Virginia's Cyber Security Approach:

Leadership through Diversity

The organizations that created the Internet four decades ago, the Defense Advanced Research Projects Agency (DARPA) and the National Science Foundation, are located in Virginia. Since the inception of the Internet, Virginia has been a focal point for the Internet and associated industries, with the majority of the Internet's traffic passing through its geographical borders. Today, the Commonwealth is home to more than 650 cyber security companies, the most per capita in the nation. Thousands of Virginians work on cyber security every day in corporations, universities, the military, the intelligence community, and in Commonwealth agencies.

The Commonwealth of Virginia continues to drive the development of new products, companies and services in the cyber security industry, underscored by its unique and abundant technology resources and leadership throughout the United States. Virginia has developed a world leading technology ecosystem founded on private industry innovation and public-private partnerships. By incorporating principles of collaboration, coordination, government involvement and investment, and integration across key markets, Virginia has created the best environment for cyber security research and development in the United States.[1]

Since the beginning, policymakers in the Commonwealth have understood that technology does not evolve in a vacuum, isolated from other innovations and without policy support. By leading the nation in the adoption of industry best practices, Virginia is a nationally recognized trailblazer that has consistently served as a both a driver and early-adopter of the best cyber security technologies available.[2] As the Commonwealth moves forward, its vision is not only to continue to lead the nation in the adoption of signature Information Communication Technologies (ICTs), but to help formulate and promote their creation through innovation, investment, and a pro-business environment that nurtures all companies.

The wealth of resources that have made Virginia a leader in innovation and technology are fueling the development of a new crop of cyber security solutions. In Virginia, this principle of integrated leadership is at the root of its economic success. Leaders from business, government, and higher education have co-created an environment that nurtures the types of innovation that have made the Commonwealth the home of the top technology companies and the number one recipient of federal investment. A shared vision for pro-business policies, a massive and highly skilled workforce and cutting-edge technology research has also planted Virginia at the heart of the cyber security space.

Leaders from business, government and education sectors come together to create network nodes for success – public-private partnerships that provide investment and thought leadership in the interest of cultivating and promoting technology companies. These relationships have continued to drive the performance of key technology firms, and maintained Virginia's leadership in the defense and technology space. Recognizing the need for ongoing development, the Commonwealth continues to adopt a "**collaborative security model**" recommended by leading major internet security firms that promote shared knowledge while protecting Intellectual Property (IP).[3]

Virginia continues to attract top technology firms through defense focused partnerships, leading the nation in federal defense investment.[4] A shared vision for pro-business policies, massive and highly skilled workforce that continue to grow through specialized programs at the many higher-education universities, and bleeding-edge technology research made possible through continued infrastructure development cultivate the best environment for developing cyber security technology.[5]

Cyber Security: The Crossroad of Prosperity and National Security

Cyber security is not a fad or fleeting challenge with a potential to crash in the future. Business, government, and citizens are more interconnected than ever, which has led both to great efficiencies and significant vulnerabilities that must be faced at all levels of society. The very way consumers and citizens interact with technology and society have likewise evolved to include significantly greater use of smartphones, tablets, and non-traditional computers, creating vulnerabilities that attackers are already eyeing. Everything from interconnected Barbie™ dolls and skateboards to autonomous connected cars and medical devices were hacked this year, highlighting the increased need for security and innovation to keep pace with the rapidly evolving threats.[6]

The need to maintain a protected cyber front is now considered a pillar of society as it protects vital infrastructure, secures privacy, ensures economic efficiency, and enables the most basic needs of society including water, gas, electricity, and finance. In fact, the President of the United States declared, "America's economic prosperity, national security,

[1]Sorcher, Sara. The Race to Build the Silicon Valley of Cybersecurity. http://passcode.csmonitor.com/goldrushAccessed June 9, 2016
[2]Spidalieri, Francseca. State of the States on Cybersecurity. Pell Center for International Relations and Public Policy. http://pellcenter.org/wp-content/uploads/2015/11/Pell-Center-State-of-the-States-Report.pdfNovember 2015
[3]http://www.internetsociety.org/globalinternetreport/?gclid=CjwKEAjw4dm6BRCQhtzI6Z6N4i0SJADFPu1ngr-3sRJqBidq2awzkE7SGGgT27n1td2xXR5q4GvwuxoC5hrw_wcB
[4]Burnell, Susan. Virginia: Investing in Innovation. Forbes.com. Oct. 20, 2014. http://custom.forbes.com/2016/01/27/virginia-investing-in-innovation/
[5]http://www.yesvirginia.org/cybersecurity
[6]https://www.wired.com/2016/01/the-biggest-security-threats-well-face-in-2016/

and our individual liberties depend on our commitment to securing cyberspace and maintaining an open, interoperable, secure, and reliable Internet. Our critical infrastructure continues to be at risk from threats in cyberspace, and our economy is harmed by the theft of our intellectual property."[7]

Simply put, as the world economy and governance infrastructure increasingly rely on Internet and cyber networks for greater efficiencies, these same efficiencies promote vulnerabilities and access points for new attacks, greater threats, and unknown resource vulnerability.[8] The internet user base has more than doubled since 2008, representing growth from roughly 1.4 billion users to 3.1 billion users in 2015, while the "touch points" for attacks have grown tremendously in the mobile sector.[9] Attacks over the last decade have evolved tremendously and will continue to evolve as the number of internet users grows, avenues of attack are closed and adversaries adapt, and as governments and private industry become more interconnected. The problem is not going away, and Virginia is leading the charge against these highly adaptive, international foes.

Government

Both national and state governments recognized throughout the 1990s and early 2000s that the Internet could serve as a catalyst for economic growth, development, and the championing of fast, reliable, and affordable communications—driving job creation, information access, and innovation. However, it is only recently that those same governments recognized the exposure and costs of less resilient critical services, disruption of services, e-crime, identity theft, intellectual property theft, fraud, and other malicious cyber activities in terms of economic loss and threat to people's safety and well-being.[10]

A 2014 Deloitte-NASCIO (National Association of State Chief Information Officers) study on cybersecurity issues revealed that states have been victims of a number of high-profile attacks that "have resulted in the loss of Personally Identifiable Information (PII) of millions of citizens, including Social Security Numbers, payment card records, dates of birth, driver's license numbers, and tax data…." The study recommended that "Critical Infrastructure Security and Resilience… should be a shared responsibility between all levels of government and the operators of critical infrastructure."[11] This collaborative and cooperative model of shared security and resilience has only been developed and adopted by a few leading states; Virginia among the first.

This collaborative and cooperative model of shared security and resilience has only been developed and adopted by a few leading states; Virginia among the first.

It is imperative that the Commonwealth of Virginia protects citizen data and provides a safe, secure technology environment that enables state agencies to accomplish their respective missions. To fulfill this task, the Virginia Information Technologies Agency (VITA) established the Commonwealth Security & Risk Management Directorate.

This Directorate develops and manages an ever-changing portfolio of tools and processes designed to secure Commonwealth data and systems. Principle among these is the establishment of a Shared Security Model. The Virginia General Assembly approved funding to establish shared services for delivery of cyber security functions to agencies and support vulnerability scanning of public facing websites.

Business

In 2015, there were an average of 160 successful cyber attacks per week against businesses in the United States, more than triple the 2010 mark of approximately 50 per week. At the same time, the cost of cyber crime in the United States more than doubled from $6.5 million in 2010 to $15.4 million in 2015 per company affected, with the largest attack reaping $65 million in damages.[12]

The threat of cyber attacks impacts every nation and every aspect of the world economy, and threats to national security and economic order continue to grow as internet use, interconnected activity, and the development of the Internet of Things (IoT) (the network of physical devices, vehicles, buildings and other items to be sensed and controlled remotely across existing network infrastructure) represent greater "touch points" and networked nodes to access.

This growth trend is likely to slow over the next five years, however growth will accelerate in China, India, and across African nations where most cyber attacks have originated from abroad, and the growth in mobile penetration across nations will continue to increase rapidly.[13] As computing and communications technologies become more entrenched in the global economy and IoT provides gateways to new data modes, incentives

[7]Obama, Barack. https://www.whitehouse.gov/issues/foreign-policy/cybersecurity
[8]Zetter, Kim. The Biggest Security Threats We'll Face in 2016. 01/01/2016
[9]http://www.kpcb.com/internet-trends
[10]Hathaway et al, "Cyber Readiness Index 2.0 – A Plan for Cyber Readiness: A Baseline and an Index," Potomac Institute for Policy Studies, (forthcoming)
[11]Deloitte-NASCIO, "2014 Deloitte-NASCIO Cybersecurity Study"
[12]http://www.heritage.org/research/reports/2015/11/cyber-attacks-on-us-companies-since-november-2014
[13]http://resources.infosecinstitute.com/the-most-hacker-active-countries-part-i/

to compromise the security of these systems will likewise grow rapidly.[14]

The Virginia Story

Ranked consistently near the top in *Forbes'* annual list of Best States for Business, Virginia provides a wealth of opportunities, a great atmosphere for development and expansion, and leadership that truly understands the importance of maintaining the best business environment for economic prosperity. A variety of performance-based incentives, from tax credits to tax exemptions, are Virginia's investment in its economic future. The Commonwealth works enthusiastically with new and expanding employers who demonstrate a willingness to invest in those who invest in Virginia, create a high standard of living for Virginians, and enhance local and state economies through increased revenue growth.

Pro-Business Advantages for Companies

- Strategic East Coast location and excellent infrastructure provide easy access to national and global markets
- Stable, low tax costs for corporations and individuals and a 6% corporate income tax
- Minimized payroll costs with low worker's compensation rates and a low unemployment tax
- Favorable business environment that protects "at-will" and "right-to-work" employment practices
- One of the highest-ranked states in high-technology employment
- 38 established Technology Zones
- A vibrant and diverse multi-cultural community where employees can live and work

Photo by Matheus Gonçalves

National Cyber "Firsts" are Second Nature in Virginia

- National Institute of Standards and Technology (NIST) Cyber Framework: First in the nation to adopt federal standards
- Information Sharing and Assessment Organization (ISAO): First state to declare itself an ISAO
- Securing Consumer Transactions: First state to require security on debit or credit card present transactions, via Executive Directive #5
- Digital Identity: First state to enact landmark legislation, now used as the model by other states

- An experienced, educated and productive workforce
- Recruitment and training programs to help businesses become operational faster and maintain their competitive advantage
- More than 2,300 qualified buildings and sites located across the Commonwealth

The New Virginia Economy

In 2014, Virginia Governor Terry McAuliffe established the New Virginia Economy Workforce Initiative. This initiative seeks to overhaul our economy in four ways: increasing postsecondary education and workforce credentials, securing employment for veterans, aligning education with the needs of businesses, and diversifying the economy.

The Initiative seeks to better align workforce supply to employer demands and to ensure that Virginia's workers have the tools they need to succeed in a 21st century economy. The Initiative includes several ambitious goals, such as the "Pathway to 50K" initiative that sets a target of 50,000 credentials, licensures,

[14]Spidalieri, Francseca. State of the States on Cybersecurity. Pell Center for International Relations and Public Policy. http://pellcenter.org/wp-content/uploads/2015/11/Pell-Center-State-of-the-States-Report.pdfNovember 2015

apprenticeships, and sub-baccalaureate degrees earned that meet the immediate needs of Virginia's workforce.

Virginia's Leadership in Cyber Security

The Commonwealth of Virginia is a leading cyber security entity not only in its adoption and application of industry best practices, but also in the support and innovation environment growing new companies and new technologies. In a study by the Pell Center released in November 2015, *State of the States on Cybersecurity*, Virginia was recognized for its prioritization of the "importance of cyber security, chiefly by prioritizing their state's security and development strategy and through their commitment to increasing their resilience to cyber threats."[15]

The study demonstrated that Virginia is among the leaders in the nation for devising "innovative ways to raise awareness and implement creative solutions to protect state governments and their constituencies... highlighting leading best practices and efforts at the state level to adopt comprehensive cyber security policies and strategies, increasing funding and education, and developing programs to attract and retain qualified talent."[16]

Virginia was among the first states in the nation to adopt National Institute of Standards and Technology (NIST) special publications and benchmarks, such as International Organization for Standardization (ISO 27001 and 27002) and the Control Objectives for Information Technology (CoBIT), to secure data centers and information pipelines.[17] The cyber security mission is driving success across industries, through partnerships and relationships with federal and state governments, and enabled by a top pro-business environment.

SPOTLIGHT: The Interconnected World-Leading Innovation in Virginia

As governments and companies migrate their data to collocated centers hosted and secured by third party companies who specialize in proprietary and confidential data management, a major industry has located and propagated in Virginia. It is estimated, because of this new demand, that 70 percent of the world's internet traffic passes through Virginia largely due to the 60 data centers throughout the Commonwealth.

Recognizing this new opportunity and need, the Commonwealth embraced this flourishing market by passing tax exemptions to companies that buy or lease at least $150 million in computer equipment (between July 2010 and June 2020) for use in data centers. Major investments from Amazon, Microsoft, Bank of America, Northrop Grumman, Google, and others have accounted for over $9 billion and 7,600 new jobs since 2005 specifically in the development of data centers in Virginia. In 2014 alone, Microsoft announced a plan to expand their $500 million data center by $350 million in Boydton, Virginia offering excellent opportunities to the small town.[18]

The presence and density of these many data centers provide internet traffic security and housing that serve the national capital needs and the federal government. The needs of these unique users foster continued growth and demand in the cyber security space specifically, and related technologies more generally. Shared leadership across sectors has created an ecosystem where established enterprises can thrive while new start-ups innovate to solve newly evolving problems.

The IoT, interconnected devices that transcend computers or mobile phones and integrated across platforms, represents one of these new challenges being addressed in the Commonwealth by both established leaders such as GE and start-ups like AconAI. Accelerators and universities are turning out entrepreneurs addressing the next generation of security needs; Virgil Systems and Eunomics, both start-ups of MACH37, are good examples of how new and diverse technologies grow in the Virginia economy to meet the demands rising from IoT devices.

[15] Ibid Pg 4
[16] Ibid Pg 4
[17] Spidalieri, Francseca. State of the States on Cybersecurity. Pell Center for International Relations and Public Policy. http://pellcenter.org/wp-content/uploads/2015/11/Pell-Center-State-of-the-States-Report.pdfNovember 2015
[18] http://www.datacenterknowledge.com/archives/2014/06/13/microsoft-kicks-350m-data-center-expansion-virginia/

Photo by Norfolk State University

Virginia Cyber Security Commission

Within weeks of coming into office, Governor Terry McAuliffe established the Virginia Cyber Security Commission to both prepare and protect the Commonwealth of Virginia from cyber threats, as well as lay the policy framework that would allow Virginia to provide an excellent regulatory environment for firms working in the cyber security industry. From the beginning, the Commission concentrated efforts on building a cyber-ecosystem in Virginia across five areas – Education/Workforce, Economic Development, Awareness, Infrastructure, and Crime. The commission relied on Virginia's leadership, both public and private, and was co-chaired by Richard Clarke of Good Harbor Security Risk Management and Virginia Secretary of Technology Karen Jackson.

While recognized for its overall protection of state government and private enterprise through the work of the Commission, Virginia has invested in a number of strategic platforms that provide security and resilience to business, education, and governance. Among these industry-leading methodologies is to create and implement a State Cyber Security Strategic Plan, outline vital Incident Response Mechanisms, support E-Crime Law Enforcement, cultivate Information Sharing, and lead the nation in Cyber R&D, Education, and Capacity Building.

These five elements gave foundation to the internationally recognized structure for approaching cyber security threats and opportunities. Highlighting these five core elements of cyber security and resilience, the Commonwealth of Virginia Cyber Security Commission pointed to the following achievements in an August 2015 report:

- Became the first state to adopt the NIST Cyber Framework, issued by the President in Executive Order 13636, to provide guidance and a standard for organizations to achieve an effective cyber security posture
- Passed landmark legislation on Digital Identity (SB 814) which now serves as a model for other states and national governments
- Led the nation as the first state to embrace of the Information Sharing and Assessment Organization standard issued by the President in Executive Order 13691
- Established accountability and authority for cyber security in Commonwealth agencies through the passage of new legislation on the role of agency heads (SB 1121)
- Led the states in the adoption of the Advanced Credit Card Standard for security (Executive Directive 5)
- Led the states in the adoption of the Advanced Credit Card Standard for security (Executive Directive 5)
- Passed seven pieces of legislation that improve the ability of the Commonwealth to prosecute cyber-crime and develop cyber security policies[19]

A link to the Commission report can be found here: http://cyberva.virginia.gov/cyber-security-commission

[19]Commonwealth of Virginia Cybersecurity Commission. "Threat and Opportunities" August 2015 - https://cyberva.virginia.gov/media/4396/cyber-commission-report-final.pdf

Members of the Commission

Ms. Karen Jackson, *Co-chair, Virginia Secretary of Technology*

Mr. Richard A. Clarke, *Co-chair, Chairman and CEO of Good Harbor Security Risk Management*

Ms. Rhonda Eldridge, *Director of Engineering at Technica Corporation*

Ms. Jennifer Bisceglie, *President and CEO, Interos Solutions, Inc.*

Mr. Paul Kurtz, *Chief Strategy Officer at CyberPoint*

Mr. Paul Tiao, *Attorney and partner with the international law firm of Hunton and Williams, LLP*

Dr. Barry Horowitz, *Munster Professor of Systems and Information Engineering and Chair of the Systems and Information Engineering Department at the University of Virginia*

Mr. Andrew H. Turner, *Former Senior Vice President and Head of Global Security, VISA*

Ms. Jandria Alexander, *Principal Director of the Cyber Security Subdivision in the Engineering Technology Group at the Aerospace Corp*

Ms. Elizabeth "Betsy" Hight, *Retired US Navy rear admiral who served as the Vice Director of the Defense Intelligence Agency (DISA)*

Mr. John Wood, *Chief Executive Officer, Chairman of the Board, and Director for Telos Corporation*

Ms. Anne Holton, *Secretary of Education*

Mr. John Harvey, *Secretary of Veterans and Defense Affairs*

Dr. Bill Hazel, *Secretary of Health and Human Resources*

Mr. Maurice Jones, *Secretary of Commerce and Trade*

Mr. Brian Moran, *Secretary of Public Safety and Homeland Security*

SPOTLIGHT: MACH37 Cyber Accelerator

Nothing exemplifies Virginia's approach to cyber security support greater than the MACH37™ Accelerator – an intensive 90-day program created to launch cyber startups – headquartered at Virginia's Center for Innovative Technology (CIT) in Herndon, VA. Founded by the CIT and funded by the Virginia General Assembly, The Accelerator is designed to facilitate the creation of the next generation of cyber security product companies through mentorship, partnership, and cooperation.

Known as America's premier market-centric cybersecurity accelerator, the program facilitates the creation of next generation cybersecurity product companies with emphasis on the validation of product ideas and the development of relationships that produce an initial customer base and investment capital.[20] MACH37 Cyber Accelerator has graduated 35 new cyber companies (as of 4/1/16) and has two private sector investors (General Dynamics Mission Systems and Amazon Web Services).

MACH37's unique program design places heavy emphasis on the validation of product ideas and the development of relationships that produce an initial customer base and investment capital. The accelerator is operated by MACH37 partners who announced the latest addition, Amazon Web Services, at the highest level of partnership. Other partners include General Dynamics, Activate, Microsoft BizSpark, Rackspace, Square1bank, and Virtru who all help pick which companies are accepted to the program based on their technology, mission, and team.

While promoting robust industry relationships and cross-industry strategies, MACH37 takes cyber security start-up dreams and turns them into realities, driven by free-market economic challenges and helped along by small business support and investment from government. Virginia is leading this wave of innovation by bringing together private industry with government resources, and enabling industry to lead the discussion.

[20]https://www.mach37.com/explore/cohort-companies/

Virginia Cyber Security Partnership

Established in 2012 through a partnership with the FBI, the Virginia Cyber Security Partnership is a collaboration between public and private sectors designed to establish trust for combating Cyber threats. The Partnership has more than 220 active members, and has held more than 35 events throughout the Commonwealth.

The mission of the Virginia Cyber Security Partnership (VCSP) is to establish and maintain a trusted community of public and private sector cyber professionals. The Partnership leverages a collective experience and knowledge, promotes mutually beneficial information sharing and fosters professional development. This mission seeks to advance our nation's interests.

The VCSP has three primary mission objectives to support short-term and long-term goals:

Skills Enhancement

This mission objective is focused on providing opportunities to sharpen existing skillsets and develop new skills within cyber security. This will be accomplished through workshops, curriculum road maps, etc.

Outreach and Pipeline Development

This mission objective is focused on enhancing the awareness of cyber security and sharing opportunities within the cyber profession to help with enhancing the pipeline of skilled professionals to aid in cyber security. This will also include connecting strong candidates to potential employers.

Collaboration

This mission objective fosters community and strengthens the overall program by creating opportunities for members to collaborate on cyber related activities. This may include networking, outreach, workshops, portal communications, information sharing, etc.

Public Safety

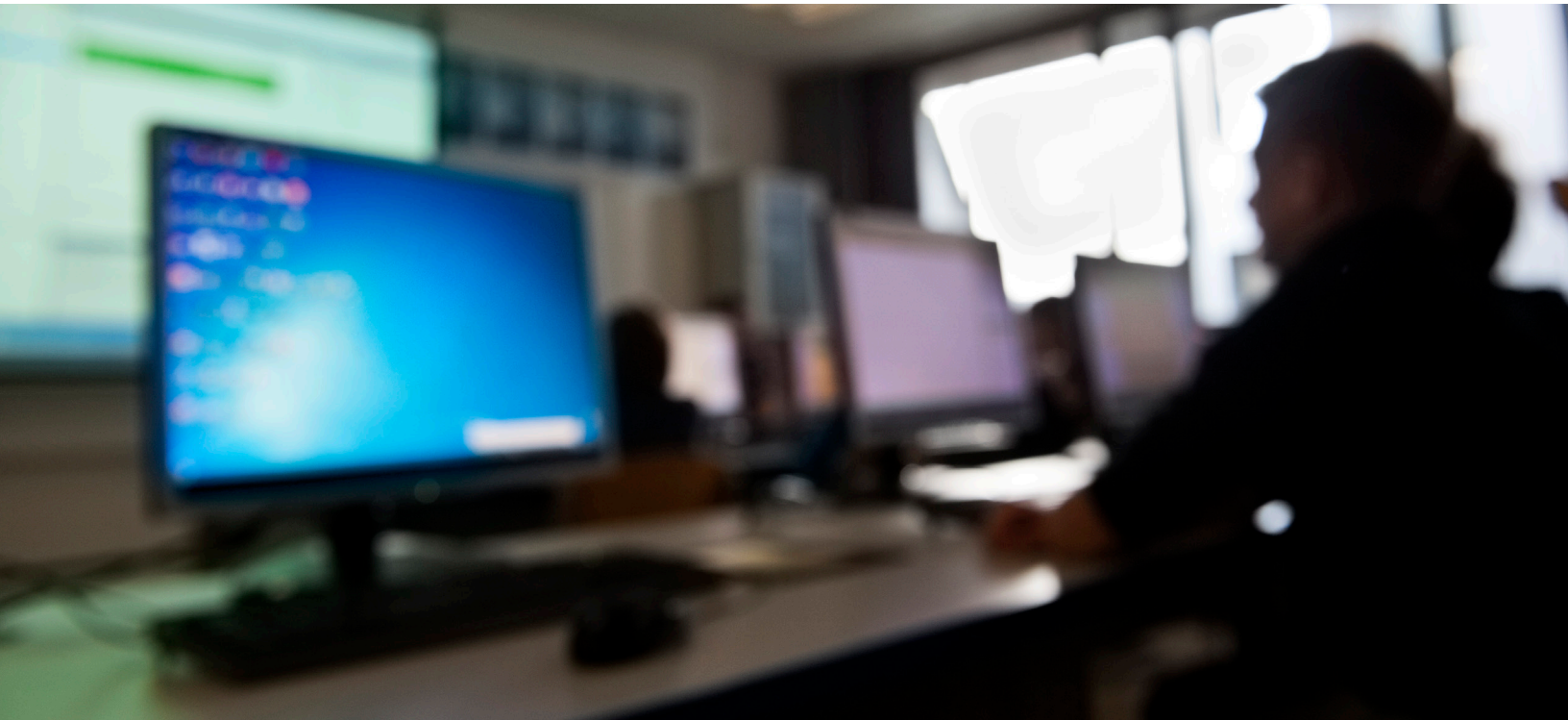
The Virginia Fusion Center

The Virginia Fusion Center (VFC) operates as a focal point within Virginia for the collection, receipt, analysis, and dissemination of timely threat intelligence between the federal government and state, local, and private sector partners. The VFC strives to operate under an all-hazards approach to threat information, and has developed cyber capabilities utilizing a civilian analyst and sworn special agents detailed from other mission areas to address ongoing cyber activities. These personnel identify and track known and emergent cyber threats to the Commonwealth in support of statewide awareness, detection, analysis, and response through the dissemination of timely and actionable cyber threat intelligence.

The VFC also provides analytical case support on criminal investigations with a cyber nexus, cyber security training and awareness, and increased cyber resilience through exercise and assessment. In 2014, the VFC produced 43 products related to potential cyber threats and cyber security. In 2016, the Virginia General Assembly funded four additional positions for the VFC.

Virginia State Police High Tech Crime Division (HTCD)

HTCD was formed within the Bureau of Criminal Investigation (BCI) in 2009 by the Department of State Police. The HTCD engages the use of leading technologies to proactively provide



specialized law enforcement services in support of the Department's overall mission. In 2016, the Virginia Assembly funded 10 additional positions within the HTCD. Key capabilities include:

- Investigation of "All Forms of High Tech Crimes"
- Investigation of Crimes Against Children
- Computer forensic laboratory services
- On-scene digital forensic services
- Technical support to federal, state, and local agencies
- Domestic, federal, and international agency liaison

Cyber Guard Prelude

Cyber Guard prelude 2015 was a table top exercise that engaged state agency partners as well as local, federal, and private sector stakeholders to test state level cyber response procedures. Planning is underway for a functional exercise, Cyber Guard 2016.

Virginia National Guard

Building on the efforts and recommendations of the Cyber Security Commission, Virginia is currently partnered with the Virginia National Guard's Data Processing Unit (DPU), capitalizing on the cyber security recommendations to utilize local assets such as the Guard to strengthen the Commonwealth's cyber infrastructure. The partnership conducts cyber assessments on infrastructure within Virginia localities to identify any gaps or opportunities to increase our cyber resilience. Upon completion of the assessment a detailed confidential after-action report is shared with the locality. As of July 2016, three missions have been completed, with an additional six identified in the near-term. Virginia's proactive stance in addressing cyber security has also led the Air National Guard to select Virginia as a location for their cyber-guard unit.

Workforce and Education

Technology companies are supported in Virginia by infrastructure that outperforms other states, and a pro-business environment geared toward innovation and IP-protection. They are also supported by a robust, educated, and well-developed workforce and a world-leading university system that produces thousands of graduates in cyber-related fields annually.

For cyber security firms looking to find the best workers and students in the nation to innovate and succeed, they need look no further than the Commonwealth of Virginia. This pipeline begins with K-12 education and continues through the Commonwealth's world-class post-secondary institutions, which include 13 National Centers of Academic Excellence at 11 institutions and produce more than 2,150 technology graduates annually.

Workforce

Maintaining a highly skilled workforce is a fundamental component to ensuring future success. As Virginia has led the nation in the adoption of vital protections for infrastructure and data security—creating one of the most vibrant, protected, and diverse technology ecosystems in the world—it has also been focusing on creating a specialized workforce through its nationally ranked public and private education system through funding, investments, and public-private partnerships. Virginia has the *largest concentration of high-tech workers in the United States*, with 9.8 percent of the state's private sector workforce in tech.[21] In 2014, 19.3 percent of Virginia's payroll came from technology companies.[22]

Veterans Pathway Program in Cyber Security (George Mason University): Supports student success through expanding a program that allows veterans who complete an Associate Degree at a Virginia community college to transfer (through guaranteed admissions) to GMU and earn a B.A.S. in Cyber Security

Virginia currently has more than 67,850 people working in cyber security alone, and many of Virginia's universities are at the forefront of cyber security research and development. Virginia's population of more than 8.2 million and a workforce of more than 4.2 million boasts the 8th highest education rate in the nation for those with a minimum of a bachelor's degree at 35 percent. Approximately 18,000 people leave Virginia military bases seeking civilian employment annually.

- Virginia currently supports the third highest concentration of technology jobs as a share of overall private-sector employment

[21] TechAmerica Foundation's annual Cyberstates Report
[22] http://www.doe.virginia.gov/administrators/superintendents_memos/2016/040-16a.pdf

- More than 35% of Virginians have at least a bachelor's degree, the 8th highest rate in the country
- More than 1,400 doctorate degrees in science and engineering are awarded annually from Virginia universities
- More than 15,000 science and engineering graduate students pursue advanced degrees in Virginia
- Approximately 18,000 people leave Virginia military bases each year and enter the civilian workforce

This workforce includes the high-tech skills found in our northern Virginia Technology Corridor, highly skilled veterans returning to civilian life from one of the many regional defense installations, and leading edge research performed at our universities and local federal laboratories.

Cyber Security Apprenticeship Program

Starting in June of 2016, businesses have the opportunity to stand up registered apprenticeships for cyber security occupations. Formally approved by the Virginia Apprenticeship Council, the three new registered apprenticeship cyber security occupations include: Information Security Analyst - Cyber Security Analyst, Information Security Analyst - Computer Forensics Analyst, and Information Security Analyst - Incident Response Analyst.

Introducing registered apprenticeship occupations in an industry sector like cyber security that has not traditionally employed apprentices will boost the ability of young adults and career switchers to attain in-demand skills and even earn industry certifications and college credits. These programs bolster Virginia's national leadership in cyber education and training and lay a firm foundation for this emerging sector.

Education

cyber.virginia.gov/doe

The Commonwealth's commitment to integrating cyber security into education pathways has already begun. The Cyber Security Commission hosted the Commonwealth Conference on Cyber and Education 2015 on December 2, 2015, to engage educators, employers, and government in a dialogue on cyber security.

As one result, the Virginia Department of Education established Cyber Security as a career pathway that begins with career and technical education programs in middle grades and high schools.[23] This includes the creation of Virginia's Cyber Security and Cyber Forensics Infusion Units, which have identified eighty-five tasks/competencies that can be incorporated into existing technology or STEM courses. Included are Basic Operations and Concepts, Social and Ethical Issues, Technology Research Tools, Thinking Skills, Problem Solving and Decision Making, Technology Communication Tools, and Leadership Development Expectations. There are two Governor's STEM Academies (Marshall and Chantilly), which have developed cyber security camps during summer months. The Virginia General Assembly allocated grant funds for 32 cyber camps in the summer of 2016 through the Virginia Department of Education.

Seventeen of Virginia's 23 community colleges offer one or more courses aligned to cyber security, and eight offer security certificates. Three—Lord Fairfax Community College, Northern Virginia Community College, and Tidewater Community College—are designated as National Centers of Academic Excellence, with more pursuing accreditation. With the growth of new programs around the Commonwealth, the Virginia Community College System saw huge enrollments in Fall 2015 at 732 students up from 180 students in Fall 2014 (407% growth).

According to the Bureau of Labor Statistics, Virginia ranks first in the nation in the percentage of computer systems analysts and computer software

Virginia is training its workforce now.

We provide innovative cyber training to speed worker readiness for the New Virginia Economy:

Cyber Boot Camp: Cyber Education training for high school teachers and students

Conference on Cyber and Education: Discussion and education on the importance of training for cyber careers

Cyber Range: Secure platform built for training, research and collaboration

[23] http://www.doe.virginia.gov/administrators/superintendents_memos/2016/040-16a.pdf

Virginia's Commitment to Cyber Security in Higher Education

In 2016, the Commonwealth instituted two grant programs that support students seeking education and credentials in cyber security related fields. These grants bolster the current commitment to STEM fields provided by the Two Year College Transfer Grant Program.

Cyber Security Scholarship for Service

Offered through the State Council on Higher Education in Virginia, the Cyber Security Scholarship is designed to obtain commitments from students to work in state government in the field of cyber security. $500,000 has been appropriated for this program in the 2016-2017 Academic Year.

New Economy Workforce Credential Grant Fund and Program

This grant opportunity supports students as they complete high demand workforce credentials. While a list of eligible programs in currently being developed by the state Workforce Board, information technology and cyber security are both in high demand and currently emphasized.

Two-Year College Transfer Grant Program (CTG)

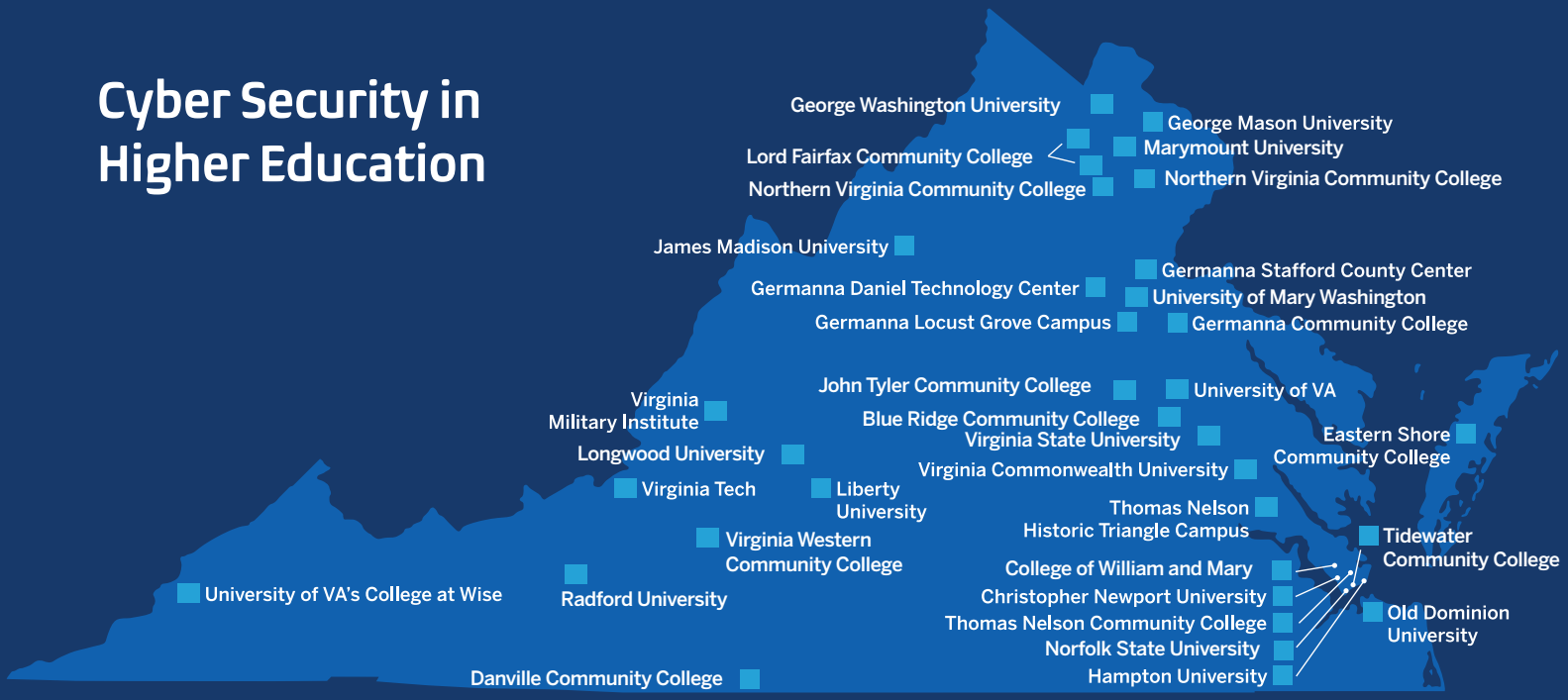
CTG qualifying students receive $1,000 per year if enrolled in STEM programs, such as information technology or cyber security degree programs.

engineers in the workforce. Every year, Virginia's universities have more than 15,000 graduate students pursuing advanced degrees in science and engineering.

As Virginia universities have contributed to preparing the workforce by offering various degrees associated with cyber security/information technology, they also support activities to enhance traditional course offerings with competitions, challenges, and student scholarship programs. For example:

- In Fall 2015, George Mason University's Volgenau School of Engineering became the first college in the nation to offer a cybersecurity engineering degree that focuses on cyber-resilience engineering design. It also runs summer camps for children and outreaches to high school students, boosting interest in the STEM fields.
- George Mason has joined a new research and training initiative of the U.S. Army Reserve (USAR), the Cyber P3i, which is a Private Public Partnership designed to enhance operational readiness in the U.S. Army. The initiative also seeks to address the national shortage of cybersecurity professionals. Mason's #7 ranking by Ponemon/HP as a top national cyber program was an important factor used by USAR to select the initial group of six universities to launch the partnership.
- Norfolk State leads a $25 million effort that begins with kindergarten activities in an effort to develop cyber security professionals. Funded by the Department of Energy, Norfolk State is leading a consortium of Historically Black Colleges and Universities, a school division, and the Department of Energy National Laboratories to develop STEM education that will lead to security careers.
- Virginia Tech, James Madison University, Marymount University, and Hampton University participate in the Federal CyberCorps Scholarship for Service program, which provides full tuition and up to $25,000 per year in scholarships to students interested in pursuing careers in cybersecurity. The program is open to students majoring in computer science or computer engineering.

Cyber Security in Higher Education



- James Madison University hosted a cyber security boot camp for high school teachers during the summer of 2015 to raise awareness and encourage the integration of cyber security topics into the curriculum.
- Virginia Tech hosted the 2015 U.S. Cyber Challenge and Cybersecurity Camp for high school students in the eastern United States. This competition seeks to recruit 10,000 of America's brightest students to usher into next generation cyber security professional jobs.

National Initiative for Cybersecurity Education

The National Initiative for Cybersecurity Education (NICE) is a nationally coordinated effort to advance education and training opportunities for cyber security career preparation. NICE is coordinated by the National Institute of Standards and Technology, an agency of the U.S. Department of Commerce. NICE defines the work within the cyber security field to help maintain a globally competitive cyber security workforce and broaden the pool of skilled workers capable of supporting a cyber-secure nation. It includes federal departments and agencies, industries, and academic institutions beginning with K-12. NICE has 13 Virginia affiliates, including seven educational institutions: *George Mason University, Hampton University, James Madison University, Marymount University, Norfolk State University, Northern Virginia Community College, and Virginia Tech*.[24]

Cyber Security Centers of Excellence

NSA and the Department of Homeland Security (DHS) jointly sponsor the National Centers of Academic Excellence in Information Assurance and Cyber Defense (IA/CD) programs. The goal of these programs is to reduce vulnerability in our national information infrastructure by promoting higher education and research in IA/CD and producing a growing number of professionals with IA/CD expertise in various disciplines. This unique designation is valid for five academic years, after which the school must successfully reapply in order to retain its CAE designation.

Students attending CAE IA/CD-E and CAE IA/CD-R schools are eligible to apply for scholarships and grants through the Department of Defense Information Assurance Scholarship Program and the Federal Cyber Service Scholarship for Service Program. CAE IA/CD institutions receive formal recognition from the U.S. Government as well as opportunities for prestige and publicity for their role in securing our nation's information systems.

Virginia boasts thirteen Centers of Academic Excellence at eleven institutions.

[24]http://niccs.us-cert.gov/footer/about-national-initiative-cybersecurity-education

National Centers of Academic Excellence in Virginia

College/University	Programs offered		Honors
George Mason University Fairfax, Virginia 4 Year / Public	Masters Degree	M.S. in Information Security and Assurance	
		M.S. in Applied Information Technology with concentration in Cyber Security	
		M.S. in Computer Forensics	
		M.S. in Data Analytics with concentration in Digital Forensics	
		M.S. in Management of Secure Information Systems	
	Bachelors Degree	B.S. in Information Technology with concentration in Information Security	
		Bachelor of Applied Science with Concentration in Cyber Security	
		B.S. in Cyber Security Engineering	
	Graduate Certificate	Graduate Certificate in Applied Cyber Security	
		Graduate Certificate in Information Security and Assurance	
		Graduate Certificate in Tactical Computer Operations	
		Graduate Certificate in Telecommunications Forensics and Security	
	Center/ Institute	Mason Center for Security Information Systems	
		Center for Assured Research and Engineering	
Hampton University Hampton, Virginia 4 Year / Private	Masters Degree	M.S. for Information Assurance	Center of Academic Excellence in Information Assurance Education NSF CyberCorps Scholarship for Information Assurance recipient
James Madison University Harrisonburg, Virginia 4 Year / Public	Masters Degree	M.S. in Computer Science with concentration in Information Security and Digital Forensics	National Center of Excellence in Information Assurance Education NSF CyberCorps Scholarship for Information Assurance recipient
		M.B.A. with concentration in Information Security	
	Bachelors Degree	B.S. in Intelligence Analysis	
	Certificate	Certificate in Information Systems Security	
		Certificate in Network/Information Security	
	Professional Development	VATCyber Boot Camp and GenCyber Boot Camp instructing teachers in cyber security education	
	Partnerships/ Consortiums	Partners with Commonwealth Center for Advanced Logistics Systems	

College/University	Programs offered		Honors
Longwood University Farmville, Virginia 4 Year / Public	Minor	Minor in Cyber Security, Forensics and Policy	National Center for Digital Forensics Academic Excellence by US Department of Defense
	Partnerships/ Consortiums	Partners with Commonwealth Center for Advanced Logistics Systems	
Lord Fairfax Community College Middletown, Virginia 2 Year / Public	Career Studies Certificate	Career Studies Certificate in Cyber Security	National Center of Academic Excellence in Cyber Defense for 2 Year Education
	Associates Degree	A.A.S. in Information Systems Technology with concentration in Cybersecurity	
Marymount University Arlington, Virginia 4 Year / Private	Masters Degree	M.S. in Cybersecurity	Center for Academic Excellence in Cyber Defense NSF CyberCorps Scholarship for Information Assurance recipient
		M.S. in Information Technology with concentration in Cybersecurity	
		Dual Degree Program (M.S. in Information Technology and M.S. in Cybersecurity)	
	Bachelors Degree	B.S. in Information Technology with concentration in Networking and Cybersecurity	
	Combined Degree Program	Combined B.S./M.S. Program in Information Technology and Cybersecurity	
	Graduate Certificate	Graduate Certificate in Cybersecurity	
	Certificate	Undergraduate Certificate in Computer Networking and Cybersecurity	
Norfolk State University Norfolk, Virginia 4 Year	Masters Degree	M.S. in Computer Science with concentration in Information Assurance	Center of Excellence in Cybersecurity Research Center of Academic Excellence in Cyber Defense Education Consortium Enabling Cybersecurity Opportunities and Research Grant recipient
		M.S. in Cyber Security	
	Bachelors Degree	B.S. in Computer Science with concentration in Information Assurance	
Northern Virginia Community College Springfield, Virginia 2 Year / Public	Associates Degree	Cybersecurity AAS Degree	National Center of Academic Excellence in Information Assurance for 2 Year Education

College/University	Programs offered		Honors
Radford University Radford, Virginia 4 Year / Public	Masters Degree	M.S. in Data and Information Management with course in Security Analytics	Center for Academic Excellence in Cyber Defense
	Bachelors Degree	B.S. in Computer Science and Technology with course in core security	
		B.S. in Information Science and Systems with course in core security	
	Certificate	Certificate in Information Security	
	Course	Graduate course in cyber security education for K-12 teachers	
Tidewater Community College Norfolk, Virginia 2 Year / Public	Associates Degree	A.A.S. in Information Systems Technology with an emphasis in Cybersecurity	National Center of Academic Excellence in Information Assurance for 2 Year Education
	Career Studies Certificate	Career Studies Certificate in Cybersecurity	
Virginia Tech Blacksburg, Virginia 4 Year / Public	Minor	Minor in Cybersecurity	Intelligence Community Center for Academic Excellence NSA/DHS Center for Academic Excellence CyberCorps Scholarship for Information Assurance recipient
	Graduate Certificate	Graduate Certificate in Cyber Security	
	Laboratory	Information Technology Security Laborator	
	Center/ Institute	Security and Software Engineering Research Center	

Virginia's Cyber Security Industry

Success in developing an industry can be seen in how the companies, workforce, and products are received in the market place, and in all three indicators Virginia is leading the nation. The Commonwealth is home to more than 650 cyber security companies alone, up from 450 in 2011. These include small, medium, and large companies with a diverse array of services and clients. In addition, Virginia has 19,314 technology companies and 280,906 technology occupations. The Commonwealth is third nationally in computer systems design and related services jobs, employing 142,600; fifth in employing engineering services; and third in computing systems design and related services jobs.[25]

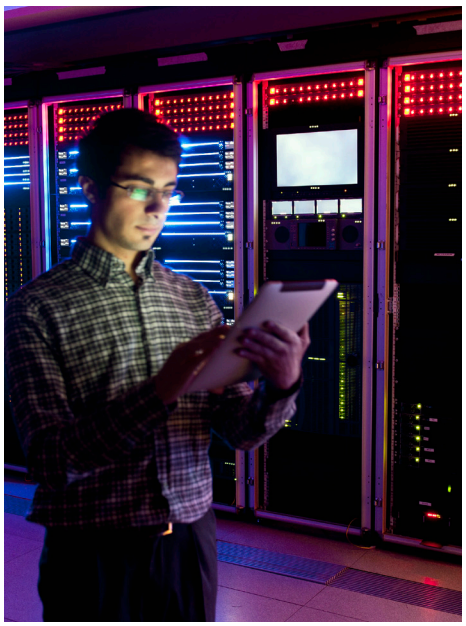
Forty of the Washington Technology Top 100 federal contracting companies are headquartered in Virginia. In the past five years, there have been more than 20 announcements related to cyber security plans to create an additional 980 jobs from companies such as Cyber Defense Solutions, FoxGuard Solutions, Telos, Kaspersky Government Security Solutions, Technology Management Solutions, and GE.[26] Demand is expected to continue to grow in this technology sector through at least 2020 with the number of persons employed in this occupational group in the Commonwealth expected to increase by 25 percent through 2022, surpassing the national expectation of just over 17 percent in that same timeframe.[27]

Virginia is also the headquarters to a number of IT Security Consulting companies such as Booz Allen Hamilton, who are all expecting to see a 68 percent rise in revenues industry-wide. Industry partners in the public and private sector are among Virginia's greatest assets in developing the strongest cyber security portfolio internationally.

Success Stories

Sera-Brynn[28]

Sera-Brynn, headquartered in Suffolk, Virginia, retained its elite standing in top the cyber security firms in the world moving up to no. 10 in the United States and continuing at no. 16 in the world rankings of like companies. Sera-Brynn approaches the cyber security



partnerships collaboratively as illustrated by CEO Rob Hegedus when he says, "Addressing cyber security requirements and response activities is more and more becoming a community-based approached." Sera-Brynn's clients include Fortune 1000 companies, healthcare, financial institutions, insurance carriers and reinsurers, higher education, municipalities and state governments, manufacturers, law offices, and more.

Verisign[29]

Verisign is a global leader in domain name and internet security and a leading provider of infrastructure services. This Reston, VA based company operates two of the internet's root servers and performs the root-zoned maintainer functions for the core of the Internet Domain Name System (DNS). Verisign ensures online businesses are available through a platform of Security Services that include intelligence-driven Distributed Denial of Service Protection, iDefense© Security Intelligence and Managed DNS. Verisign also ensures the long-term stability, security, and resilience of authoritative directoy for all .com, .tv, .cc, .name top-level, and .net domain names as well as the back-end registry for a portfolio of generic top-level domains.

Invincea[30]

With technology born out of a joint program between company founders and George Mason University's Center for Secure Information Systems, Invincea has become a leader in the protection of IT threats that impact business. More than 25,000 customers now rely on Invincea to prevent and detect threats and to enable their workforce in diverse climates. Invincea is now ranked in the top 500 Cybersecurity firms in the world.

AxonAI[31]

Axon AI is a leading cyber security firm focused on the Internet of Things (IoT) developing across and throughout technology industries. By providing a three product approach that address massive parallel, autonomous processes, scales to working with any database size, and capable of utilizing swarming technologies, AxonAI is positioning itself as a leader in the IoT space to collaborate with such innovative manufacturers as SAP, Amazon Web Sevices, NVIDIA, and Google.

L-3 & Northrop Grumman

Both L-3 Communications and Northrop Grumman offer a diverse, compelling platform of cyber security products and

[25]CompTIA LLC, 2015
[26]http://www.yesvirginia.org/Content/pdf/Industry%20Profiles/VA%20Cybersecurity%20Summary%202016.pdf
[27]Idib Pg 4
[28]https://sera-brynn.com/sera-brynn-moves-top-10-u-s-cybersecurity-500-top-global-cybersecurity-firms
[29]http://cybersecurityventures.com/cybersecurity-500/#home/viewdetails/54ce2314ae73104b48470e8c/
[30]https://www.invincea.com
[31]http://axonai.com/our-work

platforms and are both based in Virginia. Ranked 54 and 55 in the top cyber security firms in the world, federal, state, and private entities are able to incorporate world-leading technologies easily.

ThreatQuotient

Founded in 2013, Sterling, VA-based ThreatQuotient was awarded as the silver "Security Start Up of the Year" at the 2016 Info Security Global Excellence Awards, part of the RSA Conference. ThreatQuotient received funding through the Virginia Center for Innovative Technology GAP Fund, and offers ThreatQ, a threat intelligence platform that centrally manages and correlates external sources with internal security and analytics solutions for contextual and operationalized intelligence. The company's platform has integrations with commercial intelligence feeds, OSINT feeds, private feeds, import threat intelligence via email, and advanced threat solutions/malware sandboxes.

Companies Listed in the Top 500 Cybersecurity Companies in the World located in Virginia

Company	Cybersecurity Sector	Corporate HQ
Sera-Brynn	Cyber Risk Management	Suffolk, VA
IKANOW	Information Security Analytics	Reston, VA
VeriSign	Internet Security Solutions	Reston, VA
Northrop Grumman	Cyber & Homeland Security Services	McLean, VA
L-3	National Security Solutions	Reston, VA
Novetta	Cyber Security Analytics	McLean, VA
Leidos	Anti-Terrorism & Homeland Security	Reston, VA
CYREN	Web, Email & Mobile Security	McLean, VA
CyFIR	Digital Forensics & e-Discovery	Manassas, VA
Haystax	Advanced Threat Analytics	McLean, VA
LookingGlass	Cyber Threat Intelligence Management	Arlington, VA
SAIC	Cybersecurity Professional Services	McLean, VA
Siemens Government Technologies	Cybersecurity for Federal Government	Arlington, VA
ThreatQuotient	Threat Intelligence Platform	Reston, VA
MeasuredRisk	Cyber Advisory & Risk Analysis	Arlington, VA
Centripetal	Cyber Threat Intelligence	Herndon, VA
Paraben	Digital Forensics & Data Recovery	Ashburn, VA
MindPoint Group	IT Security Solutions	Springfield, VA
Ntrepid	Secure Network & Online Computing	Herndon, VA
Oberthur Technologies	Digital Security for Mobility	Chantilly, VA
CACI	Intelligence, Defense & Federal Security	Ballston, VA
General Dynamics	IT Cybersecurity Solutions	Fairfax, VA
PhishMe	Phishing Attack Defense	Leesburg, VA
MicroStrategy	Mobile Identity Platform	Tysons Corner, VA

Company	Cybersecurity Sector	Corporate HQ
Daon	Identity Assurance & Biometrics	Fairfax, VA
PFP Cybersecurity	IoT Security	Vienna, VA
Defense Point Security	Cybersecurity Services for Federal Agencies	Alexandria, VA
CSC	IT Security Services	Falls Church, VA
Invincea	Malware Detection & Prevention	Fairfax, VA
Endgame	Security Intelligence & Analytics	Arlington, VA
ePlus Security	Infosecurity Services & Products	Herndon, VA
Verodin	Cyber Attack Simulations	Reston, VA
AxonAI	Internet of Things Security	Harrisonburg, VA
Cigital	Application Security Testing	Dulles, VA
ThreatConnect	Cyber Threat Intelligence Platform	Arlington, VA
GuidePoint Security	Information Security Services	Reston, VA
Risk Based Security	Cyber Risk Analytics	Richmond, VA
SurfWatch Labs	Cyber Risk Intelligence Analytics	Sterling, VA
Distil Networks	Malicious Bot Detection & Prevention	Arlington, VA
Veris Group	Cybersecurity Professional Services	Vienna, VA

The Federal Connection: Federal Cyber Security Investments and Initiatives

Proximity to Decision-Makers

Virginia exhibits unique qualities that most other states cannot claim. Its geographical location allows for companies to have access to the nation's political decision-making center in Washington, D.C. With unparalleled access to federal legislators and the executive branch, educational and business groups have seen it in their own best interests to call Virginia home. Federal contract spending in Virginia increased nearly $1 billion in 2014 over 2013, the most out of all 50 states.[32] Deltek forecasts the demand for vendor-furnished information security products and services by the U.S. federal government will increase from $8.6 billion in FY 2015 to $11.0 billion in 2020 at a compound annual growth rate (CAGR) of 5.2 percent.[33]

Virginia is home to several federal agencies that focus on cyber security and offer contract relationships to the industry including the U.S. Army Cyber Command (ARCYBER), U.S. Department of Defense, U.S. Department of Homeland Security's National Cyber Security and Communications Integration Center, and the Defense Advanced Research projects Agency (DARPA).[34] Educational partners such as the International Cyber Center (ICC) at George Mason University, The Center for Secure Information Systems (CSIS), Cyber@VT and the Hume Center for National Security and Technology, The Cybersecurity Innovations Laboratory,

Federally Funded Research Centers in Virginia

Facility	Location
National Security Engineering Center	Bedford, MA McLean, VA
Center for Advanced Aviation System Development	McLean, VA
Center for Enterprise Modernization	McLean, VA
National Security Engineering Center	Bedford, MA McLean, VA
Center for Advanced Aviation System Development	McLean, VA
Center for Enterprise Modernization	McLean, VA
Centers for Communications and Computing	Alexandria, VA
CMS Alliance to Modernize Healthcare	McLean, VA
Homeland Security Studies and Analysis Institute	Arlington, VA
Homeland Security Systems Engineering and Development Institute	McLean, VA
Judiciary Engineering and Modernization Center	McLean, VA
National Radio Astronomy Observatory	Charlottesville, VA
Studies and Analyses Center	Alexandria, VA
Thomas Jefferson National Accelerator Facility	Newport News, VA

Federal Entity Offices in Virginia

Facility	Location
Langley Research Center (LaRC)	Hampton, VA
Wallops Flight Facility	Wallops Island, VA
Thomas Jefferson National Accelerator	Newport News, VA
United States Patent and Trademark Office (PTO)	Alexandria, VA
National Cybersecurity & Communications Integration Center	Arlington, VA
Air Force Office of Scientific Research (AFOSR)	Arlington, VA
National Science Foundation (NSF)	Arlington, VA
Office of Naval Research (ONR)	Arlington, VA
United States Fish & Wildlife Service	Falls Church, VA
Foreign Service Institute	Arlington, VA
Nuclear Waste Technical Review Board	Arlington, VA
US Marshals Service	Arlington, VA
Army National Guard Readiness Center	Arlington, VA
Joint Improvised Explosive Device Defeat Organization	Arlington , VA
United States Air Force (USAF)	Arlington , VA

[32]National Contract Management Assiciation (NCMA), Bloomberg Government, Annual Review of Government Contracting 2015 edition,
[33]Government Research Reports, Federal Information Security Market, 2015-2020 (Oct 2015)
[34]Idib Pg 6

Photo by NASA HQ PHOTO

and James Madison University's Institute for Infrastructure and Information Assurance (IIIA) interface directly with these agencies; providing mechanisms and opportunities for professionals, educators, and students to engage with federal agencies and private companies like L-3 Communications and Amazon Web Services. Engagement across industries, governments, and markets is the fundamental key to the Commonwealth's leadership success and provides a unique framework for success recognized as a national leader.

NASA & The Defense Industry

The National Aeronautics and Space Administration (NASA) and the defense industry as a whole should not be overlooked as a unique provider of opportunity in Virginia. While the defense industry is spread throughout the nation, Virginia's position is unique in the breadth of contracts and relationships available through the Department of Defense (DoD).

As of FY 2013, Virginia accounted for more than $44.6 billion in defense contracts alone, making it the No. 1 state for total revenue driven by DoD investment.[35] This success is not driven simply by the geographical access to Washington D.C., but is driven by the long-term investments made by leading companies and government agencies in the region; an investment that is likely to continue growing with the business friendly environment and partnership development in cyber security.

Twelve defense contractors are headquartered in Virginia, including Alliant Techsystems, Atlantic Diving Supply, Booz Allen Hamilton, CACI, CSC, DynCorp, General Dynamics, Huntington Ingalls, ITT Exelis, Leidos, ManTech, and Northrop Grumman. While such heavy-hitters in the same field may intimidate some companies, by being co-located in the Virginia area, new companies gain access to corporate entrepreneurial initiatives that enable cross-collaboration, increased likelihood of buyout, and a "Silicon Valley" like atmosphere focused in their field.

These defense contractors have seen the value in access to national leaders in Washington D.C., as well as a close proximity to the Pentagon and nineteen defense installations. With the Federal government focusing on investing in start-up companies by making access to venture capital easier for government related tech firms, localizing a business in Virginia has never been more important.[36]

These nineteen defense installations have cultivated programs that enable service members and procurement officers to engage with communities in the industry. By collaborating locally, diminishing the need for travel expense and increasing face-to-face communication and discussion, cyber security companies gain a leg up on any non-local competition. These Defense installations, defense contractors, and smaller firms have therefore been able

[35]Say Yes to Aerospace in Virginia, Yestovirginia.org.

to create collaborative partnerships and projects much easier than with other organizations; leading directly to research and development capabilities throughout the state.

Research and development is the first fundamental step toward innovation. By collaborating with competitors and developing private-partnerships that enable potential customers to outline their needs directly to engineering production, the iterative process of innovation comes faster and with much greater return. Virginia has therefore made these partnerships its main focus over the last five-years, and the area is reaping the rewards of those efforts.

Virginia now boasts significant partnerships between NASA, DoD, and private companies. The Virginia Modeling and Simulation Center (VMASC) applies simulation techniques to solve problems and provides training for industry, military and governments. Virginia's unique partnerships also include the Defense Advanced Research Projects Agency (DARPA) that enables private companies and universities to respond to military proposals and start-up oriented engineering labs all over the country.

Virginia as a Connector

Virginia is unparalleled in helping private companies interface and develop cross-industry relationships with military and federal government entities through its proximity to the nation's capital, and to the Virginia-based Federally Funded Research and Development Centers (FFRDC) such as MITRE and the Aerospace Corporation; research consortiums such as The Commonwealth Center for Advanced Manufacturing (CCAM) and the Commonwealth Center for Advanced Logistics Systems (CCALS); government research organizations such as the National Aeronautics and Space Administration (NASA); and the Virginia Cyber Security Partnership. By addressing a variety of industries and involving private and public entities, Virginia's ecosystem of innovation is driving the frontier of cyber security technologies as no other state can.

The Commonwealth of Virginia recognizes its role as the partnering force between the federal government and private industry to accomplish the vital task of supporting American interests throughout the world and to provide the workforce, education, infrastructure, and pro-business environment to help those partnerships flourish. The federal government, led by the February 2016 initiative to invest over $19 billion for cyber security as part of the President's Fiscal Year (FY) 2017 Budget – a 35 percent increase from FY 2016 – represents the continued growth in support and need.[37]

[36]https://www.whitehouse.gov/startup-america-fact-sheet
[37]https://www.whitehouse.gov/the-press-office/2016/02/09/fact-sheet-cybersecurity-national-action-plan

More recently, a **Cybersecurity National Action Plan (CNAP)**, and an additional $3.1 billion to modernized, retire, or replace outdated IT infrastructure characterizes the federal support for cyber security issues. The CNAP also routes an additional **$62 million for cyber security personnel**, especially those at the National Centers for Academic Excellence Cybersecurity Program locations including George Mason University, Hampton University, James Madison University, Lord Fairfax Community College, Marymount University, Norfolk University, Northern Virginia Community College, Radford University, Tidewater Community College, and Virginia Polytechnic Institute and State University – all located in the Commonwealth of Virginia.[38]

Beyond those institutions within Virginia that are heavily involved with the federal government already, Virginia seeks to be a home for new developing technology partnerships such as the newly envisioned **Cybersecurity Assurance Program**, **National Center for Cybersecurity Resilience**, and to be a leading voice in the public-private partnerships between technology companies and government envisioned by the White House in February 2016.[39] The federal government has signaled their long-term interest in partnering with states that are pro-business, locally accessible to help reduce logistical costs, and able to meet the current and future challenges facing the country. Private industry has also shown interest in investing in cyber security technologies, estimating a market size of $77 billion in 2015 with growth to $170 billion by 2020 with active participation by venture capital and new accelerator program development through Virginia.[40]

The Commonwealth of Virginia is considered the top recipient of federal contracts as a result of unique resources that will not change moving forward, including proximity to Washington, D.C., being home to the Pentagon, Quantico, and other Federal Agency Headquarters, and providing a very pro-business financial structure.[41] The Northern Virginia area, specifically, is in considered to be in the "best position in the nation to be the next "Silicon Valley" of cyber security as it combines a "developing workforce ...

[38]https://www.iad.gov/NIETP/reports/current_cae_designated_institutions.cfm
[39]https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/2016_Federal_Cybersecurity_Research_and_Development_Stratgeic_Plan.pdf
[40]http://www.forbes.com/sites/stevemorgan/2015/10/16/the-business-of-cybersecurity-2015-market-size-cyber-crime-employment-and-industry-statistics/#1ff1b58710b2
[41]National Contract Management Association. Annual Review of Government Contracting, 2015 Edition. Pg. 7

advanced and modern infrastructure ... and proximity to end-users."[42]

It will take true leadership, partnership, and support from government to meet the new challenges brought on by technologies cultivated today and Virginia is set to set the benchmark for innovative solutions. IoT is expected to bring on new challenges and "lift cyber security spending and research through 2025 ... while a cyber security workforce shortage is expected to reach 1.5 million unfilled positions by 2019."[43] Virginia is ahead of the game; addressing both needs through the creation of industry led accelerator programs, academic and private research oriented collaborations, and heavy investment in the public university system cultivating tomorrow's leaders, today. Virginia's Centers of Excellence for Education in Cyber Security, Centers of Excellence for Research in Cyber Security, and Scholarship for Service where cyber security students earn federal financial assistance are sterling demonstrations of Virginia's leadership in education solving the needs of industry.[44]

Cyber Security: Another Important Piece of the Innovation Ecosystem

The Commonwealth does not see cyber security as a technology industry that stands alone, but instead sees it as another important partner in the innovative landscape for the future that the governor's office has worked diligently to cultivate. Virginia is now a world leader in the field of Unmanned System Technologies (UMS) throughout ground, air, sea and space and leads the nation as one of only 6 FAA designated test-sites in the United States – the Mid-Atlantic Aviation Partnership (MAAP). MAAP's Virginia lead is the Secretary of Technology Karen Jackson who also co-chaired the Virginia Cyber Security Commission which outlined the states policies and goals for cyber security initiatives and needs.

Both industries have similar problems and needs, and with leadership involved in both initiatives private companies have a knowledgeable and involved executive with whom to align their own expectations. The UMS industry considers cyber security one of the most important elements in enabling future developments and integration into commercial operations. The FAA, AUVSI, and other stakeholders all cite communications protection, data and privacy security, and signal assurance as necessary to success in unmanned robotics. These technologies must grow together, and industry relationships developed in Virginia will enable that growth with significant efficiency and effectiveness. The latest news in the Unmanned Aircraft Systems (UAS) field is the final regulations passed by the FAA which will make it much easier for commercial UAS operations to succeed. By supporting these UMS industries with regional innovation and application of cyber security, Virginia pushes the limit for where both technology industries can go.

Virginia as a Partner

The Commonwealth Research Commercialization Fund and the Center for Innovative Technologies (CIT) are key players in promoting homegrown innovation for any investment opportunities. This center, developed as a flagship for the New Virginia Economic Development Plan, thrives in the recognition that the availability of early-stage capital is a critical need of many emerging technology companies and that making connection with private, public, and international funding is a difficult step in the start-up lifecycle.[45]

CIT has created for any early-stage startup the Commonwealth Innovation and Entrepreneurship Measurement Systems (IEMS); a web-based portal using key metrics to track the performance of Virginia's innovation economy, allowing angel investors and private equity firms and other stakeholders a unique insight into the life-cycles and stages of start-up companies in Virginia along with opportunities to get involved very easily. This reduces the hurdles of engagement for investment for companies and investors alike.[46]

Small businesses have been rewarded significantly by beginning their journey in Virginia. The Small Business Innovation Research (SBIR) program and the Small Business Technology Transfer program (STTR) offer similar incentives for small business that partner with non-profit U.S. research institutions. Virginia based firms, because of the local and supported access to non-profit organizations such as universities, military and non-military government groups, and R&D laboratories received a total of $109.6 million in SBIR/SBTT funds in 2014; the third highest amount of any state. [47]

By focusing on all levels of a company's life cycle, Virginia provides the perfect environment to start, grow, and commercialize any cyber-related firm. By taking advantage of the unique characteristics and government support provided in Virginia, companies make a smart decision for their future. ■

[42]http://passcode.csmonitor.com/goldrush
[43]http://www.forbes.com/sites/stevemorgan/2015/10/16/the-business-of-cybersecurity-2015-market-size-cyber-crime-employment-and-industry-statistics/3/#15e47bfb26f9
[44]https://cyberva.virginia.gov/media/4396/cyber-commission-report-final.pdf
[45]http://www.cit.org/service-lines/cit-entrepreneur
[46]http://www.cit.org/initiatives/iems/measurement-system/
[47]http://www.cit.org/initiatives/iems/research-and-development/

Incentives

New Virginian companies can be supported by a number of unique incentives geared toward enabling technologies in sub-markets. While this has created a friendly environment for all business development within the state for new or expanding firms, there are number of technology focused programs of which to be aware.

Commonwealth's Opportunity Fund

The Commonwealth's Opportunity Fund (COF) is a discretionary incentive available to secure a business location or expansion project for Virginia. Grants are awarded to localities on a local-matching basis with the expectation that the grant will result in a favorable location decision for the Commonwealth.

Grant requests are made by the community for a project under the following conditions:

- Projects must meet investment, job creation, and wage minimums
- Matching local financial participation is required on a dollar-for-dollar basis (cash or in-kind)
- Public announcement of the project must be coordinated by the Virginia Economic Development Partnership and the Governor's Office (neither the company nor the locality may publicly confirm the proposed project)
- Grants are made at the discretion of the Governor

http://www.yesvirginia.org/ProBusiness/BusinessIncentives

Governor's Development Opportunity Fund

The Governor's Development Opportunity Fund (GOF) provides either grants or loans to localities to assist in the creation of new jobs and capital investment in accordance with criteria established by legislation.

General Eligibility Thresholds:

- 50 new jobs / $5 million capital investment; or
- 25 new jobs / $100 million capital investment

The average annual wage for the new jobs must be at least equal to the prevailing average annual wage in the locality, excluding fringe benefits. If the average annual wage is twice the prevailing average annual wage, the Governor may reduce the new jobs threshold to as low as 25

http://www.virginiaallies.org/assets/files/incentives/GOFGuidelines.pdf

Virginia Investment Partnership Act/Major Eligible Employer Grant

The Virginia Investment Partnership (VIP) Grant and the Major Eligible Employer Grant (MEE) are designed to encourage continued capital investment by Virginia companies. This is intended to add capacity, modernize, increase productivity, creation, development, and utilization of advanced technology. UMS technologies are specifically being targeted for this type of investment.

To be eligible for a VIP grant, a minimum of $25 million in capital investment is required by an eligible existing Virginia manufacturer or research and development service.

http://www.virginiaallies.org/assets/files/incentives/VIPGuidelines.pdf

The Virginia Economic Development Incentive Grant

The Virginia Economic Development Incentive Grant Program (VEDIG) assists and encourages companies to invest and to provide new employment opportunities by locating significant headquarters, administrative, research and development, and/or similar service and basic sector operations in Virginia. This is a discretionary program in which grants are negotiated and offered to qualified applicants as an economic development incentive.

The VEDIG program has two separate eligibility requirements. Companies located in a Metropolitan Statistical Area with a population of 300,000 or more in the most recently preceding decennial census, must:

- Create or cause to be created and maintained (i) at least 400 jobs with average salaries at least 50% greater than the prevailing average wage; or (ii) at least 300 jobs with average salaries at least 100% greater than the prevailing average wage
- Make a capital investment of at least $5 million or $6,500 per job, whichever is greater. For all companies located elsewhere in Virginia, the company must create or cause to be created and maintained at least 200 jobs with average salaries at least 50% greater than the prevailing average wage, and make a capital investment of at least $6,500 per job

http://www.virginiaallies.org/ assets/files/ incentives/VEDIGGuidelines.pdf

Tobacco Region Opportunity Fund

The Tobacco Region Opportunity Fund is available to tobacco producing regions to assist with specific projects that result in the crea-tion of new jobs and investment. Grants are made to the community at the discretion of the Tobacco Region Revitalization Commission. The goal of the fund is to attract competitive projects ex-pected to have a regional impact due to the magnitude of new employment and investment, and the possibility of follow-on industry.

- Evaluation of award amount is consistent throughout the region and is based on the following criteria: local unemployment rates, prevailing wage rates, number of new jobs, capital investment levels, industry type, and the possibility of related economic multiplier effect
- TROF is the only Tobacco Commission grant program paid at the beginning of the project to help tobacco region localities be competitive in attracting new investment and jobs resulting in increased tax revenue and opportunity for quality employment in the tobacco region
- Intended to support the goal of the Commission to "revitalize the economies of tobacco-dependent regions and communities." This goal is measured by job creation, workforce participation rate, wealth, diversity of economy, and taxable assets. All measurements listed are increased when a new or expanding business in the tobacco region creates new jobs that pay more than prevailing wage and adds taxable assets to the local tax rolls

http://www.tic.virginia.gov/tobregionoppfund.shtml

Center for Innovative Technology Incentives

Commonwealth Research Commercialization Fund

The Commonwealth Research Commercialization Fund (CRCF) accelerates innovation and economic growth in Virginia by advancing solutions to important state, national, and international problems through technology research, development, and commercialization. Cyber security has been identified as a critical field of study.

Proposals submitted to CRCF undergo a multi-stage review process, which includes award recommendations made by the Research and Technology Investment Advisory Committee (RTIAC) to the CIT Board of Directors and culminates with award decisions made by the Board. CRCF awards contribute to the Commonwealth's overall plan to enhance economic development through technology research and commercialization and, as such, CRCF awards must further the goals set forth in the Commonwealth Research and Technology Strategic Roadmap. In addition to identifying research areas worthy of economic development and institutional focus, the Roadmap provides a framework for aligning key industry sectors within the state, as prioritized by the research community, which includes but is not limited to the private sector, academia, and economic development professionals.

http://www.cit.org/initiatives/crcf/

CIT GAP Funds

CIT GAP Funds is a family of seed-and early-stage investment funds placing near-equity and equity investments in Virginia- based technology, life science, and clean tech companies. CIT GAP Funds invests in companies with a high potential for achieving rapid growth and generating significant economic return for entrepreneurs, co-investors and the Common-wealth of Virginia.

CIT's family of funds includes:

- GAP Fund I – A vintage 2004 fund fully invested in a broad array of seed-stage technology companies
- GAP BioLife Fund – A seed fund investing exclusively in life science companies
- GAP Tech Fund – A seed fund investing in IT and technology companies
- Commonwealth Energy Fund (CEF), a seed fund investing in energy efficiency and renewable energy companies

http://www.cit.org/service-lines/cit-gap-funds/

CIT GAP Tech Fund

The CIT GAP Tech Fund makes seed-stage equity investments in Virginia-based technology companies with a high potential for achieving rapid growth and generating significant economic return. The fund invests exclusively in companies headquartered, and with an express desire to grow in the Commonwealth of Virginia.

Sectors (includes cyber security)

- Software, Telecommunications
- Semiconductors
- Security
- Information and Communication

Technologies

- E-Commerce
- Networking and Equipment
- Electronics/Instrumentation
- Computers and Peripherals
- Sensors
- Materials

http://www.cit.org/service-lines/gap-tech-fund/

Business Development Tax Credits

Refundable Research and Development Expenses Tax Credit

This credit is an individual and corporate income tax credit for certain taxpayers that incur Virginia qualified research and development expenses.

During the 2014 Session, the Virginia General Assembly enacted legislation that increased the overall credit cap, increased the per taxpayer credit cap, allows pass-through entities to elect to claim the credit at the entity level, and requires taxpayers to provide certain information to the Department of Taxation ("the Department") when applying for the credit

http://www.tax.virginia.gov/content/rd

Enterprise Zone Tax Credit

This credit provides state and local incentives to businesses that invest and create jobs within Virginia's enterprise zones, which are located throughout the state.

http://www.tax.virginia.gov/content/tax-credits#enterprise

Major Business Facility Job Tax Credit

Through this credit qualified companies locating or expanding in Virginia receive a $1,000 income tax credit for each new full-time job created over a threshold number of jobs.

- Companies locating in Enterprise Zones or economically distressed areas are required to meet a 25-job threshold; all other locations have a 50-job threshold. The threshold number of jobs must be created within a 12-month period
- The $1,000 credit is available for all qualifying jobs in excess of the threshold and is taken in equal installments over two years ($500 per year) through 2014. Credits earned after 2014 will be taken in equal installments over three years
- Non-qualifying jobs include seasonal positions shifted within Virginia, building and grounds maintenance, security, and other positions ancillary to the principle activities of the facility
- Credits are available for taxable years before January 1, 2020. Unused credits may be carried over for up to 10 years

http://www.tax.virginia.gov/content/tax-credits#Major_Business_Facility_Job_Credit

Qualified Equity And Subordinated Debt Investments Credit

This credit offers angel investors a 50% tax credit for pre-qualified small business ventures involved in technology fields. The state also offers individual and corporate income tax subtractions for long-term capital gains attributable to qualified investments in early stage technology, biotechnology, and energy start-ups; technology, nanotechnology, or any similar technology-related field, which includes cyber security.

- The credit is equal to 50% of the qualified business investments made during the taxable year. If total annual requests for the credit exceed $5 million for tax year 2015, the Department of Taxation will prorate the credit for each taxpayer
- The credit a taxpayer may claim per taxable year may not exceed the credit authorized by the Department of Taxation, $50,000, or the income tax liability on that year's return, whichever is less. The credit is nonrefundable. Unused credits may be carried forward up to 15 years

http://www.tax.virginia.gov/content/tax-credits#Qualified_Equity_And_Subordinated_Debt_Investments_Credit

Telework Expenses Tax Credit

This credit allows a tax credit to employers for eligible expenses incurred for allowing employees to telework pursuant to a signed telework agreement for taxable years beginning on or after January 1, 2012, but before January 1, 2017. An employer may be eligible for a credit of up to $1,200 per teleworking employee and/or a maximum of $20,000 for conducting a telework assessment.

- The telework assessment can only be allowed once. The aggregate amount of tax credits that will be issued is capped at $1 million annually
- An employer shall be ineligible for a tax credit pursuant to this section if such employer claims a credit based on the jobs, wages, or other expenses for the same employee under any other provision of this chapter. Additionally employers are not allowed to deduct expenses that are deducted for federal purposes

http://www.tax.virginia.gov/content/tax-credits#TeleworkExpensesTaxCredit

Worker Retraining Tax Credit

This credit allows an employer to claim a tax credit for the training costs of providing eligible worker retraining to qualified employees for taxable years beginning on or after January 1, 1999. The credit may be applied against individual income tax, estate and trust tax, corporate income tax, bank franchise tax, and taxes imposed on insurance companies and utility companies.

Eligible worker retraining includes noncredit courses approved by the Virginia Economic Development Partnership. For information on noncredit course approval, call (804) 545-5706. It also includes credit or non-credit retraining courses undertaken through an apprenticeship agreement approved by the Commissioner of Labor and Industry.

The credit is generally 30% of all classroom training costs:

- Limited to up to $200 annual credit per student if the course work is incurred at a private school or $300 per qualified employee with retraining in a STEM or STEAM discipline
- The Department of Taxation is authorized to issue up to $2,500,000 of retraining credits annually. If total requested credits exceed this amount, the Department of Taxation will prorate the authorized credits
- Credits taken may not exceed tax liability in any one taxable year. Unused credits may be carried forward for three years

http://www.tax.virginia.gov/content/tax-credits#Worker_Retraining_Credit

Additional Tax Credits

Sales and Use Tax Exemption

This exemption is for purchases used exclusively in research and development.

Research and Development Tax Credit

Businesses may claim a tax credit equal to 15% of the first $234,000 in Virginia qualified research and development expenses incurred during the taxable year or they may claim a tax credit equal to 20% of the first $234,000 in Virginia qualified research and development expenses if the qualified research was conducted in conjunction with a Virginia college or university.

- $6 million cap on the total amount of credits allowed in any fiscal year

http://www.tax.virginia.gov/content/tax-credits#ResearchandDevelopmentTaxCredit

Credit for Tax Paid to Another State

The Code of Virginia makes out-of-state tax credit provisions for income taxed by more than one state. The credit is restricted to certain types of income. The intent of the law is to address double taxation when income is generated in more than one state; however, the credit does not eliminate double taxation in all cases. For example, taxes paid to another state on non-qualifying income would not be subject to the credit provisions.

Generally, Virginia will allow taxpayers filing resident individual income tax returns to claim credit for income tax paid to another state on qualifying income derived from sources outside of Virginia, provided the income is taxed by Virginia as well as the other state. If the income is from one or more of the following states, the credit should be claimed on the nonresident income tax return of the other state instead of the Virginia return: Arizona, California, District of Columbia, Oregon

http://www.tax.virginia.gov/content/tax-credits#Credit_for_Tax_Paid_to_Another_State

Programs

SSBCI Virginia Capital Access Program

This program provides loan loss insurance to a bank to cover a portfolio of enrolled loans. It is designed to be a quick, efficient means of obtaining a credit enhancement from the VSBFA. Under most circumstances, the bank determines whether a loan will be enrolled in the program without VSBFA's involvement.

- Program is designed to assist financial institutions in making small business loans by mitigating some of the risk associated with the loan
- Program offers lenders a flexible, non-bureaucratic tool to expand their market base and enhance their ability to meet the financing needs of Virginia's businesses

http://www.vabankers.org/ssbci-virginia-capital-access-program

Small Business Microloan Program

This is a direct loan from the VSBFA to the business client that does not require a bank's participation in the transaction. It is an ideal tool for bankers who are faced with business loan requests for very small amounts where the bank would prefer to refer the client to an alternative source of funds.

The Virginia Small Business Financing Authority (VSBFA) is the Commonwealth of Virginia's economic development and business financing arm and helps banks make loans to businesses that can demonstrate repayment ability, but where the bank needs additional collateral support or a more robust secondary repayment source by providing:

- Cash collateral
- Subordinate companion loans
- Guaranties
- Loan loss reserves

http://www.vabankers.org/VSBFA

Economic Development Access Program

Administered by the Virginia Department of Transportation, this program assists localities in providing adequate road access to new and expanding basic employers.

- Funds may be used for financing the construction or improvement of secondary or local system roads within all counties and cities, and certain towns that are part of the Urban System, hereinafter referred to as eligible localities
- Ancillary improvements, such as turn lanes or intersection modifications may also be warranted as part of the access project, but are not considered the primary objective of the project

http://www.virginiadot.org/business/resources/local_assistance/access_programs/EconomicDevelopmentAccessProgramGuide.pdf

Zones

Enterprise Zones

The Virginia Enterprise Zone (VEZ) program is a partnership between state and local government that encourages job creation and private investment. VEZ accomplishes this by designating Enterprise Zones throughout the state and providing two grant-based incentives, the Job Creation Grant (JCG) and the Real Property Investment Grant (RPIG), to qualified investors and job creators within those zones, while the locality provides local incentives.

State incentives are available to businesses and zone investors who create jobs and invest in real property within the boundaries of enterprise zones.

http://www.dhcd.virginia.gov/index.php/community-partnerships-dhcd/downtown-revitalization/enterprise-zone.html

Enterprise Zone Job Creation Grant

Job Creation Grants are based on net new permanent full-time job creation exceeding a four-job threshold. Positions over the four-job threshold must meet wage and health benefits requirements to be eligible for the JCG. Firms can receive grants for up to 350 positions per year.

- Business firm must be located in a Virginia Enterprise Zone
- Business firm must create at least 4 net new permanent full-time positions over the base calendar year
- Net new permanent full-time positions created over the 4-job threshold must meet wage (at least 175% of the Federal Minimum Wage, 150% in High Unemployment Areas) and health benefits requirement (at least 50% of employee's premium paid for by employer)
- Grants are available for a five-consecutive-year qualification period
- To be eligible for the JCG in years 2-5 of the grant cycle, a business firm must maintain or increase the number of eligible permanent full-time positions (above the 4-job threshold) over base year employment. Base year employment levels are established during the first grant year and will remain consistent throughout the 5-year grant period
- Firms can continue to receive grants for any net new permanent full-time positions created over base year employment levels that meet wage and health benefits requirements
- Firms may apply for a subsequent 5-year period given they meet the grant eligibility requirements. Grant Year 2011 was the first year firms were eligible to begin subsequent five-year periods

http://www.dhcd.virginia.gov/images/VEZ/JCG-Instruction-Manual.pdf

Enterprise Zone Real Property Investment Grant

Real Property Investment Grants are available for investments made to industrial, commercial, or mixed use properties located within the boundaries of Enterprise Zones. Grants are available to qualified zone investors in amounts up to 20% of the qualified real property investment, not to exceed $200,000 per building or facility within a five year period.

The property (building or facility) must be located within the boundaries of a Virginia Enterprise Zone:

- The building or facility must be commercial, industrial, or mixed-use. Mixed-use is defined as a building incorporating residential uses in which a minimum of 30% of the useable floor space is devoted to commercial, office, or industrial use
- For the rehabilitation or expansion of an existing structure, the zone investor must spend at least $100,000 in qualified real property investments to be eligible
- For new construction projects, the zone investor must spend at least $500,000 in qualified real property investments to be eligible
- Grants may not exceed $200,000 per building or facility in a 5 consecutive-year period. 5-year periods being with the qualification year in which a grant was first awarded
- After the conclusion of a 5-consecutive-year period, the property beings another eligibility period and the grant cap of $200,000 is restored

http://www.dhcd.virginia.gov/images/VEZ/RPIG-Instruction-Manual.pdf

Technology Zones

Virginia authorizes its communities to establish technology zones to encourage growth in targeted industries. Presently, 30 cities and counties and 6 towns have created zones throughout the state. Qualified businesses locating or expanding operations in a zone may receive local permit and user fee waivers, local tax incentives, special zoning treatment, or exemption from ordinances. Once a local technology zone has been established, incentives may be provided for up to 10 years.

Localities that have established technology zones include the counties of Amherst, Arlington, Bedford, Caroline, Chesterfield, Culpeper, Fauquier, Frederick, Halifax, Henry, Page, Roanoke, Rockingham, Russell, Smyth, Spotsylvania, Stafford and Warren; the cities of Buena Vista, Charlottesville, Chesapeake, Falls Church, Franklin, Fredericksburg, Harrisonburg, Lynchburg, Manassas, Manassas Park, Newport News, Poquoson, Suffolk and Winchester; and the towns of Ashland in Hanover County, Bridgewater in Rockingham County; Cape Charles in Northampton County, Front Royal in Warren County, Kilmarnock in Lancaster County, Marion in Smyth County and Wytheville in Wythe County.

http://www.virginiaallies.org/assets/files/incentives/techzonewriteup.pdf

Foreign Trade Zones

Foreign Trade Zones (FTZ) are areas which are geographically inside the United States, but are legally considered outside its Customs territory. Companies that locate in FTZs can benefit by using special procedures to encourage U.S. activity by reducing, eliminating, or delaying duties.

- Virginia offers 6 foreign trade zones designed to encourage businesses to participate in international trade by effectively eliminating or reducing customs duties
- Numerous subzones are provided and additional ones can be designated to enhance the trade capabilities of specific companies and technologies such as UMS

http://www.yesvirginia.org/ProBusiness/BusinessIncentives

Defense Production Zones

Virginia's cities, counties, and towns have the ability to establish, by ordinance, one or more defense production zones to attract growth in targeted industries. Establishment of a defense production zone allows localities to create special incentives and certain regulatory flexibility for qualified businesses locating or expanding operations in a zone. These incentives may include: reduction of user and permit fees, special zoning treatment, exemption from local ordinances or other incentives adopted by ordinance. Virginia authorizes its communities to establish local defense production zones to benefit businesses engaged in the design, development, or production of materials, components, or equipment required to meet the needs of national defense. Companies deemed ancillary to or in support of the aforementioned categories would also apply.

- Once a defense production zone is established, incentives may be provided for up to 20 years
- Each locality designs and administers its own program
- Establishment of a defense production zone shall not preclude the area from also being designated as an enterprise zone
- Two localities currently have an established Defense Production Zone:
  - Fauquier County and the City of Manassas Park;
  - Henrico County will create individual defense production zones based around individual projects on a case-by-case basis

http://www.vaallies.org/assets/files/incentives/defenseproductionzoneswriteup.pdf

Conclusion

Virginia is proud of its distinguished history and exemplary record of national leadership through exceptional cyber security operations in support of state agencies and operations. The Commonwealth is resolute in its dedication to garnering the expertise of leaders in cyber security in order to mitigate risks. By ensuring the highest level of security for government infrastructure networks, fostering cyber security education and awareness, incorporating innovative best practices to protect data statewide, bolstering business investment with public-private partnerships, and proactively enhancing its national standing as one of the preeminent leaders in the cyber security arena, the Commonwealth leads the nation for cyber security policy.

It's also clear that the Commonwealth of Virginia has developed a world leading technology ecosystem founded on private industry innovation and public-private partnerships. Reflected in the strong presence of state, federal, military, and private cyber security businesses, assets, and activities throughout the Commonwealth, Virginia has leveraged its unique resources and relationships to create this ecosystem of innovation that underpins thriving industry development. Leaders from business, government, and higher education have joined in a shared vision that the Commonwealth will not only to continue to lead the nation in the adoption of signature Information Communication Technologies (ICTs), but to formulate and promote their creation through innovation, investment, and a pro-business environment that nurtures all companies.

The Commonwealth stands as an able and active partner that facilitates the types of innovation that have made the Commonwealth the home of the top technology companies and the number one recipient of federal investment. A shared vision for pro-business policies, a highly skilled workforce, a world-class education system, and cutting-edge technology research have put Virginia squarely at the forefront of cyber security.

Innovation and rapid technology change dominate all markets and all networks, providing ample opportunities for attack, malicious activities, and the degradation of the very systems needed to support society in this interconnected world. The Commonwealth of Virginia understands the devastating impact that neglecting these cyber security challenges poses, and has made it a primary goal to provide an environment for leaders to find partners, companies to find infrastructure and investment, and adversaries to find impenetrable defenses.■

cyberva.virginia.gov