronage at the intersection of Military Highway and Norview Avenue also contributes to ORF’s ground access issues.

*Newport News-Williamsburg International Airport (PHF):* PHF experiences similar congestion-related access issues as ORF. Newport News-Williamsburg International’s access road originates at the Interstate 64 to Jefferson Avenue interchange. Also converging on this intersection are access roads servicing a commercial corridor, and a large residential development, contributing to the congestion that limits access to the airport terminal.

*Washington-Dulles International Airport (IAD):* Washington-Dulles International’s operations over the past fifty years have equated to growth in the high-tech industries surrounding the Interstate 66 corridor. However, the airport is now experiencing negative effects of the congestion attributed to these businesses. In response, the Commonwealth Transportation Board (CTB) identified a North-South Corridor of Statewide Significance, which will better link the airport to the Interstate 95, Interstate 66, Route 29, and Interstate 81. Planning for this new corridor is projected to begin in early 2012.

Virginia's Air Transportation System accessibility issues are not confined to the previous three airports. Efforts to improve access to the Commonwealth's national and international hubs, as well as the corridors immediately surrounding them, are at the heart of ensuring that these airports remain a preferred option for international travel and cargo shipping, providing Virginia's high-technology businesses the opportunities to expand in an ever-globalizing marketplace. The ultimate goal for these access improvements is a multimodal system that enables people and freight to move door-to-door between any Virginia locality and any world market in a 24-hour period.

## 3.2 AIRPORT SERVICES AND AMMENITIES MATRIX

Amenities, as described for the purposes of this study, are airport features and services that can influence the use and success of a particular facility. Representatives within Virginia's aviation industry determined the following services and amenities to be significant when considering how an airport facility competes against other desired facilities.

### Runway Length of 5,000-Feet or Greater

A 5,000-foot runway is a "threshold" attribute that allows many corporate/business aircraft to consider aircraft operations at that facility. The ability to support business jet traffic can greatly enhance the utilization and success of an airport and the surrounding community. According to a recent study by the National Business Aviation Association (NBAA), business aviation contributes \$150 billion to U.S. economic output and employs more than 1.2 million people.<sup>34</sup> Pilots consider many factors when determining an aircraft's suitability for operation at particular airports. These include the aircraft's operation handbook, insurance requirements, airport elevation, wind velocity, etc., but runway length is often the determining factor for corporate and business aircraft.

### Instrument Approach Procedures (IAPs)

Instrument approach procedures are published for the utilization of either ground-based or satellite navigational equipment and enable aircraft to operate at an airport under hazardous weather conditions, or Instrument Meteorological Conditions (IMC). Pilots are often required to file an Instrument Flight Rules (IFR) plan, even when conditions are better than IMC, due to insurance or flight management requirements. IAPs offer pilots an airport-specific navigational guide for more efficient IFR flight plan development, thus enhancing the use of an airport in all weather conditions.

### Precision Instrument Approach Procedures (PIR's)

While IAPs allow greater use of an airport, the availability of a precision instrument approach procedure further enhances the utilization of any given airport. Precision approach procedures enable pilots to fly at the lowest of IFR minimums, allowing pilots to utilize a facility under extremely poor weather conditions.

### Weather Reporting

Due to safety and insurance policy considerations, on-site weather reporting is often a major factor in deciding to use a particular airport. The business aircraft community also prefers to have weather reporting capabilities at airports that they utilize. Therefore, the services and amenities matrix in Appendix 1 includes a count of airports with weather reporting capability from an on-site automated weather observing station (i.e., Automated Weather Observing System AWOS III or better). The National Airspace Data Interchange Network (NADIN) only acknowledges AWOS III or better facilities, making them the only weather reporting systems available to aircraft in flight when the aircraft are equipped with modern avionics. Having an FAA-certified weather station on the field enables the lowest possible IAP minimums for that facility. In addition, an on-field weather station provides airport users the enhanced safety benefit of knowing the weather conditions at that particular field.

### General Aviation Terminals

Terminal buildings provide the benefits of shelter, flight planning areas, and rest facilities for pilots and passengers. They also provide a valuable first impression of the community that frequently influences business decisions and the perceptions of the community. Terminals also provide additional necessities such as fueling, maintenance, and locality information for services such as car rental, hotel, business, tourist and restaurant locations.

### Paved Aircraft Aprons

Paved aircraft aprons provide a solid, stable surface for the maneuvering of both transient and based aircraft. Having adequate paved parking apron space also allows for fueling operations, tie-downs, and taxiing operations to occur under all weather conditions. The size of the aircraft parking apron is always a consideration for larger business aircraft operators.

<sup>34</sup> NBAA, *2010 NBAA Business Aviation Fact Book*, bullet #1: <http://www.nbaa.org/business-aviation/fact-book/facts/> [accessed December 12, 2011]

## Hangars

Hangars allow for aircraft storage at a particular airport. Hangars provide private/corporate operators with another degree of safety, security, and protection from the elements when storing aircraft. Many businesses often look for the security and safety provided by hangar facilities, even on short stays. Having the ability to provide storage to both based, as well as “transient” aircraft, is an added feature of hangars on the field. Aircraft owners will often evacuate aircraft to airports with hangar facilities in preparation for bad weather conditions. The Virginia Economic Development Partnership (VEDP) explained that the availability of corporate hangars is a key factor in encouraging businesses and flight departments to locate within the Commonwealth.<sup>35</sup>

## 100 LL and Jet Fuel

Most piston-driven GA aircraft use 100 low lead (100LL) aviation fuel. Turboprop and jet aircraft utilize variations of “jet” fuel. Fuel availability is always considered when making flight plans, as aircraft operators determine the nearest airports with fueling facilities. Those without fueling facilities are often not considered proper rest stops for meals, lodging, or to wait out weather delays.

## Weight-Bearing Capacity

In addition to runway length, runway weight-bearing capacity (maximum repetitive aircraft loading capability) is an important factor when pilots consider the use of any particular airport. Runways that are undersized for the aircraft frequently using them will likely experience premature runway pavement failure. Weight-bearing capacity tabulations for airports range from the upper-end of the FAA’s designation of “small aircraft” (12,500 lbs.), single-wheel-configuration, to those having a dual-tandem wheel configuration capacity greater than 300,000 pounds.<sup>36 37</sup>

## Analysis of Services and Amenities

This section displays Virginia’s ranking in the categories outlined above compared to three preselected comparison groups: contiguous states, comparable states, and competitor states. To reiterate, these groups are defined as follows:

<sup>35</sup> Virginia Department of Economic Development input as part of the study’s steering and technical committees.

<sup>36</sup> All state-by-state data is located in Appendix 1.

<sup>37</sup> Due to the complexity of the weight-bearing capacity data, it was not included in the state-by-state services and amenities analysis. Raw state-by-state data is available in Appendix 1.

**Contiguous states** – States adjoining the Commonwealth that are competitive for aircraft housing and stopovers due to proximity. These include:

- Kentucky
- Maryland
- North Carolina
- Tennessee
- West Virginia

**Comparable states** – States chosen for their similarity in the number of public-use airports and aviation system revenues. These include:

- Arizona
- Colorado
- Louisiana
- Missouri
- Washington

**Competitor states** – States identified as competitors in aviation specific economic development opportunities. These include:

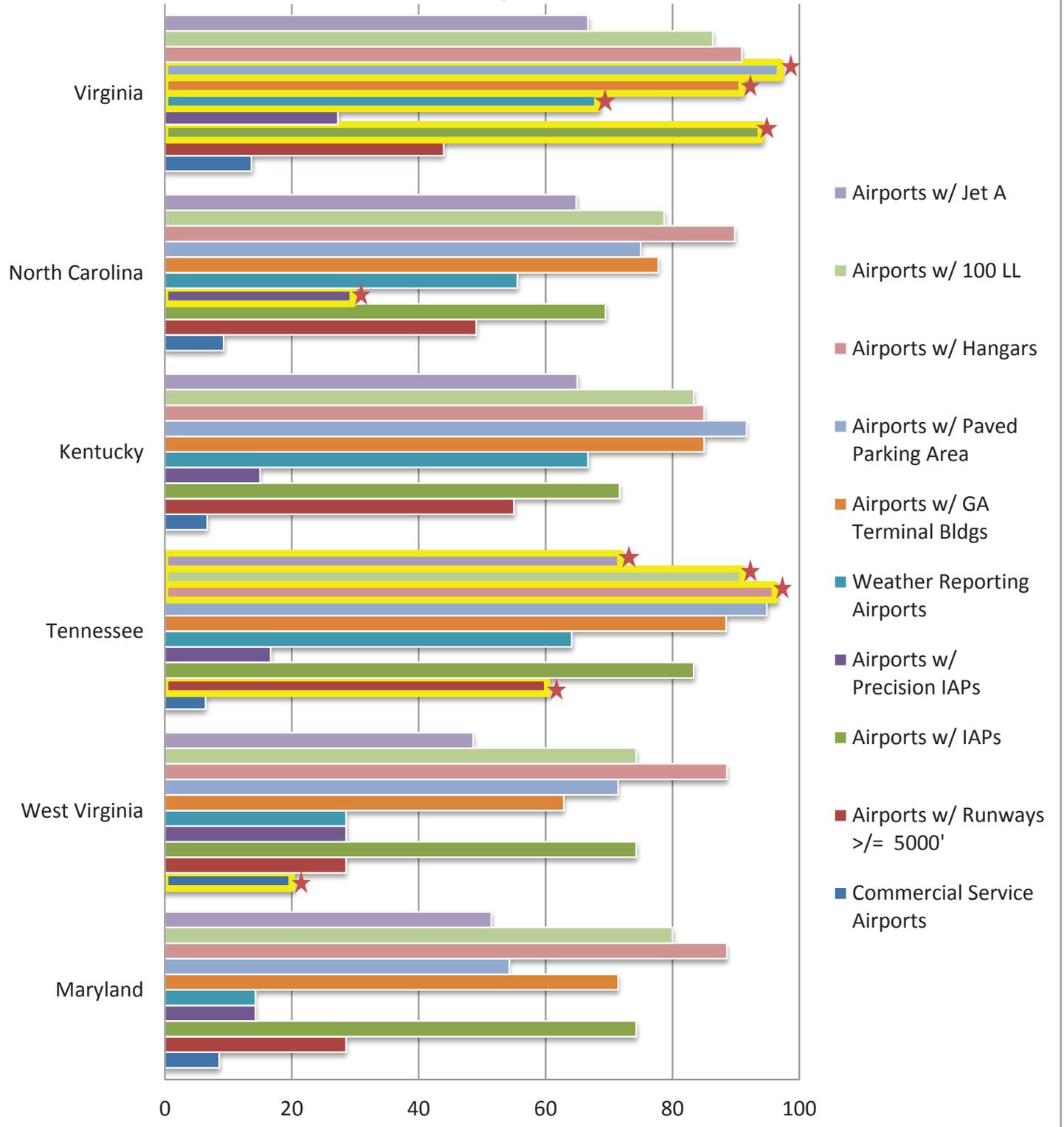
- Alabama
- Georgia
- North Carolina
- South Carolina

## ***Contiguous States: Services and Amenities Competitive Standing***

Figure 3.2 graphically illustrates Virginia’s standings in the categories discussed relative to its contiguous states.

Virginia’s relative strengths lie in the infrastructure designed to enhance safety, providing pilots the highest level of information available to guide flight plans, especially in preparation for hazardous flying conditions. These safety precautions provide pilots and the charters employing these pilots a higher degree of confidence in flying during IMC weather conditions. At 93.9% and 68.2%, respectively, Virginia equips the highest percentage of its public-use airports with IAPs and AWOS III, or better, weather reporting systems.

**Figure 3.2: Contiguous States: Percentage of Airports with Specified Service/Ammenities**



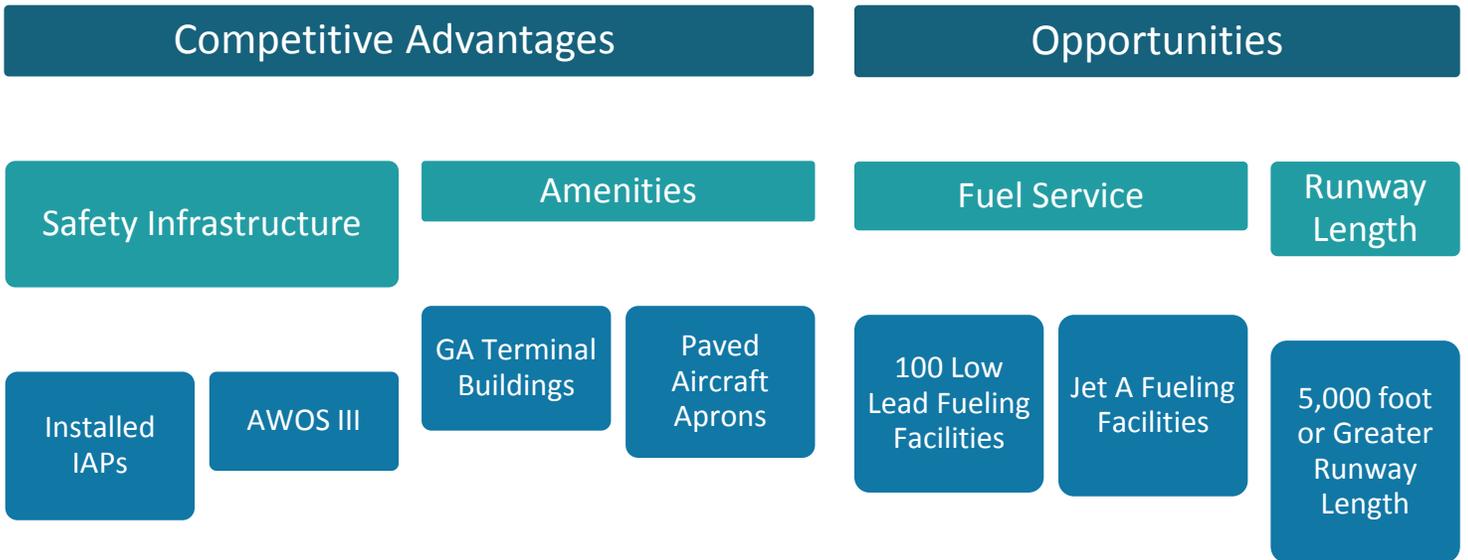
\*Virginia will have IAPs at 100% of its public-use airports by April 2012.

\*\*Virginia has initiated a program to put AWOS III weather reporting at 100% of public-use airports not currently served by weather reporting capability.

\*\*\*Yellow outline and star denote leader in category

\*\*\*\*Terminal percentages account for both attended and unattended facilities

**Figure 3.3: Contiguous States: Airport Services and Amenities Advantages and Opportunities**



As seen in Figure 3.3, Virginia’s aviation system ranks favorably in comparison to its contiguous states. Virginia holds a clear competitive advantage in public-use airports equipped with IAPs. The second ranked state, Tennessee comes in roughly ten percentage points lower at 83.3%. Virginia’s excellence in this capacity is the product of programs funded by the Aviation Special Fund (ASF) to equip every public-use, paved runway with IAPs by April 2012. Virginia also recently initiated a program to put AWOS III systems at the 20 airports not currently served by weather-reporting capability. This will complete the initiative to have weather-reporting capability at all of the Commonwealth’s 66 public-use airports. Taking the lead in areas similar to IAP-equipped airports helps Virginia remain competitive in attracting aviation operations and aviation-dependent business.

Beyond its network of instrument approach and weather reporting infrastructure, Virginia’s aviation system caters to Part 91 and 135 operators. Among its contiguous states, Virginia outfits the highest percentage of public-use airports with general aviation terminal facilities (~91%). Additionally, Virginia ranks first among contiguous states in the percentage of airports with paved aircraft parking aprons (~97%).

Although the Commonwealth ranks first in four of the ten services and amenities categories, there is room to expand upon the current infrastructure at the public-use airports. Tennessee represents Virginia’s greatest competition, ranking first in categories relating to:

- 100 low lead and jet fuel facilities
- 5,000-foot runways

The combined effect of these first-place rankings may factor into corporate jet operators locating in Tennessee due to the relative ease of access to its public-use airports.





### ***Comparable States: Services and Amenities Competitive Standing***

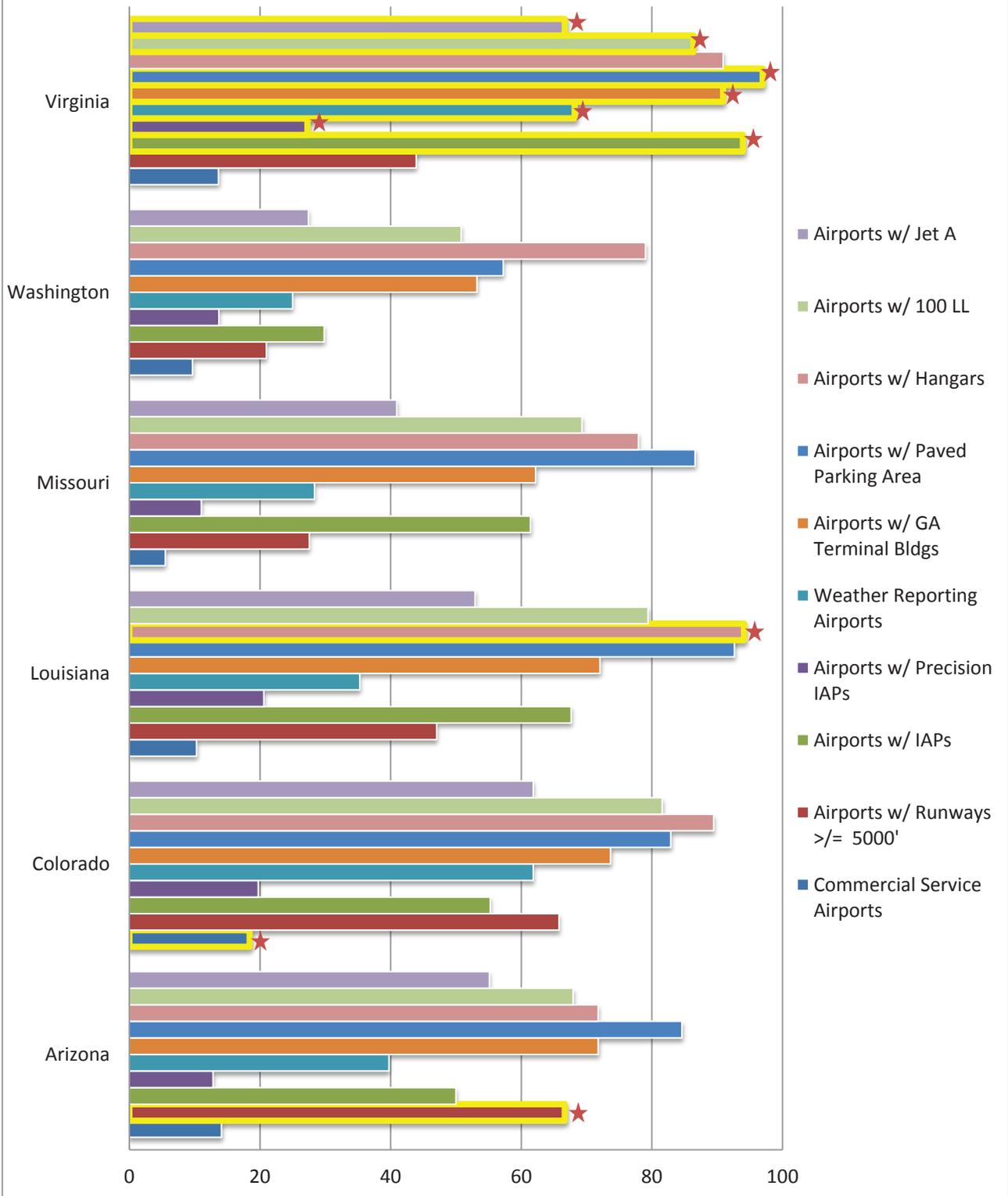
Figure 3.4 compares Virginia’s aviation services and amenities to a group of comparable states chosen for their similarity in the number of public-use airports and aviation system revenues. Virginia ranks higher than any of the comparable states in the percentage of:

- Public-use airports with IAPs and precision IAPs
- Weather reporting systems
- General aviation terminals
- Paved aircraft aprons
- 100 Low Lead and Jet A fueling facilities

The categories in which Virginia lags behind Colorado, Arizona, and Louisiana, respectively, are in the percentage of:

- Airports offering scheduled commercial services
- 5,000-foot runways
- Hangar facilities

**Figure 3.4: Comparable States: Percentage of Airports with Specified Service/Amenities**



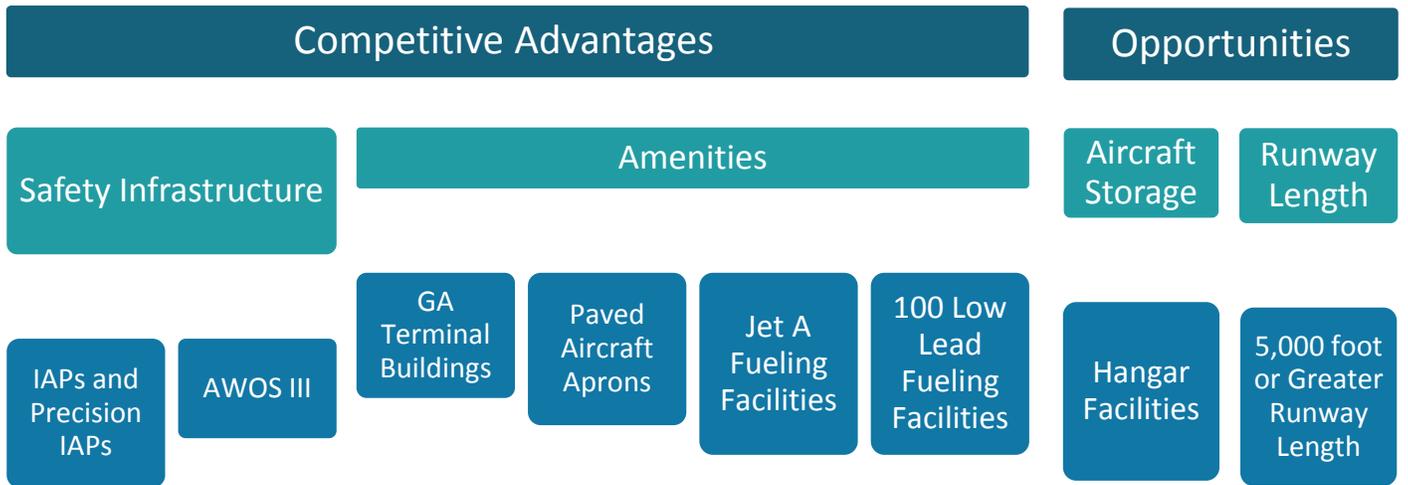
\*Virginia will have IAPs at 100% of its public-use airports by April 2012.

\*\*Virginia has initiated a program to put AWOS III weather reporting at 100% of public-use airports not currently served by weather reporting capability.

\*\*\*Yellow outline and star denote leader in category

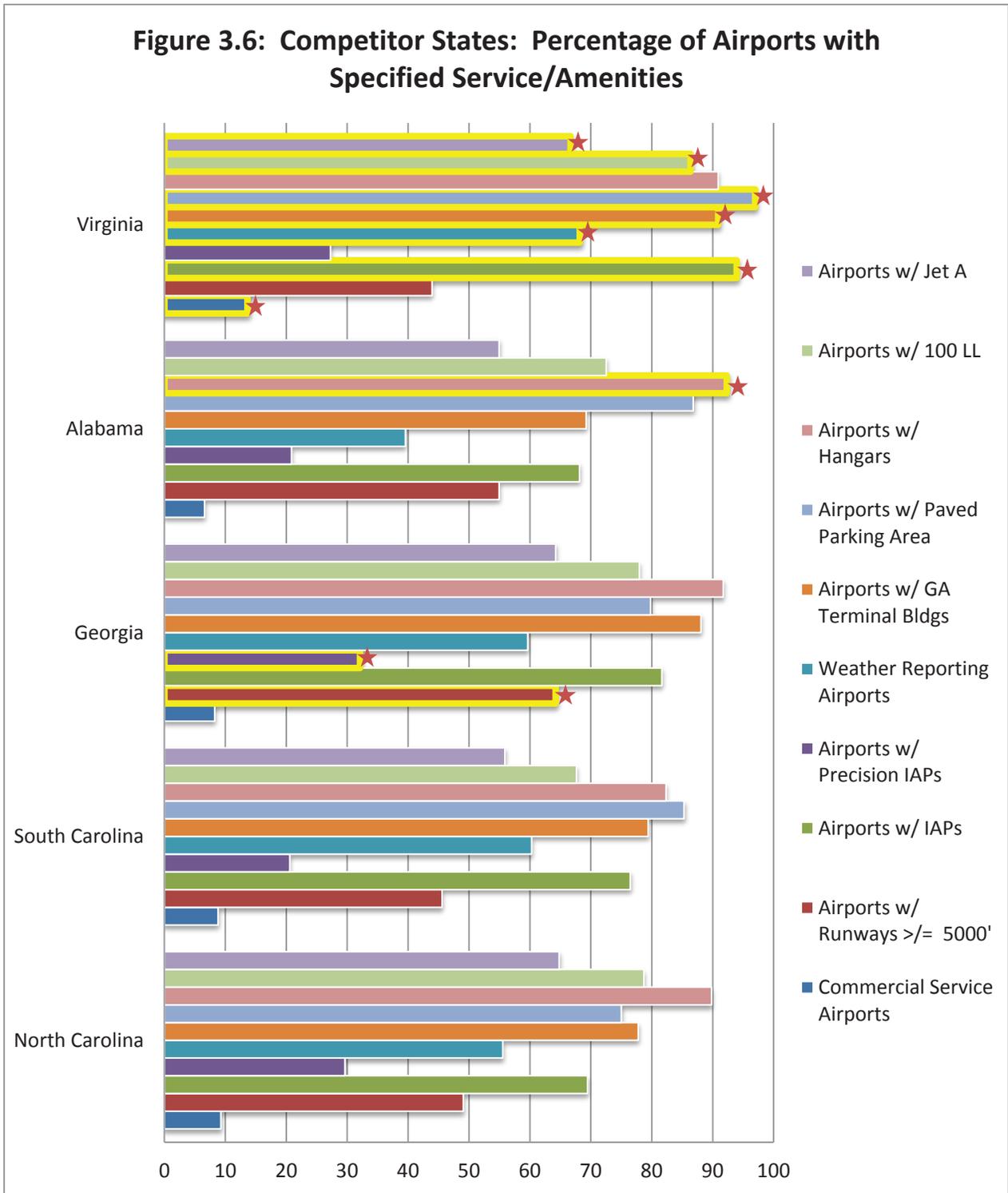
\*\*\*\*Terminal percentages account for both attended and unattended facilities

**Figure 3.5: Comparable States: Airport Services and Amenities Advantages and Opportunities**



**Competitor States: Services and Amenities Competitive Standing**

According to the VEDP, Virginia often competes with North Carolina, South Carolina, Georgia, and Alabama for aviation-related economic development opportunities. Figure 3.6 shows how Virginia compares to these states in aviation services and amenities.



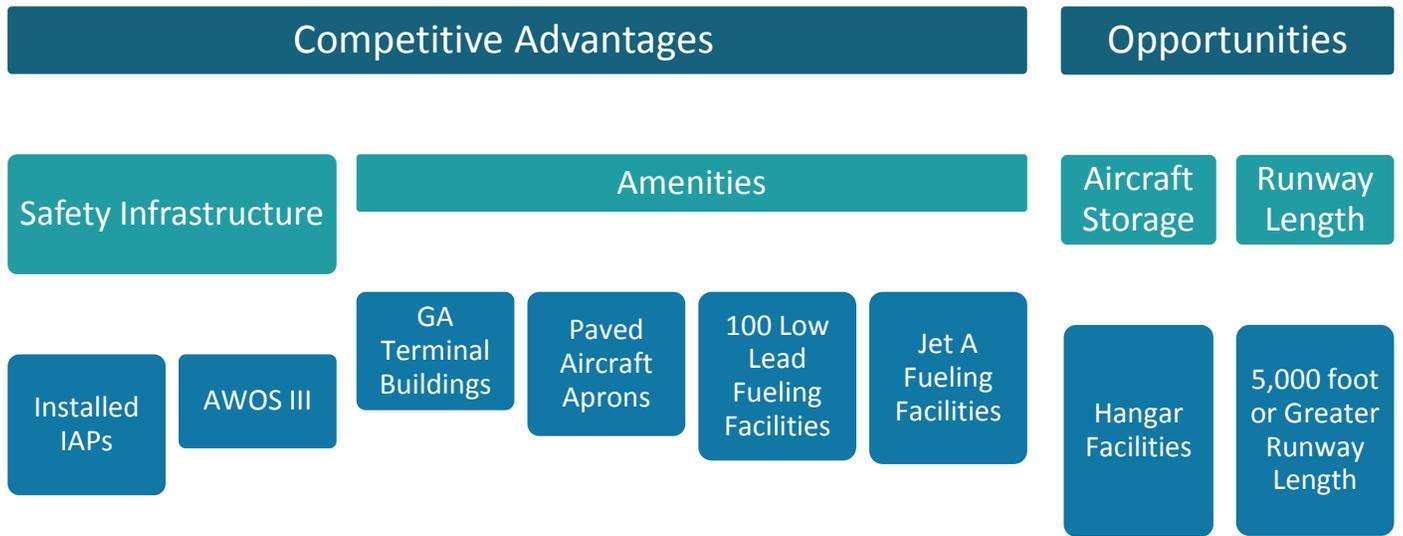
\*Virginia will have IAPs at 100% of its public-use airports by April 2012.

\*\*Virginia has initiated a program to put AWOS III weather reporting at 100% of public-use airports not currently served by weather reporting capability.

\*\*\*Yellow outline and star denote leader in category

\*\*\*\*Terminal percentages account for both attended and unattended facilities

**Figure 3.7: Competitor States: Airport Services and Amenities Advantages and Opportunities**



Virginia leads its economic development competitors in seven of the ten services and amenities categories. Georgia ranks second holding competitive advantages in the percentage of airports with 5,000-foot runways and airports equipped with precision IAPs. Alabama’s public-use airports benefit from a higher percentage of airports with hangar facilities. Of the three classifications of competitor states, Virginia excels in its network of airport services and amenities.



# 4. COMPETITIVENESS OF VIRGINIA'S AVIATION POLICY

## 4.1 POLICY ENVIRONMENT

### Commercial Aviation

Regulations governing commercial aircraft and air carrier airport operations are largely federal and do not, therefore, vary greatly from state-to-state. Many of the policies and regulations dictating commercial aviation originate with the FAA and are administered with little state input. The FAA regulates the various types and uses of aircraft, airport safety and security, airport environmental impact, and also administers various airport improvement grants and funds. Federal dollars are allocated to eligible public-use airports to guide airport planning, design, and construction of aviation infrastructure and facilities.<sup>38</sup> In order to meet eligibility, airports must serve a role in the National Plan of Integrated Airport Systems (NPIAS). NPIAS airports are also determined to have a significant impact on national air travel and warrant federal dollars to ensure that they operate at elevated standards. The majority of the key states analyzed within this study, including Virginia, provide NPIAS airports varying levels of funding to assist in their development. However, while aviation regulations are administered from a federal top-down approach, states retain the ability to influence their air transportation system's competitiveness in their taxing and program funding policies.

### General Aviation

The FAA centrally regulates general aviation activity at the federal level, though many states have recently taken the initiative to enact promotions and policies that increase awareness of its functions and benefits. Virginia leaders are advertising the connections between a strong network of general aviation airports and economic vitality in the private industry. Acknowledging these connections is not a principle that is confined to Virginia, as shown by recent promotional and policy initiatives in states with comparable general aviation infrastructure. Business growth through general aviation stands as a top trend in the industry. Virginia became the most recent state to call for aviation-related awareness when Governor Bob McDonnell declared August 2011 "Virginia Aviation Month."<sup>39</sup> With this proclamation, Virginia joins the majority of the other contiguous, comparable, and competitor states that have formally allocated

dates to acknowledge the jobs and economic benefit provided by the state's aviation system. Of the three categories of key states, only Louisiana, Arizona, and Alabama have not formally recognized the job growth and economic benefits of the state's aviation system.<sup>40</sup>

## 4.2 COMPARISON OF REVENUE STRUCTURE

While airport and aircraft regulations originate at the federal level, funding policy and programs vary from state-to-state. The revenue structure of a state's public aviation operation is a critical factor in determining the success and competitiveness of the aviation industry. Tax revenue structure is an especially salient factor for the industry due to the high costs and numerous regulations associated with aviation activity. To determine a state's competitive standing relating to its revenue structure, analyses must include an examination of the state administered programs funded through tax revenues. The following section highlights Conklin and de Decker's *State Aviation Tax and Funding Study* contracted as a part of this overall study, to help determine Virginia's standing among the various classifications of competitors regarding tax structure and levels of annual revenue.

40 "Alliance for Aviation Across America Proclamation-Signing Celebration with Georgia Governor Sonny Perdue Recognizing the Value of General Aviation," AAAA press release, October 7, 2009, on AAAA website, <[http://www.aviation-acrossamerica.org/Press\\_Release\\_Detail.aspx?id=21347](http://www.aviation-acrossamerica.org/Press_Release_Detail.aspx?id=21347)>



38 DOAV, *Airport Program Manual* (PDF file), p. 4, August 2011, available at <http://tinyurl.com/72uznma> [accessed December 5, 2011]

39 Aviation Across America. "Certificate of Recognition: Virginia Aviation Month". Available at [http://www.aviationacrossamerica.org/uploadedFiles/News/Press\\_Releases/VA%20Certificate%20of%20Recognition%202011.pdf](http://www.aviationacrossamerica.org/uploadedFiles/News/Press_Releases/VA%20Certificate%20of%20Recognition%202011.pdf) [accessed 7 December 2011]

## Personal Property Tax on Aircraft\*

Personal property tax is an important component of a competitive aviation industry for several reasons. Personal property tax, which is assessed annually (aircraft are most often taxed in this category), can be more significant to the aircraft owner than the state sales tax which is paid only once at the point of purchase. This revenue can be critical in the decision to move aircraft to a city, county, or township that charges lower personal property tax or none at all. For example, when an aircraft is located near a state line, there is an incentive for aircraft owners to base the aircraft in a state that does not impose a local personal property tax (i.e. Maryland). There are approximately 199 localities

in Virginia that administer some type of personal property tax. Of these, 71 (~36%) levy property taxes on aircraft.<sup>41</sup> Within the Virginia localities with a public-use airport, four currently do not levy a property tax or impose a marginal tax on aircraft.\*\* These localities include:

- Fauquier County (Warrenton-Fauquier Airport - HWY)
- Loudoun County (Leesburg Executive Airport - JYO and Dulles International Airport - IAD)
- Manassas City (Manassas Regional Airport - HEF)
- Stafford County (Stafford Regional Airport - RMN)

<sup>41</sup> John L. Knapp, and Stephen Kulp, "Virginia Local Tax Rates, 2010," *Weldon Cooper Center for Public Service: University of Virginia*, 29<sup>th</sup> edition, p. 142.

**TABLE 4.1: CONTIGUOUS STATES: AIRCRAFT PROPERTY TAX REGULATIONS**

State	Aircraft Property Tax Regulations
<b>Virginia</b>	Tax on aircraft varies from 0.00001% to 8.5% depending on the locality.
<b>Kentucky</b>	Aircraft not used in the business of transporting people or property for compensation or hire are subject to annual <i>ad valorem</i> tax of 1.5 cents per \$100 of value.
<b>Maryland</b>	Aircraft are exempt from property tax.
<b>North Carolina</b>	Airplanes are taxed at their true monetary value by the county in which they are domiciled. Qualified antique aircraft are specially classified and are taxed at the lesser of their actual value of \$5,000.
<b>Tennessee</b>	Aircraft are valued at 30% fair market value and depreciated assuming a 13-year life. The property tax rates in the counties range from 1.33% to 7.21%.
<b>West Virginia</b>	Aircraft are valued according to a nationally recognized aircraft valuation guide of the Tax Commissioner's choice. The valuation of aircraft takes into account the value of the navigational and radio equipment installed on the plane. The property tax rate is between 1.5% and 2% of this value, depending on the locality.

\*Revised Edition 1: February 10, 2012

\*\*Although Arlington County levies a property tax, aircraft at Ronald Reagan Washington National Airport are tax exempt because the airport is considered federal property.

A table of aircraft personal property tax for Virginia localities with public-use airports is included in Appendix 2.

In Virginia, aircraft are considered personal property and Virginia has both an annual property tax and an annual registration fee. Virginia’s annual registration fees include:

- \$5 for a noncommercial aircraft license
- \$10 for a commercial aircraft license
- \$50 for a noncommercial dealer fleet license
- \$50 for a contract carrier permit (one-time fee)
- \$75 for a commercial dealer fleet license

Many states impose an annual registration tax in lieu of the personal property tax while still other states charge an excise tax in lieu of a personal property tax. The analyzed states that do not levy personal property taxes are Alabama, Maryland, and Washington.

### Assessment of Key States’ Aviation Tax Policy

This section builds on Section 3 to determine the added value that Virginia’s presence within the top 25% of funding percentiles (compared to the analyzed states) brings to the Commonwealth’s aviation system. Virginia, as well as Alabama, Arizona, Colorado, Louisiana, Missouri, South Carolina, Tennessee, Washington, and West Virginia, has a

dedicated aviation fund, meaning that aviation operations are partly funded through an independent pool of revenue. Virginia’s dedicated aviation fund is called the Aviation Special Fund (ASF).

The second component of Virginia’s aviation-related revenue system consists of general tax funds, including a percentage of the Commonwealth Transportation Trust Fund (TTF). Georgia, Kentucky, Maryland, and North Carolina are strictly supported by a general fund, similar to a trust that funds a state’s entire transportation system. All aviation-related taxes flow directly into this fund to be distributed among multiple transportation divisions.

### Total State Aviation Funding

In FY 2008, Virginia invested \$30.8 million in its air transportation system, ranking the Commonwealth 9th behind Maryland, Florida, Wisconsin, Tennessee, Colorado, Rhode Island, Michigan, and Pennsylvania in state aviation funding.<sup>42</sup> The Commonwealth’s support for its airports has proven to be a good investment yielding substantial benefits to the economy. Nationally, Virginia ranks 35th in number of public use airports, however, when ranked by economic impact produced by the airports, the Commonwealth ranks 10th behind Florida, California, Georgia, New Jersey, New York, Texas, Arizona, Maryland, and Colorado.<sup>43</sup> This indi-

42 State-by-state information available in Appendix 3.

43 State-by-state information available in Appendix 4 and 5.

**TABLE 4.2: COMPARISON OF STATES’ TAX REVENUE: STATES WITH DEDICATED AVIATION FUNDS (IN THOUSANDS)**

State	Contributing Sources-Dedicated Fund	Dedicated Aviation Fund Revenue	Other Funding	FY 2010 Total Revenue	FY 2008 Total Revenue
Virginia	Jet Fuel and Avgas Taxes, Aircraft Registration Fees, Aircraft Sales and Use Taxes	\$12,246	\$19,652	\$31,899	\$30,833
<b>Contiguous States</b>					
Tennessee	Jet Fuel and Avgas Excise Taxes and State Sales and Use Tax on Fuel	\$26,486	None	\$26,486	\$56,801
West Virginia	Jet Fuel and Avgas Excise Taxes	\$2,900	\$2,200	\$5,100	No Data
<b>Comparable States</b>					
Arizona	Jet Fuel & Avgas Excise Taxes, License Tax, Airline Flight Property Tax	\$18,098	\$9,465	\$27,563	\$24,952
Colorado	Jet Fuel & Avgas Excise Taxes, Sales and Use Tax imposed on Jet Fuel	\$25,314	\$13,606	\$38,920	\$51,788
Louisiana	Jet Fuel and Avgas Sales/Use Taxes	\$28,594	None	\$28,594	\$8,307
Missouri	Jet Fuel and Avgas Sales/Use Taxes	\$5,000	\$2,500	\$7,500	\$10,250
Washington	Jet Fuel and Avgas Excise Taxes	No Data	No Data	No Data	\$3,222
<b>Competitor States</b>					
South Carolina	Jet Fuel and Avgas Sales/Use Taxes, Airline Property Tax	\$7,776	\$666	\$8,442	\$5,194
Alabama**	Jet Fuel & Avgas Excise Taxes	\$441	\$1,425	No Data	\$1,866

\*Source: Conklin and de Decker, *State Aviation Tax and Funding Study*, 2011.

\*\*Alabama’s dedicated fund and other revenue figures are from 2008.

cates that the value of Virginia's Air Transportation System is especially high.

Virginia is ranked third when compared to contiguous, comparable, and competitor states in total, state aviation-related revenue levied in FY 2010 collecting roughly \$31 million.<sup>44</sup> Maryland topped the list of 14 states, drawing \$193.8 million from its transportation trust fund. Colorado ranked second with \$38.9 million in total state revenue. While Virginia received \$71 million in federal funding in FY 2010, these figures, as is the case with the remainder of the key study states, are not included when ranking according to state-specific revenue.<sup>45</sup>

## Dedicated Aviation Funding

Conklin and de Decker's *State Aviation Tax and Funding Study* explains that of the states included in this competitive analysis, typically those operating under dedicated aviation funds are fed through fuel taxes and aircraft registration fees. As 4.2 shows, Virginia follows this trend while also employing a one-time, 2% sales and use tax on aircraft levied upon purchase or registration within the Commonwealth. This segment of the ASF amounted to roughly 68% of the fund's revenue and 31% of the total aviation system revenue in 2010. The bulk of Virginia's total revenue came from the Commonwealth's Transportation Trust Fund (TTF) at \$18.7 million in FY 2010. The Virginia aviation fuel sales tax contributes \$.015 per gallon of fuel sold in Virginia to the Commonwealth's TTF. 2.4% of the TTF is then allocated to DOAV in operation of the Commonwealth's aviation system.<sup>46</sup>

Although Virginia ranks third in total revenue compared to all of the states analyzed, it ranks second behind Colorado when compared to states with dedicated aviation funds.

Important to note are the differences in the components that constitute Virginia and Colorado's dedicated aviation funds. Virginia's ASF revenue structure is more diversified, encompassing three sources of tax funding. They are:

- Aircraft sales and use tax
- Aircraft registration fees
- Jet fuel and Avgas excise taxes

Colorado on the other hand is strictly dependent on the amount of aviation fuel purchased within the state. Fluctuating market trends therefore heavily influence the operation of Colorado's aviation system. While the discovery of a one-time lump sum artificially inflated Colorado's FY 2008 total revenue, commercial service cutbacks and rising fuel

prices helped to contribute to the nearly 25% decrease in total revenue for 2010.

Tennessee provides another example of the effect that fluctuating market trends can have on an aviation system funded strictly through fuel taxes. From FY 2008 to FY 2010, Tennessee's total aviation system revenue dropped 53%. Tennessee's dedicated fund inherently double-taxes aviation fuel through excise and sales and use levies. When the commercial air services market contracted between 2008 and 2010, fuel consumption dropped, causing Tennessee's aviation system to take a major revenue loss. Over the same period, Virginia's revenues grew 9.5%, while aviation fuel tax revenue grew at 6%.<sup>47</sup>

## Sales and Use Tax

Virginia compares favorably with the three classifications of competitor states in the various facets of tax policy relating to aviation system operation. At 2% of the value of the aircraft, Virginia's sales and use tax rate is tied with Alabama for being the lowest of all fourteen states included in the analysis. Nationally, only four states and the District of Columbia do not levy this tax. These states are Alaska, Montana, New Hampshire, and Oregon.<sup>48</sup> Of those states taxing aircraft sales and use, only Delaware levies a lower percentage than Virginia and Alabama at .384% of the aircraft value. Important to note, however, is that North and South Carolina place a \$1,500 and \$300 respective cap on the tax, which may result in a lower tax overall.<sup>49</sup>

## "Fly Away" Exemption

In 2011, Virginia enacted a "Fly Away" exemption, allowing aircraft purchased by a "nonresident" to be removed within 60 days of purchase to forego registration and sales and use taxes.<sup>50</sup> Virginia is one of seven states included in the study to grant this exemption, and aside from Tennessee, the only among the contiguous states. Virginia is also one of ten states to exempt certain aircraft labor costs. In most cases, Virginia, Alabama, Arizona, Colorado, Georgia, Kentucky, Maryland, Missouri, North Carolina, and South Carolina exempt labor costs on aircraft if the labor is stated separately on the work invoice, and given that the labor is not of a manufacturing or fabrication nature.<sup>51</sup>

47 Virginia Department of Aviation, "Monthly Revenue Collections-Major Revenue Sources-Fund."

48 Virginia Department of Aviation, "Public Facilities by State and Ranking," See the entire list in Appendix 3.

49 Nel Stubbs, "Tax and Funding Study," completed for the Virginia Department of Aviation by Conklin and de Decker

50 Virginia Department of Aviation, "Aircraft Licensing," [http://www.doav.virginia.gov/licensing\\_aircraft.htm](http://www.doav.virginia.gov/licensing_aircraft.htm) [accessed December 12, 2011]

51 Nel Stubbs, "Tax and Funding Study," completed for the Virginia Department of Aviation by Conklin and de Decker.

44 Nel Stubbs, "State Aviation Tax and Funding Study," performed for the Virginia Department of Aviation by Conklin and de Decker

45 DOAV, "Finance and Administration," [http://www.doav.virginia.gov/finance\\_admin\\_division.htm](http://www.doav.virginia.gov/finance_admin_division.htm) [accessed December 12, 2011]

46 Virginia Department of Aviation

**TABLE 4.3: FUEL EXCISE AND SALES TAX RATES**

	Jet Fuel Taxes			Avgas Taxes		
	Excise Tax (per gallon)	Sales Tax	\$5 Gallon – Tax Added	Excise Tax (per gallon)	Sales Tax	\$5 Gallon – Tax Added
Virginia	\$0.050	0.00%	\$5.05	\$0.050	0.00%	\$5.05
<b>Contiguous States</b>						
Kentucky	\$0.000	6.00%	\$5.30	\$0.218	0.00%	\$5.22
Maryland	\$0.070	0.00%	\$5.07	\$0.070	0.00%	\$5.07
North Carolina	\$0.000	4.75%	\$5.24	\$0.000	4.75%	\$5.24
Tennessee	\$0.014	4.50%	\$5.24	\$0.014	4.50%	\$5.24
West Virginia	\$0.120	0.00%	\$5.12	\$0.120	0.00%	\$5.12
<b>Comparable States</b>						
Arizona	\$0.031	0.00%	\$5.03	\$0.050	0.00%	\$5.05
Colorado	\$0.040	2.90%	\$5.18	\$0.060	0.00%	\$5.06
Louisiana	\$0.000	4.00%	\$5.20	\$0.200	4.00%	\$5.40
Missouri	\$0.000	4.23%	\$5.22	\$0.090	0.00%	\$5.09
Washington	\$0.110	6.50%	\$5.44	\$0.110	6.50%	\$5.44
<b>Competitor States</b>						
Alabama	\$0.009	0.00%	\$5.01	\$0.030	0.00%	\$5.03
Georgia	\$0.000	4.00%	\$5.20	\$0.010	4.00%	\$5.21
South Carolina	\$0.000	6.00%	\$5.30	\$0.000	6.00%	\$5.30

\*Source: Conklin and de Decker, *Tax and Funding Study*, 2011.

### Fuel Taxes

Virginia's aviation fuel tax policies are generally favorable when compared to key states as shown on Table 4.3.

Of the states that levy excise taxes, Virginia ranks fifth behind Alabama, Arizona, Colorado, and Tennessee in tax per gallon of jet fuel purchased. Georgia, Kentucky, Louisiana, and Missouri levy no excise taxes on jet fuel. North Carolina and South Carolina do not levy excise taxes on either jet fuel or Avgas. Of those states levying excise taxes on Avgas, Virginia's rates are tied for fourth with Arizona, both ranking behind Alabama, Georgia, and Tennessee.

Virginia also holds a competitive advantage in fuel sales tax rates. Alabama, Arizona, Maryland, Virginia, and West Virginia do not levy any sales tax on jet fuel or Avgas. Sales tax is based on the percentage of fuel purchased; amounting to substantial sources of revenue, ultimately at larger amounts than excise taxes. For instance, a state that charges \$.05 per gallon of jet fuel receives only five cents on a \$5.55 gallon of

gas. By contrast, a state that charges 6% on that same gallon of gas receives roughly 33 cents in tax revenue.

Analyzing fuel excise and sales tax policy concurrently shows that Virginia holds the most favorable rates of all contiguous states. Maryland comes in second with a slightly higher excise tax and no sales tax. Important to note is that along with Maryland, Kentucky, and North Carolina, Virginia provides exemptions on jet and Avgas fuel. After the first 100,000 gallons sold in any fiscal year, Virginia's excise tax reduces from \$.05 per gallon to \$.005, a great incentive to encourage those operators dependent on large quantities of fuel for business operation to refuel within Virginia's borders. Maryland provides an exemption on jet and aviation fuel tax if 70% of the fuel is used in common carriage, while North Carolina and Kentucky exempt taxes on jet fuel purchased over \$2.5 million and \$1 million respectively.

Virginia's favorable tax rates are evidence of the diversified nature of its revenue structure. In general, those states that rely on fuel sales to provide the bulk of aviation revenue charge the highest percentage rates on jet and Avgas fuel sales.

## Common Carrier Sales and Use Tax Exemption

There are a number of areas in which Virginia does not compete as closely with the three classifications of competitor states. First, all contiguous states offer common carrier sales and use tax exemptions for Part 135 aircraft. These states either exempt Part 135 aircraft operating in the conveyance of persons or property, interstate, or foreign commerce, or in North Carolina's case, make no distinction between Part 135 and 121 and merely cap the tax at \$1,500.<sup>52</sup> Maryland is the most lenient of all states analyzed by not requiring aircraft to be commercially certified, only that the aircraft be used "principally in interstate commerce," be it Part 121, 135, or 91.<sup>53</sup>

Of the 14 states analyzed, Virginia, Alabama, and Arizona only exempt airline (Part 121) operators from paying any sales and use tax on aircraft. South Carolina does not exempt any aircraft, but caps its sales and use tax at \$300 per aircraft. Finally, the remaining states exempt Part 135 aircraft operating "principally" or "exclusively" in interstate or foreign commerce. Missouri is the only exception, making a distinction between common carriers (Part 121) and contract carriers (Part 135). It offers the exemption to common carrier aircraft and non contract carriers.<sup>54</sup>

Over the six-year period, from 2005-2010, Virginia brought in \$2,109,104 in sales taxes, ranging from \$1,362 in FY 2008, a slow year in aircraft sales and registrations, to \$1,448,490 in FY 2009. These taxes were levied from ten of the 35 Part 135 certified companies registered with DOAV.<sup>55</sup>

DOAV's sales and use tax figures represent those aircraft that are *owned* by the Part 135 charter operation companies; they do not factor in aircraft that are *leased* by the charter companies. Because many aircraft charter companies also perform aircraft management functions, a large percentage use their fleet for on-demand charter services. In most cases, other individuals and businesses own aircraft in the management fleet. These operators arrange lease agreements with the management companies to share charter revenues, offsetting ownership expenses.

One challenge of enacting and enforcing a Part 135 sales and use tax exemption is that many of the Part 91 companies can potentially attain Part 135 certification that might result in a significant decrease in the amount of (ASF) revenue to be invested back into Virginia's aviation system. A large revenue reduction in the 2% sales and use tax would negatively impact the Commonwealth's ability to provide funding for its airport programs, as it accounts for 68% of the ASF.<sup>56</sup>

52 Ibid.

53 Ibid.

54 Ibid.

55 Data provided by the Virginia Department of Aviation.

56 Nel Stubbs, "Tax and Funding Study," completed for the Virginia Department of Aviation by Conklin and de Decker Associates, Inc.

## Resale/Lessor Exception

A second area in which Virginia's tax policy does not align with the thirteen states examined for this study is in a resale/lessor exception. Virginia is the only state not to offer a blanket resale/lessor exception, which states that a single entity can purchase an aircraft for lease or resale and collect and remit the sales and use tax on the lease payments. Virginia does, however, offer this exception for registered dealers, which includes those in the regular business of selling aircraft. Registered dealers must own five or more aircraft at any time during the calendar year for which the exception is employed. The exception is one that benefits the lessor/lessee in that the lessor, the single purpose entity, leases the aircraft to an operating entity for their use and collects and remits the use tax on the lease payments. This option benefits the lessee by enabling them to spread the sales/use tax out over a period of time, allowing both to manage costs.<sup>57</sup>

In consulting with Virginia's Taxation Department, DOAV found that the statute is currently written in a way that reduces the propensity for single entities to abuse their benefits. Allowing an entity to purchase a single aircraft, exempt for resale, and collect the 2% aircraft tax on the lease payments creates a loophole to essentially avoid the tax. Creating a leasing company is a commonly used technique to defer payment of sales and use tax. This allows for a tax deferral, as the sale of the aircraft to the leasing company is exempt from initial sales tax. Sales tax is then charged on the lease payments.<sup>58</sup>

## Programs and Services Funded Through Tax Revenue

Virginia's ASF is a user-pay, user-benefit system. The ASF is entirely based on taxes levied on aircraft operators' utilization of the Commonwealth's Air Transportation System. The ASF, in its entirety, then returns to operators in the form of programs and technical services to the benefit of all that utilize the Commonwealth's public-use airports. In FY 2010, Virginia's ASF provided \$12.2 million in collected fuel tax, aircraft sales and use tax, and aircraft registration fees to fund the program categories described in Figure 4.1.

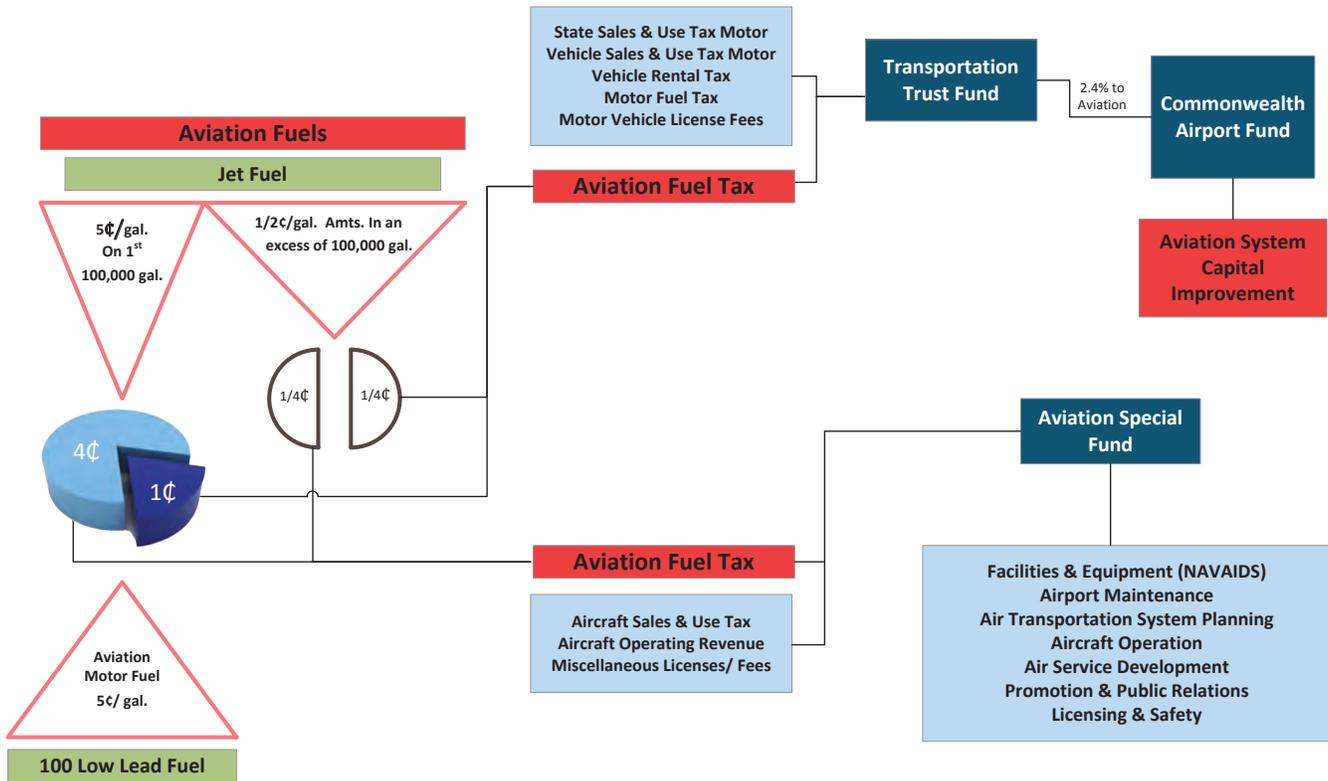
Programs made possible by the ASF include:

- The Facilities and Equipment (F&E) Program;
- Maintenance Program;
- Security Program;
- Aviation Promotion Program;
- And the Air Service Development and Enhancement Program

57 Nel Stubbs, "Tax and Funding Study," performed for the Virginia Department of Aviation by Conklin and de Decker Associates, Inc.

58 Information provided by DOAV Aircraft Licensing Manager.

**Figure 4.1: Virginia's Aviation Dollars at Work - Commonwealth Transportation Fund**



**Facilities and Equipment (F&E) Program**

Virginia's highly competitive standing in the percentage of airports serviced by AWOS and IAP systems can be attributed to the facilities and equipment (F&E) program. The F&E program provides funding for the installation of electronic communication, navigation, and information systems to enhance aircraft operator safety while also encouraging the utilization of Virginia's air transportation system. These infrastructure improvements are either owned and operated under by DOAV or are the responsibility of the airport sponsor. DOAV owns and operates facilities such as distance measuring equipment (DME), nondirectional beacons (NDB), and Instrument Landing Systems (ILS), while visual aids, AWOSs and ground communication outlets are under the airport sponsor's responsibility.<sup>59</sup>

**Maintenance Program**

The maintenance program is designed to fund nonrecurring maintenance and to encourage airport sponsors to undertake preventative maintenance, extending the useful life of airport infrastructure and reducing the frequency with which this infrastructure must be replaced. Eligible projects include obstruction removal, pavement maintenance and

repairs, repairs to fueling stations and airport lighting systems, as well as repairs to terminal buildings.<sup>60</sup>

**Security Program**

Virginia's voluntary security program offers a best-practice approach to enhancing general aviation security. Virginia's ASF provides airport sponsors with 100 percent of the funding to conduct security audits and to develop security plans for public-use, GA airports. The ASF then provides 90 percent of the necessary funding to design and install security improvements to address the deficiencies reported in the security audits and plans. Beyond the audit and security plan development, the ASF funds terminal area fencing, perimeter fencing, electronically controlled entry gates, surveillance systems, security signage, lighting, and barriers.<sup>61</sup>

**Aviation Promotion Program**

The aviation promotion program exists to boost awareness among the business community and public sector to the economic benefits associated with the utilization of Virginia's aviation system. Annual state funding for airport sponsors' promotional endeavors is capped at \$25,000 per air carrier airport and \$10,000 per general aviation airport. These funds support promotional efforts, which include ra-

<sup>59</sup> Ibid.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

dio and television airtime; airport flight guides; billboards, banners, and other print media; business and financial plans; and sponsorships of community events that promote the function and use of a particular airport.<sup>62</sup>

### Air Service Development and Enhancement Program

The Air Service Development and Enhancement Program provide airport sponsors assistance in attracting scheduled air charter service under Part 135, as well as cargo-related air traffic. The program provides funding for:<sup>63</sup>

- Air service studies and reports
- Airline visits, including presentation preparation and consultant services
- Air service data subscriptions
- Component market research services
- Marketing and advertising for new or enhance air service for the first calendar year

### Virginia’s Programs and Technical Services Competitive Standing

Table 4.4 exhibits the National Association of State Aviation Officials’ (NASAO) latest *Funding and Organizational Structure Study* completed in 2008. It provides a general tally of the program, technical service, and policy categories funded through federal and state tax revenues. Virginia offers the

62 DOAV, “Airport Program Manual,” August 2011, available at <[http://www.doav.virginia.gov/Downloads/Airport\\_Grant\\_Program/Airport%20Program%20Manual/2011%20Airport%20Program%20Manual/500%20DOAVAS%2020110831%202011%20Airport%20Program%20Manual%20bookmarked.pdf](http://www.doav.virginia.gov/Downloads/Airport_Grant_Program/Airport%20Program%20Manual/2011%20Airport%20Program%20Manual/500%20DOAVAS%2020110831%202011%20Airport%20Program%20Manual%20bookmarked.pdf)> [accessed December 5, 2011].

63 Ibid.

most tax-funded programs when compared against the remaining thirteen states. Virginia’s closest competitors are Louisiana, Maryland, and Tennessee, providing funding for eight of the twelve categories.

Virginia excels in offering aviation education services and air service assistance programs. However, there is room to improve the Commonwealth’s noise compatibility program as the only two airports with such regulations are Richmond International and Roanoke Regional. Virginia also lags behind its closest competitors in the “Airport Preservation Program.” After consulting with NASAO’s Director of Operations, it was determined that this category includes a state’s efforts to protect public-use airports from housing and business-related encroachment.<sup>64</sup> These efforts may come in the form of funding to support airport preservation, guidelines for development, or land use policy. As of 2011, Virginia reported a lack of airport preservation programming.

### Land Use Policy

When land around and near airports is developed or redeveloped in a way that is not compatible with aviation activities, it can pose issues for the full utility of the airport. If that development is not compatible with aviation activities. Aviation operations create noise that is incompatible for certain land-uses. There are numerous examples of where these incompatible land uses can create a groundswell for operational restrictions at the airport, effectively degrading airport investment. Examples of incompatible land uses around airports include residential, religious, educational, and others that amass large assemblies of people for special

64 Director of Operations, National Association of State Aviation Officials, “Personal Interview.”

TABLE 4.4: POLICIES, PROGRAMS, AND TECHNICAL SERVICES												
	Aviation Education	Airport Minimum Standards	Noise Compatibility Program	Air Service Assistance Program	Tall Structures Regulations	Airport Sponsors Guide	Tax Relief-Private Airports	Airport Preservation Program	NAVAID Projects	Airfield Maintenance Program	Hangar Construction	Number of Listed Programs Funded
VA	✓	✓	RIC, ROA	✓	✓	✓			✓	✓	✓	9
<b>Contiguous States</b>												
KY	✓	✓			✓	✓			No Data	No Data	No Data	5
MD		✓	✓		✓		✓	✓	✓	✓	✓	8
NC		✓		✓		✓			✓	✓	✓	6
TN	✓	✓				✓	✓	✓	✓	✓	✓	8
WV		✓		✓								2
<b>Comparable States</b>												
AZ	✓			✓		✓						3
CO		✓						✓	✓	✓	✓	6
LA		✓	✓		✓	✓		✓	✓	✓	✓	8
MO				✓		✓			✓	✓		4
WA			✓	✓	✓			✓	✓	✓		6
<b>Competitor States</b>												
AL		✓			✓	✓		✓	No Data	No Data	No Data	5
GA						✓			✓	✓		4
SC	✓	✓			✓	✓			✓	✓		6

Source: NASAO *Funding and Organizational Structure Study - 2008*  
 \*GPS Implementation Study results were excluded based on NASAO advice

events. Noise and safety issues are paramount in trying to segregate these uses from negatively impacting the airport's ability to serve the surrounding communities. When land use is not properly addressed, the negative impacts include restricted hours of operation, difficult approach and departure procedures, caps on the number of operations, restrictions on the type of aircraft that can use the facilities, and in some cases, poor land use policy has been a major contributor in airport closure.

To ensure that the taxpayers' substantial investment in public-use airport infrastructure is protected and that the trans-

portation asset remains viable, regulatory action is necessary to guide compatible land-uses near airports.

Table 4.5 indicates the regulatory measures that are in place for the 14 states examined in this report. One can easily see that these states have not had much success regarding the regulatory approach to land use compatibility, and have thus far relied upon the marketplace to ensure proper compatibility. The record indicates that this method often lacks seeking the proper assignment of uses of properties in the airport environs.

<b>TABLE 4.5: STATE MANDATED PROTECTION OF PUBLIC USE AIRPORTS: INCOMPATIBLE LAND USE MEASURES</b>		
<b>State</b>	<b>State Mandate</b>	<b>Comments</b>
Virginia	No	Advisory land-use guidance is available from DOAV
<b>Contiguous States</b>		
Kentucky	Yes	State airport zoning commission established
Maryland	No	Localities encouraged to adopt local zoning - most have
North Carolina	No	Blocked in the past by special interests
Tennessee	No	Discussed, never proposed
West Virginia	No	Discussed internally, but never attempted
<b>Comparable States</b>		
Arizona	No	State supplies "Airport Disclosure Maps" to real estate firms
Colorado	No	Require "adherence" to Part 77, but not land use
Louisiana	No Response	No Response
Missouri	No	Never advanced by state
Washington	Yes	Localities must adopt comprehensive plans that follow state land-use checklist
<b>Competitor States</b>		
Alabama	No	State mandate discussed internally, but not advanced
Georgia	No	Never advanced by state
South Carolina	No Response	No Response
*Survey conducted by Virginia Department of Aviation, November, 2011		

# 5. BUSINESS CLIMATE

## 5.1 ECONOMIC DEVELOPMENT INITIATIVES

VEDP targets the aerospace and airline industries in its efforts to attract business to Virginia. From 2005-2010, these efforts amounted to roughly \$859 million in business investment and expansion within the Commonwealth. According to VEDP press releases, investing companies most often cited the Governor’s Opportunity Fund (GOF) and the Virginia Investment Partnership (VIP) Grant as the financial impetus for locating to and expanding in Virginia.<sup>65</sup> The GOF is a discretionary incentive that is available to potential investments based on stipulations put forward by the Virginia legislature. The Virginia Investment Partnership Grant is designed to motivate existing company capital investments that result in, “...added capacity, modernization, increased productivity, or the creation, development and utilization of advanced technology.”<sup>66</sup> Important to note is the popularity of the VIP Grant, as 70% of the aviation investments announced from 2005-2010 were reported by existing companies undergoing business expansion within Virginia.

TABLE 5.1: AVIATION-RELATED BUSINESS EXPANSION 2005-2010					
Company Name	Location	Business	Employment	Investment (millions)	Year
Orion Air Group	Newport News	Business aircraft operator	51	\$4.00	2010
Euro-Composites Corporation	Culpeper Co.	Honeycomb composite material	70	\$11.25	2010
<i>2 announcements</i>			<b>121</b>	<b>\$15.25</b>	
Alcoa Howmet Castings	Hampton	Complex investment cast turbine airfoils	25	\$25.00	2009
Cobham Composite Products	Suffolk	Manufactures integrated assemblies and subsystems for military aircraft, ground vehicles	198	\$13.20	2009
Cobham Sensor Systems	Montgomery Co.	Manufactures integrated assemblies and subsystems for military aircraft, ground vehicles	0	\$7.00	2009
Cyberdome Technology	Virginia Beach	Flight simulators	15	\$1.50	2009
Quartus Engineering	Loudoun Co.	Engineering/design for aerospace industry	5	\$0.10	2009
<i>5 announcements</i>			<b>243</b>	<b>\$46.80</b>	
A&A Machine Company	Westmoreland Co.	Manufactures precision machined parts for the aerospace industry	15	\$0.68	2008
AVID, LLC	York Co.	R&D, design, and software tools for the aircraft industry	20	\$2.12	2008
Dynamic Aviation	Rockingham Co.	Aircraft maintenance and modification	102	\$5.90	2008
Goodyear Tire & Rubber Co.	Danville	Aircraft tire and medium radial truck tire manufacturing	0	\$200.00	2008
Zenith Aviation	Fredericksburg	Distributes aircraft equipment	30	\$1.60	2008
<i>5 announcements</i>			<b>167</b>	<b>\$210.30</b>	
Capital Logistics Services	Prince William Co.	Distributes aircraft parts	12	\$0.75	2007
ProJet Aviation, LLC	Winchester	Aviation consulting and management services	5	\$23.80	2007
Rolls-Royce PLC	Prince George Co.	Assembles aircraft engines	542	\$501.40	2007
<i>3 announcements</i>			<b>559</b>	<b>\$525.95</b>	

65 Press releases highlighting specific VEDP successes can be accessed at [http://www.yesvirginia.org/about\\_us/news.aspx](http://www.yesvirginia.org/about_us/news.aspx).

66 Virginia Economic Development Partnership, *2011-12 Virginia Guide to Business Incentives* (PDF file), p. 17, available at <http://www.yesvirginia.org/pdf/guides/BusinessIncentivesGuide2011.pdf> [accessed December 5, 2011].

Alcoa Howmet Castings	Hampton	Complex investment cast turbine airfoils	40	\$0.00	2006
Eagle Aviation Technologies Inc.	Hampton	Design prototypes for unmanned helicopters; R&D	40	\$3.30	2006
Lockheed Martin	Loudoun Co.	Flight service station hub; flight plan/weather conditions consulting	200	\$7.00	2006
		<i>3 announcements</i>	<b>280</b>	<b>\$10.30</b>	
Air Wisconsin Airlines Corporation	Norfolk	Aircraft maintenance and flight crew hub	131	\$34.00	2005
Aurora Flight Services Corp	Manassas	Corporate HQ; Develop robotic aircraft	101	\$4.15	2005
Colgan Air, Inc.	Manassas	Regional air carrier	90	\$8.00	2005
Dynamic Aviation	Rockingham Co.	Aircraft maintenance and modification	206	\$4.10	2005
Eagle Aviation Technologies Inc.	Hampton	Design prototypes for unmanned helicopters; R&D	40	\$0.50	2005
		<i>5 announcements</i>	<b>568</b>	<b>\$50.75</b>	
*Source: Virginia Economic Development Partnership, 2011.					

Table 5.2 references a sampling of Virginia’s missed opportunities in aviation investments from 2005-2010. These “missed opportunities” refer to Virginia’s attempt to either lure a company away from a competitor state or entice an already bidding company. The stated reasons for why the investment did not occur within Virginia range from the presence of a specialized workforce in the competing state or superior location factors, (i.e. deep-water ports, rail access) to the company ultimately deciding to expand within its original settings. However, a theme in two of the missed investments was the lack of acceptable hangar space. One firm cited a lack of hangar space at airports in the Northern Virginia area with minimum 5,000-foot runways. The other, also a jet maintenance company, invested elsewhere due to a lack of commercial hangar space.



**TABLE 5.2: VIRGINIA AVIATION PROJECTS—SAMPLE OF MISSED OPPORTUNITIES**

Project Name	Project Year	Investment	Jobs	Type of Project	Competition	Reason Virginia Was Dropped From Further Consideration
"Propel"	2006/2007	\$49 million	250	Turboshaft component manufacturing	NC, SC, GA & FL	Property with existing FTZ subzone status; concentration of existing area subcontractors qualified for aerospace tolerance machining standards
"Aero"	2007	\$25.5 million	100	Aircraft engine manufacturing	NC	Favorable existing company manufacturing experience in NC; property adjacent to airport runway
"Grizzly"	2006	TBD	TBD	Private jet maintenance for SAAB 340's ATR 42/72's, & EMB 135/140/145's	OH	No availability of 75,000 sq.ft. hangar space in northern VA at airports with 5,000 ft. minimum length runways
"Support"	2007	TBD	50	Regional jet aircraft maintenance	Unknown	No availability of 35,000 sq.ft. commercial airport hangar space
"Tank"	2008	\$120 million	900	Aircraft interior completion & exterior painting	AK	Smaller scale expansion in existing airport location with runway access
"Coyote"	2009/2010	\$65 million	500	Aircraft final assembly	KA & 15 other states (including VA)	Expanded in existing location with runway access
EADS	2005	\$600 million	1150	Aircraft assembly; originally for KC-30 advanced aerial refueling aircraft (contract re-awarded to Boeing) and now CN-235/C-295 aircraft delivery	AL & several other states	Located in industrial park complex at Mobile Regional Airport adjacent to wide-body runway, deep water port & multiple rail carrier and interstate access

\*Source: Virginia Economic Development Partnership, 2011.

## 5.2 COMPARISON OF GRANT PROGRAMS, INCENTIVES, AND TAX CREDITS FOR MANUFACTURING AND LOGISTICS PROJECTS

In recent years, Virginia competed more often with certain states, namely Alabama, Georgia, North Carolina and South Carolina, for aviation and aerospace-related investment. Each state lists aerospace as a target industry in attracting companies to locate within the state. Georgia is the only state, until recently, to tailor a loan-based incentive to attract aerospace-business. Georgia, with its "Edge Fund" and North Carolina with the "One North Carolina Fund" compete well with Virginia in their capacity to provide authorities a level of discretionary funding to devote to a worthy investment opportunity that might ultimately "close the deal."<sup>67</sup>

Virginia's competitor states also have incentive policies that entice businesses to perform research and development functions, such as partnerships with the public institutes of higher learning. All states offer a form of research and development tax credit that offsets a percentage of a company's R&D expenses. However, Virginia excels with its added stipulation that increases the redeemable expense cap if a company performs the research and development in conjunction with a university or college located within Virginia. Although Georgia does not include such an allowance in its R&D exemption, it does emphasize its "Centers of Innovation" as a forum in which companies can partner with state universities to fund research and development practices that are designed to breed innovation within the state's strategic industries. Each state's targeted industry incentives are shown in Table 5.3.

67 Information provided to steering committee by the Virginia Economic Development Partnership

Virginia recently experienced economic development success in the aviation and space industry with Rolls-Royce's announcement to locate an aircraft engine manufacturing plant in Virginia. In 2010, Rolls-Royce agreed to be a contributing member of The Commonwealth Center for Advanced Manufacturing (CCAM), designed to bring innovation to the aviation and space industry while advancing the research efforts of Virginia's university system. CCAM is intended to foster R&D through public-private partnerships, and its facilities will house research and development to provide private enterprise with access to academia's intellectual capital in return for funding to advance university-affiliated research. CCAM is currently in its first year of operation but plans to provide Virginia with a sustainable source of jobs and avenues for economic development throughout the coming years.

**TABLE 5.3: TARGETED INDUSTRY INCENTIVES**

State	Adv. Mfg.	Services & Security						Science & Research			Transportation				Other Incentives w/o targeted industries	Deal Closing Fund	
	Advanced Manufacturing	Supplier Cluster	Finance & Insurance	Info. Tech.	Headquarters	Defense, Federal Contractors	Telecom/ Data center	Biotechnology/ Life Science	R&D	Alternative Energy	University collaboration	Aerospace	Distribution/ Logistics	Port (usage)			Mega Projects
VA	B, L, \$, TC, TE				\$		TE	L	TC	TC		X, TE		TC, TC, TC*	\$, B	\$, \$, \$, \$, L, TC, TC, TC	GOF (\$18.9 million)
NC	B, TE, TR, TD			TE		\$	TE	L	TC	L, \$, TC				TC		\$, \$, \$, \$, TC	One North Carolina Fund (\$28 million)
SC	TC				TC				TC				TC	TC		TR, \$	No Equivalent
GA	L, TC, TE	L	L	L	L	TC	L	TC, TC	L	X, X	L	L, TC	TC, TC	T	C	\$, \$, L, TC, TC	Edge Fund (\$47.1 million for FY09)

Source: Virginia Economic Development Partnership

Note: Tables does not include Workforce or Infrastructure (Road, Rail) Incentives

\* Multiple listings of same incentive classification denote the presence of multiple programs within that classification

B = Bonds

L = Loan

\$ = Grant

TC = Tax Credit

TE = Tax Exemption

TD = Tax Discount

TR = Tax Refund/Rebate

VC = Venture Capital

X = Partnerships between Universities and Industry (i.e. Centers of Innovation)

# 6. QUALITY OF LIFE

## 6.1 FACTORS INFLUENCING EMPLOYEE RELOCATION

Quality of life indicators such as housing prices, crime rates, and education are important factors that individuals consider when they are thinking about relocating. These factors impact the individual's daily life and can significantly influence the decision about where to live. In this study, Virginia is compared with contiguous, comparable, and competitor states on measures of housing prices, crime rates, education expenditures, and health rankings.

Virginia has the highest median housing price of all other states, though the expensive market in the suburbs surrounding Washington, D.C. significantly impacts it. Virginia has the lowest violent crime rate (per 100,000 persons) in comparison to all other states and ranks second in education expenditures behind Maryland (8). Finally, Virginia's health ranking is 22<sup>nd</sup> in the nation, but only ranks behind Colorado, Maryland, and Washington in relation to states most relevant to aviation competitiveness, as shown in table 6.1.

**TABLE 6.1: QUALITY OF LIFE FACTORS INFLUENCING INDIVIDUAL RELOCATION**

State	Median House Price (In Thousands Dollars --2011) <sup>68</sup>	Violent Crime Rate (Per 100,000 People) <sup>69</sup>	Per Capita State & Local Government Expenditures--All Education (State Ranking) <sup>70</sup>	Health Rankings (State Ranking) <sup>71</sup>
<b>Virginia</b>	<b>262.5</b>	<b>226.8</b>	<b>2,921 (10)</b>	<b>22</b>
<b>Contiguous States</b>				
Kentucky	134.4	258.7	2,491 (38)	44
Maryland	154.4	589.9	3,053 (8)	21
North Carolina	182.2	404.3	2,471 (39)	35
Tennessee	142.9	667.7	1,991 (50)	42
West Virginia	134.7	296.5	2,582 (33)	43
<b>Comparable States</b>				
Arizona	131.3	408.3	2,160 (48)	31
Colorado	262.3	337.8	2,552 (35)	13
Louisiana	162.3	620	2,677 (26)	49
Missouri	131.3	491.8	2,358 (45)	39
Washington	193.1	331	2,755 (20)	11
<b>Competitor States</b>				
Alabama	129.9	449.8	2,793 (18)	45
Georgia	102.1	426.1	2,648 (29)	36
South Carolina	143.1	670.8	2,735 (21)	41

68 National Association of Realtors, "Median Sales Price of Existing Single-Family Homes for Metropolitan Areas: FY2011 2nd Quarter." Retrieved from [http://www.realtor.org/wps/wcm/connect/41c2648047e600e7adb7ed93a9f011da/REL11Q2T\\_rev.pdf?MOD=AJPERES&CACHEID=41c2648047e600e7adb7ed93a9f011da](http://www.realtor.org/wps/wcm/connect/41c2648047e600e7adb7ed93a9f011da/REL11Q2T_rev.pdf?MOD=AJPERES&CACHEID=41c2648047e600e7adb7ed93a9f011da). Average of each state's MSA's.

69 FBI, "Crime in the United States: 2010," Retrieved from <http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/violent-crime/violent-crime>

70 National Education Association. "Rankings of the States 2010 and Estimates of School Statistics 2011." Retrieved from [http://www.nea.org/assets/docs/HE/NEA\\_Rankings\\_and\\_Estimates010711.pdf](http://www.nea.org/assets/docs/HE/NEA_Rankings_and_Estimates010711.pdf)

71 United Health Foundation, "America's Health Rankings, 2009." Retrieved from <http://www.americashealthrankings.org/measure/2009/overall.aspx>.

## 6.2 FACTORS INFLUENCING BUSINESS EXPANSION

The economic and business climates of a state are important factors that influence business decisions to expand to one state over another. Four specific factors that are critical to business expansion are human capital investment, state corporate tax rate, state business tax climate, and the concentration of technology and dynamism. Virginia's standing among the states analyzed is shown in Table 6.2.

Human capital investment refers to state efforts that are aimed at increasing the talent in the workforce pool, attracting and retaining a highly educated workforce, and the concentration and movement of various science and engineering fields.<sup>72</sup> Despite its significantly smaller size and lower population density, Virginia has the third highest human capital investment ranking amongst the comparison states,

thanks to an excellent university system and world-class science and engineering programs.

Virginia also ranked second in the technology concentration and dynamism index that measures the level of innovation in technology-based clusters and several technology outcomes.<sup>77</sup> Virginia's high concentration of technology-based businesses, and their reliance on convenient domestic and international access, allows the aviation industry to grow and remain competitive. This fact is the reason Virginia Delegate Joe May describes Virginia's airports as "technology magnets." A pool of highly skilled workers and a climate of innovation are important to companies that are seeking to expand to other areas. Overall, the rankings on key business expansion factors affirm Virginia's stance as a pro-business state with a strong system of airports equipped to support a range of logistic needs.

**TABLE 6.2: QUALITY OF LIFE FACTORS INFLUENCING BUSINESS EXPANSION**

State	Human Capital Investment Ranking <sup>73</sup>	State Corporate Tax Rate (Percent) <sup>74</sup>	State Business Tax Climate Index State Rank (2006-2011) <sup>75</sup>	Technology Concentration and Dynamism Index State Rank <sup>76</sup>
<b>Virginia</b>	<b>15</b>	<b>6</b>	<b>12</b>	<b>4</b>
<b>Contiguous States</b>				
Kentucky	45	4.0-6.0	19	47
Maryland	1	8.25	44	5
North Carolina	26	6.9	41	11
Tennessee	42	6.5	27	34
West Virginia	39	8.5	37	49
<b>Comparable States</b>				
Arizona	32	6.96	34	10
Colorado	3	4.63	15	2
Louisiana	41	4.0-8.0	36	37
Missouri	28	6.25	16	32
Washington	21	None	11	3
<b>Competitor States</b>				
Alabama	40	6.5	28	25
Georgia	37	6	25	14
South Carolina	46	5	24	38

72 For a complete review, see: Milken Institute, State Technology and Science Index: Enduring Lessons for the Intangible Economy, March 2004, available at <<http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=304&cat=ResRep>>

73 Ibid., p. 24.

74 Federation of Tax Administrators, "Range of Corporate Income Tax Rates, February 2011," Retrieved from [http://www.taxadmin.org/fta/rate/corp\\_inc.pdf](http://www.taxadmin.org/fta/rate/corp_inc.pdf)

75 The Tax Foundation, "2011 State Business Tax Climate Index," Retrieved from <http://www.taxfoundation.org/research/show/22658.html>

76 Milken Institute, State Technology and Science Index: Enduring Lessons for the Intangible Economy, March 2004, available at <<http://www.milkeninstitute.org/publications/publications.taf?function=detail&ID=304&cat=ResRep>>

77 Ibid.

# 7. WORKFORCE PIPELINE ANALYSIS

## Current Workforce

The aviation and space industry have significant economic development potential for the communities and citizens of the Commonwealth. This is a point made apparent in *Virginia's Aerospace Industry: An Economic Impact Analysis* (2010), and the *Virginia Airport System Economic Impact Study* (2011). The latest aviation and space-related impact studies show that Virginia directly employs more than **28,000 employees** and contributes **\$7.6 billion** in direct annual economic output.<sup>78</sup> Additionally, Virginia's airports have a profound effect on the Commonwealth's economic vitality, accounting for 4.4% of the state's total economic output. Virginia ranked 11<sup>th</sup> in the nation in aviation and aerospace employment in 2009 and increased to 10<sup>th</sup> in 2010. According to the FAA industry growth projections, this impact is destined to grow in the next 20 years. To take advantage of aviation and space growth potential, Virginia must ensure a ready and trained workforce is there to meet the industry. With its world-renowned centers for aviation and space education and "who's who" list of companies, it is important to obtain detailed information on Virginia's current workforce landscape and identify any changes needed in the education system and workforce training programs to ensure that Virginia remains competitive into the next decade and beyond.

<sup>78</sup> Virginia Department of Aviation (DOAV), *Virginia Airport System Economic Impact Study: Technical Report* (PDF file), p. 1, report prepared by ICF SH&E, 2011, available online at <http://tinyurl.com/7usgrfl> [accessed December 2, 2011].

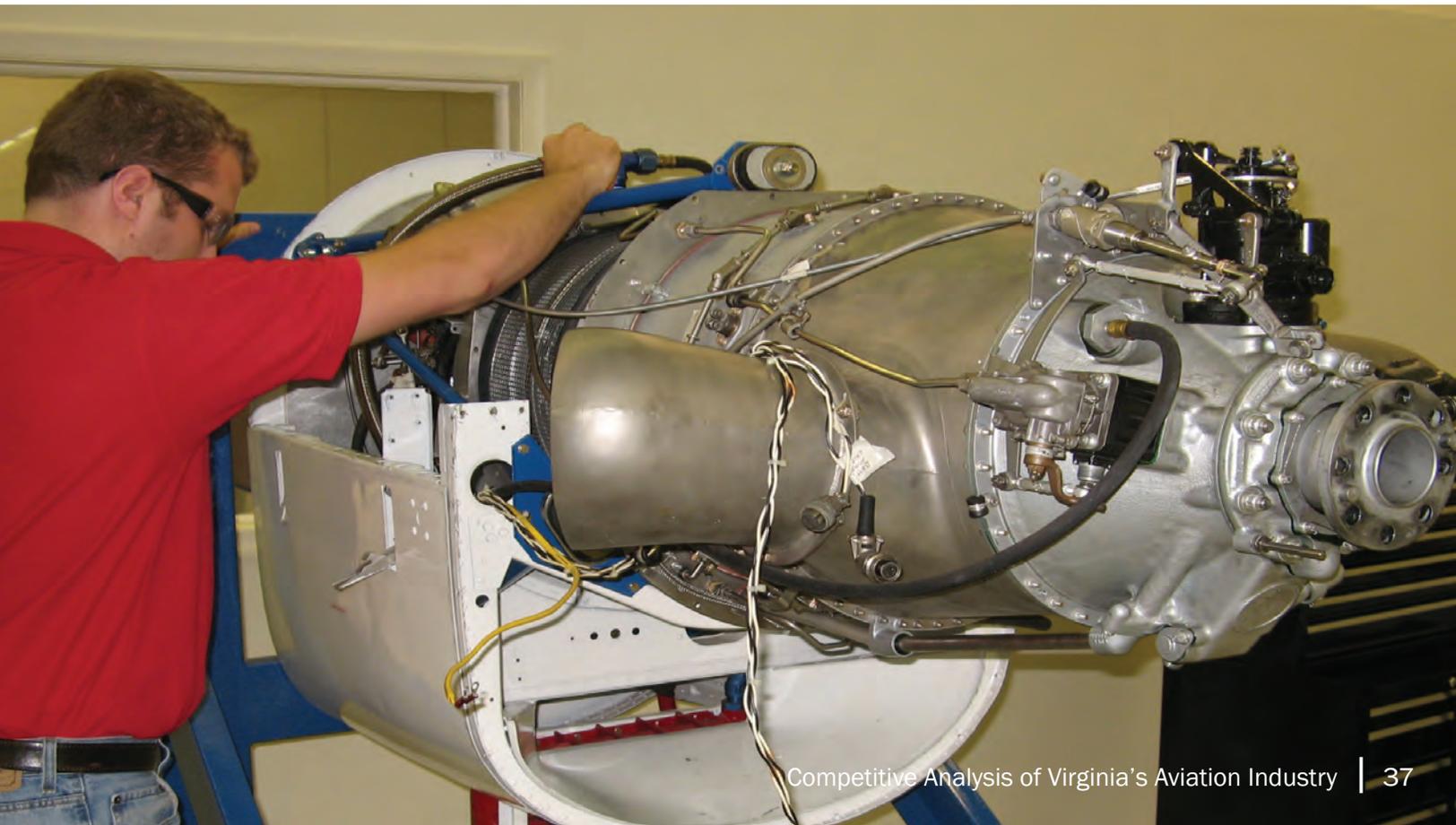
## Future Workforce

Retirements among aging baby boomers are expected to be significant in the coming years. The impact will be slightly alleviated as more of the population aged 65 and over is projected to remain in the workforce. Workers aged 65 and older accounted for an estimated 4.3% of workers in the state in the second quarter of 2010 and is expected to grow to 7.3% in 2020. The number of workers under the age of 25 is forecast to decrease over the next ten years, from 469,362 to 431,849.

Another significant trend is that the average educational attainment of the workforce is expected to increase. The number of employed workers in Virginia with a high school diploma or less is expected to drop over the next ten years by 4.4%, while over the same period, the number of workers with some college is expected to grow 14.9%. Even larger increases are expected for other attainment levels: associate's degrees (+36.3%), bachelor's degrees (+16.9%), and graduate degrees (+34.0%).

## Aviation Workforce Shortage

A number of aviation-specific technical occupations were cited as critical to the success of the aviation industry in a 2011 survey conducted by Chmura Economics & Analytics that targeted businesses in the aviation and space indus-





try.<sup>79</sup> The occupations that capture much of this group are aircraft mechanics and service technicians, as well as general maintenance and repair workers.<sup>80</sup> Roughly 25% of aviation respondents mentioned these among those most impactful upon their business' success. Other technical occupations that appear to be critical to the success of the aviation industry include avionics technicians, air traffic controllers and airfield specialists, first-line supervisors/managers of mechanics, installers, repairers, and machinery maintenance workers.<sup>81</sup>

Aviation and related business respondents mentioned critical employee shortages in several occupations. One is the broad occupation of pilots, including airline pilots, copilots, flight engineers, and commercial pilots. Several respondents reported that pilots were not in sufficient supply for their organization. Engineers were also frequently cited to be in short supply, especially aerospace engineers and electronics/electrical engineers.

<sup>79</sup> Chmura Economics & Analytics, *Virginia's Aviation and Aerospace State of the Workforce: 2011*

<sup>80</sup> *Ibid.*, p. 70

<sup>81</sup> *Ibid.*

Respondents also mentioned that certain skill sets among new hires were in short supply, especially program management skills, critical thinking, decision making, and work ethic. Aviation respondents most often cited a short supply of critical thinking and decision making skills. Among space respondents, STEM skills were most often lacking. Nine of twelve skills were designated in short supply by 32% or more of respondents.

Respondents were asked how they expected their employment to change over the coming twelve months and over the coming three years. Over the next year, about half (49%) expected to stay the same with 30% expecting job growth and 12% expecting a decline.<sup>82</sup> Space firms were especially optimistic, with five of seven expecting growth and the remaining two expecting to hold steady. An in-depth analysis regarding the current workforce can be found in the *Virginia's Aviation and Aerospace State of the Workforce: 2011* report, available on the DOAV website.

<sup>82</sup> *Ibid.* p. 73

# 8. INDUSTRY LANDSCAPE AND TRENDS

## 8.1 NATIONAL BUSINESS TRENDS

Consumers have benefited from airline deregulation, with prices for domestic roundtrip airfare decreasing by 8.6%, while the Consumer Price Index has increased by 24.6% from 2000 to 2009. Airlines, however, have lost \$58 billion, with operating revenues dropping 16.9% in 2009, leading to a loss of over 150,000 jobs.<sup>83</sup>

According to the FAA, there are three trends shaping the commercial air carrier industry. They are:

- The proliferation of ancillary revenues
- The convergence of the network and low cost carrier business models
- Industry consolidation and restructuring<sup>84</sup>

The past decade, with the 9/11 terrorist attacks, an economic recession, and soaring fuel prices, has presented many challenges to the airline industry. These factors have pressured aviation companies to look at their practices and adapt the industry in order to prosper. The response consisted of cutting unprofitable routes; grounding older, less fuel-efficient aircraft; and charging separately for services such as checked luggage, meals, etc.

The FAA is optimistic that this new focus will help create sustainable profits as opposed to the boom-and-bust business cycles of the past. The FAA noted that "...available seat miles (ASMs) will increase 4.5% [in 2011] after posting a 0.5% decrease for 2010, and will then grow at an average annual rate of 3.6% through 2031."<sup>85</sup> Growth is also expected in regard to commercial air carrier domestic revenue as, "Commercial air carrier domestic revenue passenger miles (RPMs) are forecast to grow 3.5% in 2011, and then grow at an average of 3.1% per year through 2031; domestic enplanements in 2011 will grow 3.0%, and then grow at an average annual rate of 2.5% for the remainder of the forecast."<sup>86</sup>

Both trip length and airline capacity are expected to increase in regional markets. To maintain profitability, the FAA determined that the U.S. carriers must have a "stable environment for fuel prices, an increase in demand for corporate



air travel, the ability to pass along fare increases to leisure travelers, and the generation of ancillary revenues."<sup>87</sup> U.S. carriers are also expected to continue to drive down operating costs by better matching supply (flight frequencies and routes) with demand, delaying the sale of newer aircraft and/or grounding older aircraft, and pressuring regional affiliates to accept lower fees for contract flying.<sup>88</sup>

Mainline carriers are switching to more efficient aircraft in response to fuel costs and the need to retire an aging fleet, while regional carriers are going from 50-seat aircraft to 70-90 seat aircraft in order to handle the increased demand caused by mainline carriers cutting unprofitable routes.<sup>89</sup> The focus has gone from increasing an airline's market share to increasing profit. The regional carriers were the only segment to report a net loss in 2010 of \$0.6 billion. Aviation manufacturers are suffering due to the downturn in the economy and the airlines' strategy of delaying new aircraft delivery and retiring older aircraft rather than paying for the parts and labor to repair them.<sup>90</sup>

83 James C. May, "Focus Needed on Competitiveness," *Aviation Daily*, July 13, 2010, [http://www.aviationweek.com/aw/generic/story\\_channel.jsp?channel=comm&id=news/avd/2010/07/13/11.xml&headline=May:%20Focus%20Needed%20On%20Competitiveness](http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=comm&id=news/avd/2010/07/13/11.xml&headline=May:%20Focus%20Needed%20On%20Competitiveness) [accessed December 7, 2011]

84 Ibid.

85 Federal Aviation Administration, *FAA Aerospace Forecast: Fiscal Years 2011-2031* (PDF file), p. 5, n.d., available at [http://www.faa.gov/about/office\\_org/headquarters\\_offices/apl/aviation\\_forecasts/aerospace\\_forecasts/2011-2031/media/2011%20Forecast%20Doc.pdf](http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2011-2031/media/2011%20Forecast%20Doc.pdf) [accessed December 7, 2011]

86 Ibid.

87 Ibid., p.6

88 Ibid., p. 5-6.

89 Ibid., p. 23

90 Ibid., p. 7



The latest effort to improve efficiency comes in the use of biofuels in a number of Continental and Alaska Airline flights. In early November 2011, Continental Airlines and Alaska Airlines became the first major airlines to fuel a flight using biofuels; algae in the case of Continental, and used cooking oil in Alaska Airlines.<sup>91</sup> The move to introduce biofuel capabilities within the U.S. airline industry comes in response to the industry's effort to increase operational efficiency while reducing emissions. However, current biofuels only reduce emissions by 10% over conventional jet fuel, and the infrastructure to support the bulk of the airlines' fueling needs is at least 15 years away.<sup>92</sup> Additionally, biofuels are currently six times the price of conventional fuels.

Representative of a greater trend in the industry, the capacity of regional carriers has grown 150% since 2000. Over the same period mainline carrier capacity has fallen 15.5%. This increase can be attributed to the switch from turboprop planes to regional jets, permitting regional carriers to fly longer routes. In addition, mainline carriers have been cutting low-demand routes, freeing up demand from travelers to regional carriers.<sup>93</sup> The move toward larger regional aircraft is a factor for airports to monitor when considering which infrastructure improvements might need to be made to continue to serve, or become a player in, the market. Larger regional jets that can hold around 90 passengers are replacing older turboprop and 50-seat aircraft; this speaks to the more expansive consolidation trend affecting the scheduled air services market.

91 Bellamy Pailthorp, "Biofuels Start to Take Off in the Airline Industry," NPR.com. November 9, 2011. Accessed 12/5/2011. <<http://www.npr.org/2011/11/09/142129847/biofuels-start-to-take-off-in-the-airline-industry>>

92 Ibid.

93 FAA Aerospace Forecast, Fiscal Years 2011-2031, p. 15

2010 saw a lot of action in consolidation and restructuring with operations at Northwest Airlines folding into Delta Airlines, and operations at Midwest Airlines folding into Frontier Airlines. Among regional carriers, "Delta Airlines sold its subsidiaries, Compass and Mesaba, to Trans States and Pinnacle, respectively, and Arctic Circle Air merged with ERA Aviation."<sup>94</sup> The merger of Continental Airlines with United Airlines, and Southwest Airlines with Air Tran, as well as the acquisition of ExpressJet by SkyWest Airlines were also announced in 2010.

Virginia is not immune to such airline consolidation and the overall effect that it has on business and personal travel out of the state. Lynchburg Regional Airport (LYH) provides an example of a case in which airline consolidation is adversely affecting business travel. Lynchburg supports a growing high-technology cluster, including a number of established nuclear engineering and wireless communication firms. Crucial to these businesses' operation in the "new economy" is having scheduled air access to international airports. Lynchburg currently offers scheduled regional flight services through U.S. Airways Express to Charlotte International Airport in North Carolina. Charlotte, however, does not offer the degree of international ingress and egress to adequately support the Lynchburg-based businesses. Additionally, Lynchburg Regional has been experiencing the effects of regional carrier consolidation since January 2011, when Delta discontinued regional services from Lynchburg to Atlanta. The Virginia Department of Transportation recently awarded LYH a \$700,000 federal grant via the small community air service development program to entice AirTran to commence regional commercial service to and from the airport.<sup>95</sup> While this will assist in expanding LYH's operating

94 Ibid.

95 Tabitha, Cassidy, "Lynchburg airport receives grant money to lure new airline," November 1, 2011. Available at <<http://www.libertychampion.com>>



area, the grant can only be extended to AirTran airlines and its regional service network. As a result, airport management is in negotiations with United Airlines in the attempt to extend service from Lynchburg to Dallas, an international airport that, like Atlanta, can adequately accommodate high-technology business needs for international access.<sup>96 97</sup>

Industry consolidation will continue to manifest itself in reduced service levels offered from other airports beyond Lynchburg. Southwest Airlines announced, after their acquisition of AirTran, that Newport News/Williamsburg Airport (PHF) would not remain a part of their newly consolidated network. In addition to LYH and PHF, Shenandoah Valley Regional Airport (SHD) is also struggling to withstand the market pressures of airline consolidation. The net result is that smaller markets are more vulnerable to these changes in the airline business model.

### Aviation Manufacturing

U.S. firms manufacture a wide range of products for civil and defense purposes and, in 2010, the value of civil aircraft and aircraft parts accounted for over half of the estimated \$171 billion in U.S. aerospace shipments.<sup>98</sup> In 2010, \$67 billion in civil aircraft, engines, equipment, and parts were exported. Aerospace employment totaled 477,000 workers. Of these, 228,400 were engaged in the manufacturing of aircraft, 76,400 in engines and engine parts, and 97,600 in other parts and equipment.<sup>99</sup>

[com/2011/11/01/lynchburg-airport-receives-grant-money-to-lure-new-airline/](http://www.speednews.com/2011/11/01/lynchburg-airport-receives-grant-money-to-lure-new-airline/) > [Accessed December 20, 2011].

96 Ibid.

97 David Bryan, Executive Director of Region 2000 Economic Development Council. Telephone Interview by Hunter Snellings. 29 September, 2011.

98 Glennon J. Harrison, *Challenge to the Boeing-Airbus Duopoly in Civil Aircraft: Issues for Competitiveness* (PDF file), para. 1 under "Summary," July 25, 2011.

Bethesda, MD: Congressional Research Service. Available at <[http://www.speednews.com/speednews\\_files/data/2001.pdf](http://www.speednews.com/speednews_files/data/2001.pdf)> [accessed December 2011]

99 Ibid., para. 4.

Boeing, the only U.S. manufacturer of large civil aircraft, and its main competitor, Airbus, are expected to see increased competition with numerous foreign firms entering the small commercial jet aircraft manufacturing market. This segment currently accounts for nearly half of all U.S. commercial aircraft revenues and 60% of commercial aircraft deliveries. The competition is coming from "government-owned and subsidized firms in Russia and China, as well as companies in Canada, Brazil, and Japan."<sup>100</sup> There are several important competitive factors such as, "the openness of markets to foreign commercial aircraft and aircraft engines and parts; whether state-owned aircraft manufacturers continue to receive substantial government subsidies; whether the challengers to Boeing and Airbus achieve their goal of building innovative, efficient aircraft that establish excellent safety and service records; whether airlines will buy aircraft from companies that have no track record; and the effect of collaborative partnerships with other aircraft manufacturers and suppliers as a strategy for success."<sup>101</sup>

Growing markets in Asia and Latin America and the expected retirement of older aircraft drives demand in the narrow-body aircraft market.<sup>102</sup> Breaking into the market can be difficult for new aircraft manufacturers because of the high financial barriers to entry. Companies will often succeed or fail based on the results of their first attempt.<sup>103</sup> Additionally, airlines are often set up to use certain models of planes to decrease risks that come along with fleet complexity, so they might not want to begin purchasing a different model if they can maintain continuity at a comparable cost. The newer firms also lack the history and reputation of success that Boeing and Airbus have developed, making it less likely

100 Ibid.

101 Ibid., p.4.

102 Ibid.

103 Ibid.

that an airline would risk their own reputation on an unproven manufacturer's first attempt. Boeing and Airbus may also be able to produce more efficient models during the time it takes their challengers to get up and running.<sup>104</sup>

In late 2007, Rolls-Royce and the Commonwealth of Virginia announced the creation of Rolls-Royce Crosspointe, a 1,000-acre campus in Prince George County that will support the UK-based company's future growth in aerospace. Rolls-Royce developed this campus to increase manufacturing and supply chain capacity in order to fulfill an \$80 billion order book. Crosspointe provides Rolls-Royce a state-of-the-art manufacturing facility and a supply chain technology park that fosters a competitive R&D landscape and leverages Virginia's skilled aerospace workforce. The first Rolls-Royce facility at Crosspointe, which opened in 2010, produces advanced engineered rotative disk and turbofan components for the Trent series jet engines. This first investment approached \$180 million and employs a team of 140 professionals. The second Rolls-Royce facility to be constructed at Crosspointe is under final review and is scheduled to be announced in the near future. Rolls-Royce executive management teams in Reston and the United Kingdom are actively targeting Virginia to locate future supply chain manufacturing facilities.<sup>105</sup>

In regard to R&D, Crosspointe is home to the new Commonwealth Center for Advanced Manufacturing (CCAM). As discussed earlier, CCAM provides an arena where global industrial companies join together as members and share in the benefits of innovation and intellectual property. This game-changing R&D facility is based on a British model of collaborative industrial R&D launched by Rolls-Royce a decade ago that has grown into a global network of applied R&D centers. CCAM's membership continues to grow and currently includes the University of Virginia, Virginia State University, Virginia Tech, and eight industrial corporations that include Canon, Chromalloy, Huntington Ingalls Industries, Sandvik, Siemens, Rolls-Royce, and others.<sup>106</sup>

A second R&D operation that launched in May 2009 is the Commonwealth Center for Aerospace Propulsion Systems (CCAPS). CCAPS was created by the Commonwealth of Virginia, Rolls-Royce, UVA and Virginia Tech as a closed center to benefit the innovation strategy of Rolls-Royce. CCAPS functions at the basic research level of discovery as a virtual center that leverages the laboratories and faculty of UVA and Virginia Tech engineering schools with the scientists and engineers of Rolls-Royce.<sup>107</sup>

104 Ibid.

105 Information provided by Rolls-Royce Project Team at Virginia Economic Development Partnership.

106 Ibid.

107 Ibid.

## 8.2 NATIONAL LEGISLATIVE TRENDS

The August 2011 FAA shutdown cost 4,000 workers almost two weeks of pay and depleted the U.S. Treasury by almost \$300 million. While the compromise did put workers back to work, it did not settle the differences that caused the shutdown in the first place, which was the result of members of Congress refusing to accept a House bill that included a \$16.5 million cut in subsidies to 13 rural communities.<sup>108</sup> In addition, there was a "standoff between the GOP-controlled House and the Democratic-controlled Senate over a provision in long-term funding legislation for the FAA that would make it more difficult for airline and railroad workers to unionize."<sup>109</sup> The FAA has been operating on short-term extensions since long-term funding expired in 2007, an issue associated with ambiguities in the long-term funding bill. Another issue was about \$200 million in air service subsidies to rural communities that were created during deregulation in 1978 to ensure continued air service on less profitable routes to isolated communities. The House wanted to eliminate the program except in Alaska, while the Senate would eliminate service to 13 communities that are "either less than 90 miles from a hub airport or where subsidies total more than \$1,000 per passenger."<sup>110</sup> This language was added to the Senate extension bill.<sup>111</sup>

The Senate passed a second extension to avoid another shutdown on September 15, 2011 that extended the FAA's financing for four months.<sup>112</sup> The House reauthorization bill also contains language to allow more long-distance flights to Reagan National. Some legislators in Virginia and Maryland oppose this language out of protection for other airports' business, and to protect constituents from increased jet noise.<sup>113</sup>

## 8.3 NEXT GENERATION AIR TRANSPORTATION SYSTEM (NEXTGEN) TECHNOLOGIES

NextGen is the term used by the FAA to designate the shift from ground based navigation and communications services to those based upon satellite and GPS technologies. NextGen is designed to allow air traffic control to use more direct routing on segments, and will result in more dependable travel while also saving fuel and reducing noise and carbon

108 Ashley Halsey III, "Congress reaches deal on FAA shutdown," *The Washington Post*, August 4, 2011, [http://www.washingtonpost.com/local/congress-reaches-deal-on-faa-shutdown/2011/08/04/gIQAstQkul\\_story.html?nav=emailpage](http://www.washingtonpost.com/local/congress-reaches-deal-on-faa-shutdown/2011/08/04/gIQAstQkul_story.html?nav=emailpage) [accessed December 7, 2011].

109 Ashley Halsey III, "Impasses lead to shutdown of FAA," *The Washington Post*, July 22, 2011, <http://www.westhawaii.com/sections/news/nation-and-world-news/impasses-lead-shutdown-faa.html> [accessed December 2011].

110 Ibid.

111 Ibid.

112 "New F.A.A. Shutdown is Averted," via Bloomberg LP, September 16, 2011, [http://www.nytimes.com/2011/09/16/business/senate-passes-bill-to-avert-faa-shutdown.html?\\_r=1](http://www.nytimes.com/2011/09/16/business/senate-passes-bill-to-avert-faa-shutdown.html?_r=1).

113 Dylan Matthews, "Everything you need to know about the FAA shutdown in one post," *Ezra Klein's WONK BLOG* (blog), *The Washington Post*, August 3, 2011, [http://www.washingtonpost.com/blogs/ezra-klein/post/everything-you-need-to-know-about-the-faa-shutdown-in-one-post/2011/07/11/gIQAfatTsl\\_blog.html](http://www.washingtonpost.com/blogs/ezra-klein/post/everything-you-need-to-know-about-the-faa-shutdown-in-one-post/2011/07/11/gIQAfatTsl_blog.html) [accessed December 8, 2011].

pollution. Among other benefits, NextGen will help reduce wait times by getting real-time data in the hands of the aircraft crew. NextGen's benefits rely upon aircraft operators and other stakeholders investing the resources needed to exploit the infrastructure put in place by the FAA. However, stakeholders have shown reluctance to invest in these resources, especially given the state of the economy, the fact that the industry is just recovering from a decade of losses, and the concern that the value of equipment may not offset the significant cost to equip resulting in short term losses. Simulation and other models do indicate that a well-equipped fleet with the programmed NextGen infrastructure will positively affect corporate finances over the long term.

In early 2011, DOAV published a document entitled, *Virginia's Flight to 2025: An Aviation Vision for the Commonwealth (Vision 2025)*. The document captures a strategic plan for the future, especially as it relates to NextGen development in Virginia. Vision 2025 is the first of its kind in the United States as it outlines three pillars of the Virginia plan, being (1) early implementation of NextGen ready technologies, (2) test bed activities for maturing technologies, and (3) aviation research for emerging technologies. The report is intended to leverage the deployment of NextGen in the Commonwealth sooner than later. The goal for early implementation of NextGen technologies is to give Virginia an advantage in a critical aspect of an extremely competitive economic development landscape.<sup>114</sup>

Virginia's participation in NextGen is the logical sequence of the state's involvement in advancing evolving technologies for use in the NAS. The Commonwealth has been a partner with NASA, FAA, universities and corporate entities since 1999, when it decided to allocate staff and resources to the Small Aircraft Transportation System (SATS) program. SATS was a national effort primarily funded by NASA to boost the utility of small aircraft and GA airports through accelerating the testing and deployment of technologies, which increases safety and efficiency at these airports.<sup>115</sup>

Furthermore, Virginia has assumed a national leadership role as a result of SATS. Through the Virginia SATSLab, Inc. (VSATS), a non-profit public-private research corporation, Virginia led the national organization that managed this research program, and ultimately hosted the national demonstration of SATS in Danville in June 2005.<sup>116</sup>

The evolution of SATS concepts has taken root in NextGen, and thus the state through VSATS. VSATS has again assumed an aggressive posture in seeking to demonstrate NextGen capabilities in the Commonwealth. Virginia sees opportunities for attracting businesses, both in aviation as well as

from those businesses that use aviation services, through its early deployment of NextGen technologies.<sup>117</sup>

Examples of this most recent pursuit of NextGen participation is the consideration given by the FAA to place an Early Implementation Project (EIP) in the state, deployment of ADS-B ground transmitters in Virginia at the outset of that national deployment schedule, and the potential use of Leesburg Municipal Airport in a demonstration of how to increase the acceptance rate of instrument flight plan (IFR) aircraft to non-towered GA airports.<sup>118</sup>

In 2010, the FAA approved the national deployment of the Automatic Dependent Surveillance Broadcast (ADS-B). The ADS-B system will update data for air traffic controllers with more frequency and accuracy allowing controllers to use the airspace more efficiently and will provide coverage to areas that are not currently covered by radar. The system also gives pilots access to weather and flight information services. The increased accuracy provides for reduced separation between airplanes and greater predictability in arrival and departure times. The ground infrastructure for the ADS-B is expected to be completed in 2013. This still requires NAS users to upgrade equipment, and the current deadline to allow for upgrades during regular maintenance schedules is January 1, 2020. The role of ADS-B is still being determined in adding UAS to the NAS, and to improving capacity on closely spaced runways.<sup>119</sup>

Another aspect of NextGen is using Performance Based Navigation (PBN) routes and procedures to better fit the capabilities of today's aircraft. For example, landing procedures typically call for stepping down at different levels with a change in power settings at each level, while aircraft that are properly equipped can use Optimized Profile Descent (OPD), which decreases the number of levels, allowing for fuel savings, reduced emissions, and lower noise levels. The FAA noted, "Especially beneficial for smaller airports, where general aviation aircraft often operate, are the area navigation (RNAV) Wide Area Augmentation System (WAAS) Localizer Performance with Vertical Guidance (LPV) approach procedures."<sup>120</sup> LPVs allow aircraft to land in lower visibility conditions, providing more reliable access to smaller airports throughout the year. The WAAS LPVs primarily benefit the smaller airports by providing satellite-based approaches where no ground-based landing system exists.<sup>121</sup>

117 Ibid.

118 Ibid.

119 Ibid.

120 FAA. "Next Gen." <http://www.faa.gov/nextgen/> [accessed December 8, 2011].

121 Virginia Department of Aviation, "Communications and Education Division."

114 Virginia Department of Aviation, *Virginia's Flight to 2025: An Aviation Vision for the Commonwealth* (PDF file), 2011, available online at <http://www.doav.virginia.gov/Downloads/Studies/Vision%202025/Vision%202025.pdf> (accessed 30 January 2012).

115 Ibid.

116 Ibid.

Due to cost concerns and because air traffic is not growing fast enough to justify the need for a system that better organize airplanes, many airlines are choosing not to implement the NextGen technology until they are required to do so by the FAA. Also, “while NextGen means the FAA’s costs will go down, the cost to the airlines of the transition will be on the order of \$25 billion.”<sup>122</sup> The FAA is considering giving carriers who install the ADS-B equipment before the 2020 deadline privileged access to airports, and they are performing research to show that, with rising fuel costs, the improvements could pay for themselves. One example is Southwest Airlines, who is already saving \$16 million in fuel as a result of implementation.<sup>123</sup>

As pursued by DOAV, as well as the Virginia SATSLab Inc. (VSATS), the Commonwealth is structuring its own approach to NextGen by engagement with the FAA on potential Early Implementation Projects (EIP). Virginia seeks to secure test-bed or demonstration projects that flush out the full value of emerging aviation technologies. For example, The FAA is considering DOAV’s proposal to seek answers for non-towered IFR approach bottlenecks at Leesburg Municipal Airport. The Commonwealth hopes to supplement these activities with the establishment of an Aviation Research Consortium. The objective is to organize the numerous aviation research entities in Virginia through a well-qualified and backed entity that will reach a higher threshold of success when research solicitations are announced.<sup>124</sup>

## 8.4 INTERNATIONAL TRENDS

International carriers also made a profit in 2010 with an increase in revenues per passenger kilometer (RPKs) of 8%. The Association of European Airlines (AEA) reports RPKs up 2.8% through November (despite a downturn in April due to ash clouds produced by volcanic eruption), and the Association of Asia Pacific Airlines (AAPA) reports a RPK increase of 9.8% over the same period.<sup>125</sup>

There are some established international firms entering the small, narrow-bodied aircraft market including Bombardier (Canada), Embraer (Brazil), and Mitsubishi Heavy Industries (MHI) (Japan). Russia’s United Aircraft Corporation (UAC) and the Commercial Aircraft Corporation of China (COMAC) are a reorganization of existing state-owned aero-

space manufacturing resources and they both will produce regional jets and narrow-body aircraft in cooperative partnerships with western suppliers. Bombardier and COMAC have formed a partnership, with Bombardier manufacturing narrow-body airplanes that will seat 100-149 passengers and COMAC focusing on those that will seat 156-190 passengers.<sup>126</sup> This partnership may pose the largest threat to Boeing and Airbus given the increasing demand from the Chinese market.<sup>127</sup>

Russia’s government reorganized its aviation manufacturing industry in 2006. Viewed as having poor after-sales support and poor maintenance records, Russia is not expected to have high future demand. China, however, is expected to have a high demand for narrow-bodied airplanes as their transportation industry and economy grow. COMAC and the UAC have formed partnerships with foreign firms to help bolster their reputation, and they have the advantage of not being completely vulnerable to market forces since they have state support. State-owned aviation industries and markets can also lead to a situation in which the government applies pressure to ensure the purchase of domestically produced aircraft even if they are inferior. With China’s market being one that is emerging for small-bodied aircraft, such an approach could have an effect on U.S. manufacturing.<sup>128</sup>



126 Glennon J. Harrison, *Challenge to the Boeing-Airbus Duopoly in Civil Aircraft: Issues for Competitiveness* (PDF file), para. 1 under “Summary,” July 25, 2011. Bethesda, MD: Congressional Research Service. Available at <[http://www.speednews.com/speednews\\_files/data/2001.pdf](http://www.speednews.com/speednews_files/data/2001.pdf)> [accessed December 2011]

127 Ibid.

128 Ibid., p.10-12.

# 9. STRATEGIES FOR MOVING FORWARD

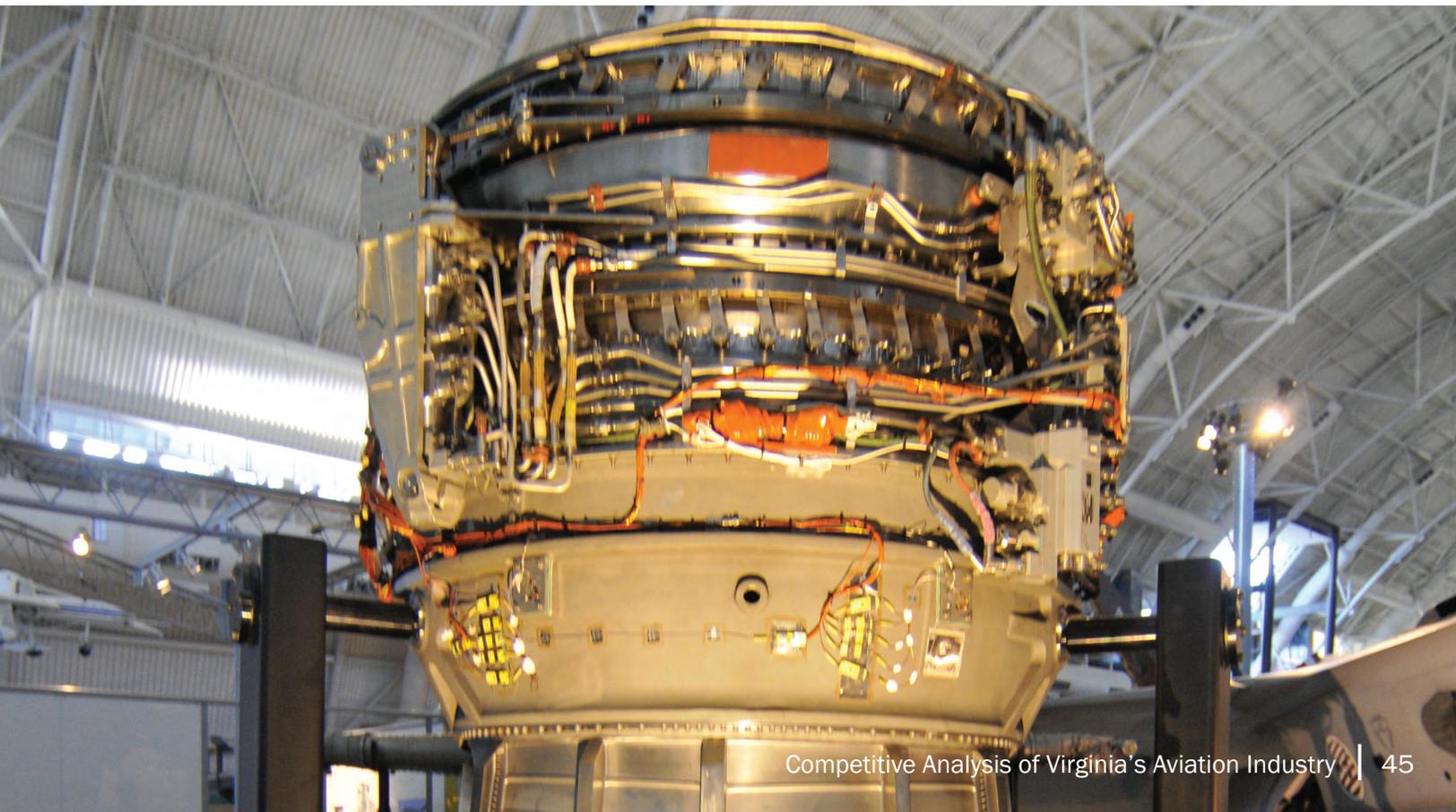
## **1. Aviation Program Funding - Ensure adequate aviation program funding to provide for robust statewide aviation infrastructure, supporting business development and expansion.**

The analysis contained within the Services and Amenities section of this report shows that Virginia holds a competitive advantage in the percentage of airports equipped with safety enhancing infrastructure, such as automated weather reporting and instrument approach procedures. The Commonwealth is also among the elite in security program funding and procedures at its 57 general aviation airports. Such assets to the Virginia Air Transportation System must now be complemented with further infrastructure enhancement programs aimed at boosting the Commonwealth's economic development potential in attracting Part 135 air charter/air taxi business. Strategic investments and policy advancements in the following categories will provide the means for such advancement:

**A. Runways** – Virginia in partnership with the FAA, should explore the potential for further development of the runway infrastructure at appropriate airports without 5,000 foot runways. Surpassing the 5,000 foot runway threshold opens the airport to enhanced Part 135 business aviation, providing better access and services while boosting a community's economic potential. Virginia should conduct a runway review/study in cooperation with the FAA

to determine which airports may qualify for FAA and state funding to lengthen the runways to encourage more business utilization.

- B. Hangars** – Virginia should work with airport sponsors and localities to increase awareness of the opportunities and funding available to construct hangars at the remaining six airports without such facilities.
- C. Fuel** – DOAV should work with airport sponsors to promote and equip airports with 24-hour Avgas fueling stations or call out capability, while also increasing the availability of jet fuel at those airports with the capabilities to support jet operations.
- D. Terminals** – In order for Virginia to elevate air charter/air taxi service, it must implement the necessary infrastructure improvements to attract business and travelers to more of the Commonwealth's public-use airports. Virginia terminals must be constructed to support aspects of business operation and present a good first impression of Virginia's communities. Virginia should conduct a terminal review and create a plan to identify and prioritize airports for terminal construction and rehabilitation. Priority should go to those airports that don't have a terminal, and then remaining terminal rehabilitations based on need.



## **2. Aviation Technology - Establish Virginia as a leader in NextGen and new aviation technologies.**

*Virginia's Flight to 2025: An Aviation Vision for the Commonwealth (Vision 2025)* provides a path forward for the Commonwealth to be a leader in NextGen. It identifies the technologies that provide the most promise for new businesses and economic opportunity for the Commonwealth.

### **A. NextGen**

**I. Early implementation of ready technologies –** DOAV should continue to pursue being an early adopter of technologies that improve the airport throughput and access to provide more opportunities for business and more economic development for the communities.

**II. Test bed for maturing technologies –** DOAV should continue to work with the FAA to hold demonstrations and testing of NextGen programs in the Commonwealth.

### **III. Research consortium for emerging technologies**

DOAV should work with the aerospace community, universities, and industry to establish a Virginia Aviation and Space Research Consortium to promote Virginia in the research of emerging technologies. Virginia's institutions of higher learning are some of the Commonwealth's strongest aviation and space industry assets. Virginia's universities are world renowned for the quality and competitiveness of their engineering programs. Consequently, Virginia has the highest number of engineers as a percentage of its workforce than any other state in the nation.<sup>129</sup> As a result of its excellent aviation and space research track record, as well as strong leadership in the federal government, Virginia has the potential to become a leader in the next generation of aviation research. According to a September 2011 article, NASA is looking to Hampton Roads, Virginia as a hub for green aviation research and development.<sup>130</sup> Virginia must capitalize on this opportunity, and future research opportunities, by developing an aviation and space research consortium to promote these initiatives.

129 Robert D. Atkinson and Scott Andes, *The 2010 State New Economy Index: Benchmarking Economic Transformation in the States* (PDF file), p. 8, The Information Technology and Innovation Foundation, available at <http://www.itif.org/files/2010-state-new-economy-index.pdf>

130 Cory Nealon, "NASA chief: Hampton Roads could be leader in green aviation," *Dailypress.com*, September 22, 2011, [http://articles.dailypress.com/2011-09-22/news/dp-nws-nasa-rocket-20110922\\_1\\_green-aviation-nasa-langley-research-center-aviation-conference](http://articles.dailypress.com/2011-09-22/news/dp-nws-nasa-rocket-20110922_1_green-aviation-nasa-langley-research-center-aviation-conference) [accessed December 2011].

**B. Unmanned Aerial Systems (UAS) -** Virginia should work to incorporate UAS development, manufacturing, testing and support into its aerospace portfolio. UAS is a growing component of military aviation and NextGen research, and Virginia should support this research as part of its strategy to become a leader in emerging technology testing and implementation

## **3. Promotion - Promote the benefits and competitive standing of Virginia's Air Transportation System in its support for airports, businesses, and tourism. Virginia airports are economic engines, technology magnets, & tourism gateways for the Commonwealth.**

**A. Business Charter and Air Taxi Services -** Use this report, and the dashboard tables and figures provided within, to promote Virginia's excellent general aviation infrastructure. Highlight DOAV's user-based funding programs and technical services to Part 135 operators and Fixed Base Operators alike. Finally, work with the Virginia Economic Development Partnership to actively approach Part 135 companies encouraging their relocation and expansion in Virginia.

**B. High-Technology Business -** Virginia's prominence in business charter and air taxi services should be promoted to provide enhanced economic opportunity in more communities serviced by a public-use airport. Virginia is host to 35 business charter and air taxi companies offering services to many of the Commonwealth's general aviation airports. DOAV should continue to embark on an enhanced business aviation campaign to raise awareness of the capabilities of air charter and air taxi to provide businesses and residents increased mobility and efficiency in traversing the state. The message should center on the airports' capacity as technology magnets and economic engines that drive economic development in the surrounding regions.

**C. Tourism -** Promotional efforts should also address the role that Virginia's Air Transportation System plays in the proliferation of the Commonwealth's tourism industry, a major component of Virginia's economic vitality.



**D. Land Use Protection** – Virginia should ensure that adequate land use regulations are in place to protect airport operations and infrastructure investments from the threat of encroachment by incompatible uses.

**4. Continuing Analysis - Conduct further research and analysis in the effort to better position Virginia's Air Transportation System as a preferred transportation choice among Virginia businesses and citizens.**

Many of the topics acknowledged in this report should be further investigated to provide the adequate direction in guiding future policy. As discussed in the first recommendation, it is imperative that Virginia fully realize the air transportation system's opportunities for infrastructure development. Further analysis is recommended for:

- A. Education** – Promote the implementation of the recommendations outlined in *Virginia Aviation and Space Workforce Analysis and Strategy Development*.
- B. Access** – DOAV should continue to explore airport access issues through the multimodal planning effort. Work should begin to relieve existing access problems and to prevent future issues. A thorough transportation analysis with the goal to remediate ground access issues at the Commonwealth's commercial service airports is necessary in ensuring that these airports continue to offer businesses and residents convenient and timely access to domestic and international locations.
- C. Cargo** – Virginia should explore ways in which the state can better accommodate domestic and international cargo shipments within its major commercial hubs.



# APPENDIX 1: AIRPORT SERVICES AND AMENITIES MATRIX DATA

Appendix: Airport Services and Amenities Matrix Data						
Contiguous States	VIRGINIA	MARYLAND	WEST VIRGINIA	TENNESSEE	KENTUCKY	NORTH CAROLINA
Airport Service Amenities:						
Public-Use Airports	66	35	35	78	60	108
Commercial Service Airports	9	3	7	5	4	10
Airports w/ Runways >/= 5000'	29	10	10	47	33	53
Airports w/ IAPs	62	26	26	65	43	75
Airports w/ Precision IAPs	18	5	10	13	9	32
Weather Reporting Airports	45	16	18	50	40	60
Airports w/ GA Terminal Bldgs	60	25	22	69	51	84
Airports w/ Paved Parking Area	64	19	25	74	55	81
Airports w/ Hangars	60	31	31	75	51	97
Airports w/ 100 LL	57	28	26	71	50	85
Airports w/ Jet A	44	18	17	56	39	70
Weight Bearing Capacity (k-lbs):						
<u>Single</u>						
12.5 - 29	27	5	8	41	18	31
30 - 59	13	4	3	25	22	30
60 - 100	8	5	5	4	6	10
>/= 100	7	2	3	5	1	7
<u>Dual</u>						
30 - 59	5	1	3	26	5	18
60 - 99	8	2	1	8	6	15
100 - 199	7	2	9	6	5	10
>/= 200	6	1	0	3	2	4
<u>Dual-Tandem</u>						
50 - 99	4	0	1	4	2	2
100 - 199	2	2	3	3	4	3
200 - 299	1	1	4	4	2	5
>/= 300	7	2	1	3	2	6
Data Source:						

The sources for the data contained in this table are: FAA publications, FAA web sites, state aviation web sites, state aviation system plans, state aviation directories, flight publications and aviation web sites.

Comparable States	Virginia	Arizona	Colorado	Louisiana	Missouri	Washington
<b>Airport Service Amenities:</b>						
Public-Use Airports	66	78	76	68	127	124
Commercial Service Airports	9	11	14	7	7	12
Airports w/ Runways $\geq 5000'$	29	52	50	32	35	26
Airports w/ IAPs	62	39	42	46	78	37
Airports w/ Precision IAPs	18	10	15	14	14	17
Weather Reporting Airports	45	31	47	24	36	31
Airports w/ GA Terminal Bldgs	60	56	56	49	79	66
Airports w/ Paved Parking Area	64	66	63	63	110	71
Airports w/ Hangars	60	56	68	64	99	98
Airports w/ 100 LL	57	53	62	54	88	63
Airports w/ Jet A	44	43	47	36	52	34
<b>Airports w/ Weight Bearing Capacity (k-lbs):</b>						
<u>Single</u>						
12.5 - 29	27	21	24	17	34	20
30 - 59	13	21	21	11	30	20
60 - 100	8	15	9	11	9	8
$\geq 100$	7	3	2	2	2	8
<u>Dual</u>						
30 - 59	5	4	9	8	15	6
60 - 99	8	13	14	7	7	10
100 - 199	7	9	9	10	9	10
$\geq 200$	6	7	1	1	4	6
<u>Dual-Tandem</u>						
50 - 99	4	1	3	2	3	6
100 - 199	2	12	8	7	6	9
200 - 299	1	6	8	6	5	6
$\geq 300$	7	7	2	4	6	9
<b>Data Source:</b>						

The sources for the data contained in this table are: FAA publications, FAA web sites, state aviation web sites, state aviation system plans, state aviation directories, flight publications and aviation web sites.

## APPENDIX 2: AIRCRAFT PERSONAL PROPERTY TAX RATES—LOCALITIES WITH PUBLIC-USE AIRPORTS IN VIRGINIA

Airport	Local Tax Jurisdiction	2010 Rate/\$100	Example on \$100,000
Accomack County	Accomack County	3.58-3.75	3,580.00 - 3,750.00
Blackstone Municipal	Nottoway County	1.00	1,000.00
Blue Ridge	Henry County	1.19	1,190.00
Bridgewater Air Park	Rockingham County	2.80	2,800.00
Brookneal-Campbell Co.	Campbell County	3.85	3,850.00
Charlottesville-Albemarle	Albemarle County	4.28	4,280.00
Chase City Municipal	Mecklenburg County	3.26	3,260.00
Chesapeake Regional	Chesapeake City	0.58	580.00
Chesterfield County	Chesterfield County	0.50	500.00
Crewe Municipal	Nottoway County	1.00	1,000.00
Culpeper County	Culpeper County	0.63	630.00
Danville Regional	Danville City	0.30	300.00
Dinwiddie County	Dinwiddie County	0.50	500.00
Eagle's Nest	Augusta County	1.90	1,900.00
Emporia-Greenville Regional	Greenville County	0.50	500.00
Falwell	Lynchburg City	3.80	3,800.00
Farmville Municipal	Cumberland County	0.50	500.00
Franklin Municipal	Isle of Wight County	1.00	1,000.00
Front Royal-Warren	Warren County	0.50	500.00
Gordonsville Municipal	Orange County	0.55	550.00
Grundy Municipal	Buchanan County	1.95	1,950.00
Hampton Roads	Chesapeake City	0.58	580.00
Hanover Municipal	Hanover County	0.50	500.00
Hummel Field	Middlesex County	3.50	3,500.00
Ingalls Field	Bath County	0.35	350.00
Lake Anna	Louisa County	0.48	480.00
Lake County Regional	Mecklenburg County	3.26	3,260.00
Lawrenceville/Brunswick	Brunswick County	3.40	3,400.00
Lee County Airport	Lee County	1.41	1,410.00
Leesburg Executive	Loudoun County	0.01	10.00
Lonesome Pine	Wise County	1.49	1,490.00
Louisa County	Louisa County	0.48	480.00
Lunenburg County	Lunenburg County	2.10	2,100.00
Luray Caverns	Page County	0.50	500.00
Lynchburg Regional	Campbell County	3.85	3,850.00
Manassas Regional	Manassas City	0.0001	0.10
Mecklenburg-Brunswick Regional	Mecklenburg County	3.26	3,260.00

Middle Peninsula Regional	King and Queen County	3.94	3,940.00
Mountain Empire	Smyth County	1.40	1,400.00
New Kent County	New Kent County	0.75	750.00
New London	Bedford County	2.35	2,350.00
New Market	Shenandoah County	3.15	3,150.00
New River Valley	Pulaski County	2.00	2,000.00
Newport News/Williamsburg Int'l	Newport News City	2.10	2,100.00
Norfolk International	Norfolk City	2.40	2,400.00
Orange County	Orange County	0.55	550.00
Richmond International	Henrico County	1.60	1,600.00
Roanoke Regional	Roanoke City	1.06	1,060.00
Shannon	Spotsylvania County	6.26	6,260.00
Shenandoah Valley Regional	Augusta County	1.90	1,900.00
Smith Mountain Lake	Bedford County	2.35	2,350.00
Stafford Regional	Stafford County	0.0001	0.10
Suffolk Executive	Suffolk City	0.58	580.00
Tangier Island	Accomack County	3.58-3.75	3,580.00 - 3,750.00
Tappahannock-Essex County	Essex County	3.50	3,500.00
Tazewell County	Tazewell County	0.50	500.00
Twin County Regional	Carroll County	1.60	1,600.00
Virginia Highlands	Washington County	1.55	1,550.00
Virginia Tech-Montgomery	Montgomery County	1.23	1,230.00
Wakefield Municipal	Sussex County	4.85	4,850.00
Warrenton-Fauquier	Fauquier County	0.001	1.00
Washington Dulles	Loudoun County	0.01	10.00
Washington National*	Arlington County	-	-
William M. Tuck	Halifax County	3.60	3,600.00
Williamsburg-Jamestown	James City County	4.00	4,000.00
Winchester Regional	Frederick County	0.42	420.00
*Property located on Washington National International Airport grounds is tax exempt, as Washington National is considered federal property			
**These rates may vary as localities may change rates as needed. Please verify before using this information for detailed analysis			
***Note: Information taken from <i>Virginia Local Tax Rate, 2010</i> by Weldon Cooper			
***Adjustment made to Stafford County with updated information			

# APPENDIX 3: STATE AVIATION FUNDING

Rank	State	State Aviation Funding	Year
1	Maryland	\$193,848,376	2010
2	Florida	\$162,489,753	2008
3	Wisconsin	\$139,427,000	2010
4	Tennessee	\$56,801,376	2008
5	Colorado	\$51,787,521	2008
6	Rhode Island	\$51,655,142	2010
7	Michigan	\$45,678,670	2008
8	Pennsylvania	\$38,560,939	2008
9	Virginia	\$30,833,012	2008
10	Minnesota	\$29,069,836	2008
11	Arizona	\$25,951,559	2008
12	Wyoming	\$25,200,000	2008
13	North Carolina	\$21,860,122	2008
14	New York	\$19,000,000	2008
15	Illinois	\$18,919,146	2008
16	Georgia	\$17,292,079	2008
17	Texas	\$16,090,490	2008
18	West Virginia	\$12,246,000	2010
19	Arkansas	\$11,967,286	2008
20	Missouri	\$10,250,000	2008
21	Massachusetts	\$9,600,000	2008
22	Louisiana	\$8,307,183	2008
23	New Jersey	\$8,200,000	2008
24	California	\$7,437,427	2008
25	Mississippi	\$5,925,484	2008
26	Kentucky	\$5,788,500	2010
27	South Carolina	\$5,757,726	2008
28	Oklahoma	\$5,164,746	2008
29	North Dakota	\$5,053,000	2008
30	Iowa	\$4,808,554	2010
31	Hawaii	\$4,452,232	2008
32	Utah	\$4,006,398	2008
33	New Mexico	\$3,513,475	2008
34	Washington	\$3,222,000	2008
35	Kansas	\$3,000,000	2008
36	Alaska	\$2,980,785	2010
37	Connecticut	\$2,500,000	2010
38	Idaho	\$2,280,000	2008
39	Oregon	\$2,142,592	2008
40	Vermont	\$2,123,200	2008
41	Alabama	\$1,865,760	2008
42	Maine	\$1,777,395	2010
43	Nebraska	\$1,514,064	2008
44	Ohio	\$1,473,799	2008
45	Montana	\$1,467,536	2008
46	Indiana	\$1,200,000	2008
47	South Dakota	\$1,077,000	2008
48	New Hampshire	\$268,932	2008
49	Delaware	\$250,000	2010
50	Nevada	\$60,000	2008

# APPENDIX 4: PUBLIC-USE FACILITIES BY STATE AND RANKING

Rank	Total Facilities	State	Rank	Total Facilities	State
1	408	Alaska	26	85	Nebraska
2	396	Texas	27	80	Mississippi
3	254	California	28	80	Tennessee
4	232	Michigan	29	79	Arizona
5	169	Ohio	30	76	Colorado
6	153	Minnesota	31	75	Louisiana
7	140	New York	32	74	South Dakota
8	139	Oklahoma	33	70	Maine
9	138	Kansas	34	68	South Carolina
10	136	Washington	<b>35</b>	<b>66</b>	<b>Virginia</b>
11	133	Wisconsin	36	62	New Mexico
12	131	Missouri	37	60	Kentucky
13	131	Pennsylvania	38	49	Nevada
14	128	Florida	39	46	Utah
15	127	Montana	40	45	New Jersey
16	123	Idaho	41	40	Massachusetts
17	121	Iowa	42	40	Wyoming
18	113	North Carolina	43	37	Maryland
19	112	Indiana	44	36	West Virginia
20	111	Illinois	45	25	New Hampshire
21	109	Georgia	46	23	Connecticut
22	99	Arkansas	47	16	Vermont
23	97	Oregon	48	14	Hawaii
24	94	Alabama	49	11	Delaware
25	89	North Dakota	50	8	Rhode Island
			<b>TOTAL</b>	<b>3883</b>	
*Effective date for facility figures is 10/21/11					
*Received 12/15/11 - Courtesy of the Virginia Department of Aviation					

# APPENDIX 5: AIRPORT SYSTEM ECONOMIC IMPACT

Rank	Study Year	State	Airport System Total Economic Impact	Dollar Classification	Notes
1	2009	Florida	114.7	Billion	
2	2001	California	110.7	Billion	
3	2009	Georgia	58.2	Billion	Atlanta International Airport Only
4	2004	New Jersey	57.0	Billion	
5	2009	New York	50.0	Billion	
6	2005	Texas	48.8	Billion	
7	2002	Arizona	38.5	Billion	
8	2008	Maryland	35.7	Billion	
9	2008	Colorado	32.2	Billion	
10	2010	Virginia	28.8	Billion	
11	2009	Tennessee	28.6	Billion	
12	2001	Washington	18.6	Billion	
13	2009	Minnesota	12.2	Billion	
14	2006	North Carolina	11.8	Billion	
15	1999	Oklahoma	11.7	Billion	
16	2009	Kansas	10.4	Billion	
17	2005	Missouri	9.5	Billion	
18	2007	Oregon	8.0	Billion	
19	2008	Michigan	7.6	Billion	
20	2007	Pennsylvania	5.7	Billion	Pittsburgh International Airport Only
21	2001	Utah	5.7	Billion	
22	2008	Kentucky	5.6	Billion	Louisville International and Bowman Field Only
23	2009	Iowa	5.4	Billion	
24	2007	Indiana	5.2	Billion	
25	2000	Alabama	4.7	Billion	
26	1996	Hawaii	4.4	Billion	
27	2005	South Carolina	4.3	Billion	
28	2007	Alaska	3.5	Billion	
29	2006	Louisiana	3.3	Billion	
30	2008	New Mexico	3.2	Billion	
31	2004	Ohio	2.9	Billion	Five Public Airports Only
32	2002	Wisconsin	2.8	Billion	
33	2005	Arkansas	2.5	Billion	
34	2003	Nebraska	2.3	Billion	
35	2008	Idaho	2.1	Billion	
36	2006	Rhode Island	2.0	Billion	
37	2008	Montana	1.6	Billion	
38	2005	Maine	1.5	Billion	
39	2008	Wyoming	1.4	Billion	
40	2001	Vermont	1.2	Billion	
41	2010	North Dakota	1.1	Billion	
42	2006	Delaware	1.0	Billion	
43	1998	Massachusetts	900.0	Million	
44	2008	Mississippi	637.0	Million	
45	2007	Illinois	331.0	Million	Chicago Executive Airport Only
46	2005	Nevada	275.5	Million	General Aviation Impacts Only
47	1994	South Dakota	164	Million	
48	2006	West Virginia	50.4	Million	
49	2004	New Hampshire	7.2	Million	Concord Municipal Airport Only
50	2006	Connecticut	2.5	Million	Danielson Airport Only

\*Sources: NASAO, State Aviation Websites, AOPA Online

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# GLOSSARY OF ACRONYMS

AAPA – Association of Asia Pacific Airlines	NADIN – National Airspace Data Interchange Network
ADS-B – Automatic Dependent Surveillance Broadcast	NAS – National Air Station
AEA – Association of European Airlines	NAS – National Airspace System
AIMD – Aircraft Intermediate Maintenance Detachment	NASAO – National Association of State Aviation Officials
ASF – Aviation Special Fund	NBAA – National Business Aviation Association
ASM – Available Seat Miles	NDB – Non-directional beacons
ATXA – Air Taxi/Air Charter Association	NPIAS – National Plan of Integrated Airport Systems
AWOS – Automated Weather Observing System	OPD – Optimized Profile Descent
AVC – Mecklenburg-Brunswick Airport	ORF – Norfolk International Airport
CCAM – Commonwealth Center for Advanced Manufacturing	PBN – Performance Based Navigation
CCAPS – Commonwealth Center for Aerospace Propulsion Systems	PHF – Newport News-Williamsburg International Airport
CHO – Charlottesville-Albemarle Regional Airport	PIR – Precision Instrument Approach Procedure
COMAC – Commercial Aircraft Corporation of China	RIC – Richmond International Airport
CTB – Commonwealth Transportation Board	ROA – Roanoke Regional Airport
DCA – Ronald Reagan Washington National Airport	RMN - Stafford Regional Airport
DME – Distance Measuring Equipment	RNAV – Area Navigation
DOAV – Virginia Department of Aviation	RPK – Revenue Passenger Kilometers
EIP – Early Implementation Project	RPM – Revenue Passenger Miles
FAA – Federal Aviation Administration	SFRA – Special Flight Rules Area
F&E – Facilities and Equipment	SHD – Shenandoah Valley Regional Airport
FYJ – Middle Peninsula Regional Airport	TTF – Transportation Trust Fund
GA – General Aviation	UAC – United Aircraft Corporation
GDS – Global Distribution Systems	UAS – Unmanned Aircraft Systems
GOF – Governor’s Opportunity Fund	VAB – Virginia Aviation Board
HAI – Helicopter Association International	VABA – Virginia Aviation Business Association
HEF – Manassas Regional Airport	VAOC – Virginia Airport Operators Council
HWY – Warrenton-Fauquier Airport	VAOA – Virginia Airport Owners Association
IAD – Washington-Dulles International Airport	VATSP – Virginia Air Transportation System Plan
IAP – Instrument Approach Procedure	VEDP – Virginia Economic Development Partnership
IFR – Instrument Flight Rules	VHA – Virginia Helicopter Association
ILS – Instrument Landing Systems	VIP – Virginia Investment Partnership
IMC – Instrument Meteorological Conditions	VNDIA – Virginia National Defense Industrial Authority
JYO – Leesburg Executive Airport	VSATS – Virginia SATSLab, Inc.
LYH – Lynchburg Regional Airport	W78 – William M. Tuck Airport
LPV – Localizer Performance with Vertical Guidance	WAAS – Wide Area Augmentation System
MHI – Mitsubishi Heavy Industries	WATF – Washington Airports Task Force
MTV – Blue Ridge Airport	

# ADDENDUM: REVISED EDITION 1: FEBRUARY 2012

The Competitive Analysis of Virginia's Aviation Industry received content revisions on February 10, 2012. These revisions are listed as follows:

## Appendix 2: Aircraft Personal Property Tax Rates—Localities with Public-Use Airports in Virginia

- A. Blue Ridge Airport's tax jurisdiction was corrected to Henry County. Tax rates were revised to reflect this change.
- B. Eagle's Nest Airport's tax jurisdiction was corrected to Augusta County. Tax rates were revised to reflect this change.
- C. Hamptons Roads Executive Airport's tax jurisdiction was corrected to Chesapeake City. Tax rates were revised to reflect this change.
- D. Lynchburg Regional Airport's tax jurisdiction was corrected to Campbell County. Tax rates were revised to reflect this change.
- E. Marks Municipal Airport's name was corrected to Lake Country Regional Airport. Its tax jurisdiction was corrected to Mecklenburg County. Tax rates were revised to reflect this change.
- F. Mecklenburg-Brunswick Regional Airport's tax jurisdiction was corrected to Mecklenburg County. Tax rates were revised to reflect this change.
- G. Middle Peninsula Regional Airport's tax jurisdiction was corrected to King and Queen County. Tax rates were revised to reflect this change.
- H. Roanoke Regional Airport's tax jurisdiction was corrected to Roanoke City. Tax rates were revised to reflect this change.
- I. Tappahannock-Essex County Airport's tax jurisdiction was corrected to Essex County. Tax rates were revised to reflect this change.
- J. Ronald Reagan Washington National Airport's tax rates were corrected to reflect its status as a federal property.
- K. William M. Tuck Airport's tax jurisdiction was corrected to Halifax County. Tax rates were updated to reflect this change.

Section 4.1, Page 23 was revised to reflect the changes in Appendix 2.





# PMG@VCU

Virginia Commonwealth University

Performance Management Group • Virginia Commonwealth University  
P.O. Box 843024 • 1014 W. Franklin Street • Richmond, VA 23284 • 804.828.8845 • [www.pmg.vcu.edu](http://www.pmg.vcu.edu)

