

As discussed in the Phase I Report, the NewVa Corridor Technology Council (NCTC) identified four industries that are considered critical to regional technology-based economic growth: Energy / Environment, Medical / Biomedical, Information Technology / Software, and Transportation Technology. In December 2009, after the Report was released, focus groups were held for each of the industries; focus group participants were specifically selected to represent a variety of industry products and services, and to include both large and small businesses.

Energy / Environment Industry

Industry Participants:

Andrew McCauley – Vice President of Marketing, Danaher

Danaher designs, manufactures, and markets innovative products, services, and technologies. Danaher's business activities are comprised of seven strategic platforms from four reporting segments: medical technologies, professional instrumentation, industrial technologies, and tools and components.

Dan Sable – President, VPT, Inc.

VPT, Inc. provides high density, low profile, lightweight DC-DC converters, EMI filters, and custom engineering services for military, aerospace, space, and industrial applications.

Dr. Glenn Skutt – President, VPT Energy Systems, Inc.

VPT Energy Systems, Inc. (VPT-ES) is a spin-off of VPT, Inc. and addresses the developing Smart Grid market by providing the controllable equipment necessary for widespread adoption of plug-in hybrid electric vehicles (PHEV) and vehicle-to-grid (V2G) energy systems.

Jennifer Tomlin – Program Coordinator for Virginia Tech, SAIC

SAIC is a scientific, engineering, and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health. SAIC is a strong supporter of Virginia Tech research and a recruiter of Virginia Tech graduates.

Mark Vinson – Vice President of Engineering, ADMMicro

ADMMicro is an organization of energy experts, including highly experienced electric utility managers, electrical engineers, facilities engineers, software and database programmers, and data network specialists. Their mission is to provide the tools and strategies to cost-effectively monitor, control, and manage facilities.

Raphael Gonzalez – President, Portaqua LLC

Portaqua LLC is a manufacturer of lightweight portable drinking water processing systems designed for fast and easy set-up and operations. The company offers multiple model options including Bottling Plant System (BPS) for local bottling needs; Commercial Plant System (CPS) for local hotels, hospitals, and communities; and Emergency Plant System (EPS) for quick emergency response system.

Stanley Breakell – President, Breakell, Inc.

Breakell, Inc. is an innovative general contractor with an eye to the future. The company is pioneering new ways of working, communicating, and building through its commitment to sustainable business practices and advancing project management technology. Breakell's wide range of projects includes government, commercial, educational, industrial, healthcare, and historic renovation with a focus on sustainable building practices.

Troy Jamison – Senior Vice President, Synchrony Inc.

Synchrony Inc. is the technology leader in improving the performance and reliability of high performance rotating machinery and power conversion systems – magnetic bearings and high-speed motors and generators.

David Bennett – Customer Services Engineer, Appalachian Power (owned by AEP)

Appalachian Power provides electricity to one million customers in Virginia, West Virginia, and Tennessee (as AEP Appalachian Power). The company is a unit of American Electric Power (AEP), one of the largest electric utilities in the United States, with more than five million customers in 11 states. AEP ranks among the nation's largest generators of electricity, owning nearly 38,000 megawatts of generating capacity in the U.S.

Vernon Danielsen – Consultant Project Manager, AECOM

AECOM is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water, and government.

Cory Donovan – Executive Director, NewVa Corridor Technology Council (NCTC)

Bethanne Trexell – Office Manager, NewVa Corridor Technology Council (NCTC)

Ed Heurtematte – Board of Directors, NewVa Corridor Technology Council (NCTC)

The NewVa Corridor Technology Council (NCTC) is a non-profit member-driven association of businesses and organizations in the greater NewVa region of Roanoke and Blacksburg, VA, working together to promote growth and success of the region's technology sector. NCTC membership includes more than 200 organizations from the smallest, emerging technology firms to some of the largest employers in the region. The NCTC is building a technology community that is a catalyst for innovation, inspiration, success, and leadership within the region.

Support Staff participating:

Bob Stolle – Core Consulting

Daniel Harris – CIT

The Energy / Environment Industry Focus Group met at Tecton Products, LLC in Salem, VA on December 8, 2009.

Current Industry Condition

The NewVa Corridor region's energy / environment industry has remained stable or has grown despite the current economic recession. Most focus group participants had either recently added employees to their organizations or were in the process of doing so.

A current global focus on clean / efficient / alternative energy generation, distribution, utilization, conservation, and storage has provided significant opportunities for businesses and organizations across a wide spectrum of related fields.

Participants felt that growth in the current economic environment in the NewVa region is limited by several key factors, including:

- Transportation – particularly airport
- Lack of recognized regional identity and / or brand
- Difficulty attracting qualified employees from outside the region
- Weak state support for focused energy and environment research initiatives through Virginia Tech

Energy / Environment Industry Opportunities

The NewVa region is particularly well positioned to benefit from projected continued growth in several critical areas of the energy industry. Several outside factors, including state and federal regulation and R&D funding, will have a significant impact on the industry in the region and nationally.

Industry representatives identified several growth opportunities that the NewVa region is well positioned for, including:

- Power Electronics
- Smart Grid Technology
- Energy Data Mining and Management
- Smart and Net-Zero Buildings

Power Electronics

Power electronics is the application of solid-state electronics for the control and conversion of electric power. Virginia Tech is the lead institution in the Center for Power Electronic Systems (CPES), an Engineering Research Center established in 1998 by the National Science Foundation (NSF).

The CPES notes that “Power electronics and related power-processing techniques constitute an enabling infrastructure technology. Worldwide sales of power electronics equipment top \$60 billion each year and support another \$2 trillion in hardware / software electronics. Advances in power electronics technology can reduce losses in power conversion and more precisely control electrical power for manufacturing operations.”

Efficiency is at the heart of all power electronics applications. Therefore, research at the CPES can directly lead to commercialization opportunities not just in power conversion and management, but also in a variety of related fields such as reducing consumption, energy monitoring, and environmental applications.

Smart Grid Technology

The Energy Independence and Security Act of 2007 established “smart grid technology” as the policy for U.S. energy distribution modernization, and set \$100 million per year for matching state, utility, and private sector funding to help develop this technology. Additionally, the U.S. Department of Energy (DoE) plans to provide nearly \$4 billion in American Reinvestment and Recovery Act funds to support smart grid projects.

These projects include a variety of applications for deployment of smart grid technology and smart grid monitoring devices. The NewVa Corridor region has a strong industry and R&D base in these applications. Specific opportunities for smart grid components include:

- In-home energy displays
- Smart thermostats and other load control devices
- Sensors and management devices for smart washers, dryers, and dishwashers
- Sensors to monitor the electric power grid and automated substations
- Plug-in electric vehicles
- Production of renewable energy from customer-owned systems, such as solar power systems or wind turbines

Energy Data Mining and Management

A strong regional industry base in information technology, data mining, energy, and research creates the foundation for opportunities in energy data mining and management. This is the automated search of large volumes of energy data for usage patterns, sustained modes of operation, and correlations between different attributes.

Energy data mining enables researchers to:

- Uncover previously unknown and potentially useful relations in data and improving the understanding of the equipment and system
- Identify usage patterns and sustained modes of operation for the equipment and systems, which in turn gives a good foundation for modeling, estimating, and calculating energy requirements of the systems
- Track and predict energy usage using key indicators like weather and production units / volume
- Provide an objective, rigorous, consistent, and repeatable approach for analyzing data

Smart and Net-Zero Buildings

In 2009 – a year that was dismal for most construction and contractors in general – Stan Breakell (President of Breakell, Inc.) reported his “best year ever.” Breakell’s wide range of projects includes government, commercial, educational, industrial, healthcare, and historic renovation with a focus on sustainable building practices.

As energy prices continue to rise, and regulations on the efficiency, carbon footprint, sustainability, and other environmental impacts of new construction and development are adopted, “smart building” construction and – eventually – zero net energy consumption and zero carbon emissions annually will become more common. The development of net-zero energy buildings is possible not only through the progress made in new construction technologies and techniques, but it has also been significantly improved by academic research on traditional and experimental buildings, which collected precise energy performance data. Therefore, opportunities in this area take advantage of the NewVa region’s strength in construction, R&D at Virginia Tech, and the strong data mining and analysis presence.

Other Potential Energy & Environment Opportunities:

- Heavy Duty Vehicle Conversion to Hybrid
- Carbon Capture and Storage
- Thermal Storage
- Water Purification

Enablers

- Partnerships with Universities and Colleges such as:
 - Virginia Tech
 - Roanoke College
 - Ferrum College
 - Radford University
 - Local Community Colleges
- NCTC Partnerships (Tech Council)
- VT Center for Power Electronic Systems

Gaps

- Regional branding
- Air transportation
- Available flat land for industrial development
- Talent retention
- Virginia Tech graduate retention
- Intellectual property ownership issues
- Need for more U.S.-based electronic components
- Need for communication from universities on what research is being done
- Lack of marketing talent and expertise in the region
- Utilities limited to recouping only energy costs

Medical / Biomedical Industry**Industry Participants:**

Dr. Andy Mueleaner – Medical Director, Carilion Clinic

Carilion Clinic is a healthcare organization with more than 600 physicians in a multi-specialty group practice and eight not-for-profit hospitals. In 2007, Carilion Clinic partnered with Virginia Tech to create the Virginia Tech Carilion School of Medicine and Research Institute (commonly known as VTC). VTC will be housed in a 150,000 square foot facility at the Riverside Center on Carilion Clinic's campus in Roanoke, VA. The first class of doctoral candidates will begin course work in August 2010.

Daniel Wrappe – CEO, Wireless MedCARE, LLC

Ken Ferris – COO, Wireless MedCARE, LLC

Wireless MedCARE, LLC was formed in 2006 to provide innovative solutions for healthcare. Its initial focus is applying a product platform of wireless, sensor, and information services technology to long-term care facilities. The company is currently developing and testing the VivaTRAK sensor assisted care system.

Edward Goyette – President, American Biosystems, Inc.

American Biosystems, Inc. provides consulting services for water quality management, waste water and industrial waste treatment, and aquaculture system waste water management. The company develops industrial enzymes for cleaning purposes, as well as ingredients for animal and aquaculture feeds.

Hiram Ewald – Managing Director, Tall Oaks Capital

Formed in 2000, Tall Oaks Capital works closely with entrepreneurial teams, providing both the long-term investment support and the strategic guidance that seed and early stage companies need to grow and prosper.

Jonathan Leder – Technical Director, Novozymes Biologicals, Inc.

Novozymes Biologicals, Inc. develops industrial enzymes, microorganisms, and biopharmaceutical ingredients. Their biological solutions are used in the production of numerous products such as biofuels, detergents, food, and animal feed.

Dr. Lud Eng – Assistant Dean for Strategic Innovations, Virginia-Maryland Regional College of Veterinary Medicine

The Virginia-Maryland Regional College of Veterinary Medicine (VMRCVM) is built upon the strong foundations of two of the nation's leading land-grant universities: Virginia Tech in Blacksburg and the University of Maryland at College Park. One of 28 colleges of veterinary medicine in the United States, the VMRCVM offers comprehensive educational programs, provides advanced clinical care for clients throughout the region, and conducts a variety of animal and biomedical research programs.

Mark Coburn – President, Virginia Tech Intellectual Properties (VTIP)

Virginia Tech Intellectual Properties (VTIP) facilitates the licensing of technology to companies, encourages new faculty start-up ventures, works with publishers and distributors of software, and supports the transfer of research and knowledge to other universities, research institutes, and companies.

Tim Howland – Director, Virginia Bioinformatics Institute (VBI)

The Virginia Bioinformatics Institute (VBI) at Virginia Tech is a research institute dedicated to the study of the biological sciences. The research platform of VBI focuses on the “disease triangle” of host-pathogen-environment interactions. By using bioinformatics, which combines transdisciplinary approaches to information technology and biology, researchers at VBI interpret and apply vast amounts of biological data generated from basic research to some of today's key challenges in the biomedical, environmental, and agricultural sciences.

Dr. Tracy Wilkins – President & CEO, TECHLAB, Inc.

TECHLAB, Inc. develops, manufactures, and distributes intestinal diagnostics with an emphasis on science and collaborations with universities. Products are focused in the areas of intestinal inflammation, antibiotic-associated diarrhea, and parasitology. Research continues on markers of intestinal inflammation, the toxins of *Clostridium difficile*, *amebiasis*, and vaccine development. TECHLAB's services include both contract research and contract manufacturing

Ward Stevens – Assistant Vice President for Development, Virginia College of Osteopathic Medicine (VCOM)

The Edward Via Virginia College of Osteopathic Medicine in Blacksburg, VA is a four-year osteopathic medical school offering the degree of Doctor of Osteopathic Medicine. Osteopathic physicians enter every field of medicine from family practice to neurosurgery. The majority of osteopathic physicians, however, practice primary care, with approximately one-fourth of the profession providing care in small communities and rural areas.

Cory Donovan – Executive Director, NewVa Corridor Technology Council (NCTC)

Bethanne Trexell – Office Manager, NewVa Corridor Technology Council (NCTC)

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Support Staff participating:

Bob Stolle – Core Consulting

Daniel Harris – CIT

The Medical / Biomedical Industry Focus Group met at Tecton Products, in Salem, VA on December 8, 2009.

Current Industry Condition

In the words of one esteemed NCTC focus group participant, “The recession hasn’t hit healthcare.” Nationally, health was one of the few industries to escape negative fallout from the global recession. In fact, according to the U.S. Bureau of Labor Statistics, while real Gross Domestic Product in 2009 decreased by 2.4%, health spending grew at a rate of 5.5%. Health costs are expected to grow 9% in 2010 – still slightly less than in previous years as a result of the continuing impact of the recession and the prospect of health reform.

Anecdotal evidence from regional industry representatives indicates that the NewVa region’s Medical / Biomedical industry reflects a similar trend. Positive regional indicators include:

- Continued strong federal funding of university research in life sciences
- The new Virginia Tech Carilion Research Institute (VTCRI) joined the Virginia Bioinformatics Institute to provide a regional focus on national life sciences research priorities
- The first class of students will arrive at the Virginia Tech Carilion School of Medicine in August of 2010
- Class sizes at the regional Osteopathic Medicine and Veterinary schools are growing

Although the region has no shortage of candidates for B.S.-level employment opportunities, industry representatives report a lack of trained lower-level medical professionals, such as lab technicians.

Medical / Biomedical Industry Opportunities

Although health reform will have a major impact on the industry, its effect on medical costs likely will not be felt until 2011 or later. However, 2010 will clearly be a year of significant change that will impact the biomedical, healthcare, pharmaceutical, medical device, and other related industries for years to come. With reform to the healthcare system and the FDA’s drug approval process, stricter regulation of the medical device industry, and greater reliance on technology for healthcare delivery, challenges and opportunities should be plentiful.

The significant public and private biomedical institutions, businesses, and organizations in the NewVa region already lead the nation in many areas. Specific opportunities identified by the focus group for continued innovation and new growth opportunities include:

- Personalized Medicine
- Remote Patient Monitoring and Care Delivery
- Integration of Social Media and Technology
- Wireless Sensors and Networks

Personalized Medicine

Personalized medicine is considered to be the application of genomic and molecular data to better target the delivery of healthcare, facilitate the discovery and clinical testing of new products, and help determine a person’s predisposition to a particular disease or condition.

Historically, diseases were believed to act the same way in almost all patients, and patients typically received uniform treatment. However, today’s emerging personalized medicine field uses the volumes of genetic information from research labs as a starting point to tailor customized drug treatments to the specific genetic code of an individual patient.

A DNA diagnostic test determines an individual’s predisposition to disease based on genetic activity levels. When a disease is diagnosed, another DNA test determines whether a patient has specific versions of the disease, and a third test assists in determining the drug therapy based on the patient’s personal form of the disease. Then, a personalized therapy attacks the specific variant of the disease based on the patient’s genetic signature.

Biotech and pharmaceutical companies see personalized medicine as an opportunity to design and develop drugs that have a higher likelihood of reaching market. Assets such as VBI, VTC, VTCRI, VCOM, and VTIP ensure the NewVa region is well positioned to be a leader in personalized medicine and other emerging healthcare strategies and technologies.

Remote Patient Monitoring and Care Delivery

An increased number of patients in the system, combined with even more emphasis on cutting the cost of healthcare, will drive initiatives that reduce the need for office visits. According to a recent PricewaterhouseCoopers report, “Squeezing the Juice Out of Healthcare,” consumers are open to receiving care outside of traditional office visits. Nearly 50% of respondents said they would be willing to use telephone consultations or computer and Internet technology to access healthcare; e-mail consultations topped the list of preferred methods to access care, followed by online consultations. Several insurers reimburse for e-consults, and this trend is expected to grow.

Integration of Social Media and Technology in Healthcare

The NewVa region has a strong base of information technology (IT), data storage and mining, and data analytics expertise. The nexus of IT and healthcare is at the heart of future opportunities for many businesses and organizations in the region.

More and more patients continue to seek medical information on the Internet. With the availability and ease of use of the Internet and the emergence of social media channels, it is easy for patients to do their “homework” before even consulting with their doctors. Today’s patients do not want to be sold a surgical procedure, but rather they are seeking education to make a personal choice that is right for them.

As the availability of remote patient monitoring systems increases and the system relies more and more on disease management and home health, opportunities to engage consumers with constant feedback on their health will increase as well. Providers will need to understand how consumers use new media and emerging technology and integrate those strategies into new delivery channels.

Wireless Sensors and Networks

Wireless networks have become commonplace in our homes, businesses, and even coffee shops. Wireless sensors are equally ubiquitous in our daily lives. The convergence of these network and sensor technologies with increased demand in healthcare is prompting partnerships between the nation’s leading telecommunications companies and software developers for solutions tailored to healthcare applications. Future medical systems are expected to benefit the most in such areas as in-home assistance, smart nursing homes, and clinical trials.

Enablers

- VBI
- Carilion Healthcare
- VTIP
- Four-year and two-year universities and colleges such as:
 - VTC
 - VMRCVM
 - Roanoke College
 - Ferrum College
 - Radford University
 - VCOM
 - Local community colleges

Gaps

- Broadband availability
- Access to capital
- State support for technology transfer
- Lack of serial entrepreneurs
- Need for marketing talent related to the medical industry in the region
- Retention of talent and graduates

- Lack of collaboration between organizations
- Need for communication from inside medical sector to the outside world
- Attracting national talent to the business side
- Air transportation
- Lack of lab technicians and other lower-level medical professionals

Information Technology / Software Industry

Industry Participants:

Colin Grant – Director of Engineering, Librato, Inc.

Librato, Inc. provides data center resource management software that enables companies to reduce operating and capital expenses by dramatically increasing utilization rates.

Doug Juanarena – CEO, GenTek Ventures, LLC

GenTek Ventures, LLC assists technology start-ups and companies with the critical technical and business activities that determine market and financial success. GenTek provides entrepreneurs real-world experience and expert guidance on starting, funding, and growing a successful technology enterprise.

Jay Foster – CEO, SoftSolutions, Inc.

SoftSolutions, Inc. is an independent software firm specializing in direct machine interfaces (DMI) and “open” data integration solutions that provide real-time, easy access to business metrics that drive better decisions. SoftSolutions’ integration software has been licensed by a diverse array of firms – both large and small – throughout the international graphic arts marketplace.

John Schott – CEO, Tele-Works, Inc.

Founded in 1986, Tele-Works, Inc. delivers industry leading interactive voice response (IVR) products to utilities and municipalities throughout North America to streamline customer communications, improve collections, and grow customer satisfaction.

Jonathan Hagmaier – President, Interactive Achievement, Inc.

Interactive Achievement, Inc. develops benchmark testing software that provides educators with accurate assessments of student performance on the Virginia Standards of Learning. Interactive Achievement is in more than fifty-five school districts throughout Virginia, with over 125,000 students having answered more than 35 million questions.

Korey Mercier – Senior Systems Architect, Rackspace

Rackspace is a global web host known for their high-end managed hosting and dedicated services. The company delivers enterprise-level managed services to businesses of all types and sizes around the globe, serving more than 14,000 customers in eight data centers worldwide.

Oscar Bryant – Data Processing Executive, Mercury Data Exchange (MDE)

Mercury Data Exchange (MDE) connects dental practices, payers, and vendors through real-time technology, including eligibility and benefits verification, real-time claims adjudication, electronic remittance advice, and electronic funds transfers. These tools enable dental organizations to minimize paper-based processes, streamline workflow, speed payment times, and reduce administrative costs.

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Bethanne Trexell – Office Manager, NewVa Corridor Technology Council (NCTC)

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Support Staff participating:
Bob Stolle – Core Consulting
Daniel Harris – CIT

The Information Technology / Software Industry Focus Group met at Tecton Products, LLC in Salem, VA on December 15, 2009.

Current Industry Condition

Industry participants agreed that the regional Information Technology (IT) / Software industry was doing well and most of their businesses experienced growth in 2009. However, there was a universal concern that success for the industry is limited by difficulty attracting employees with three to ten years of experience in necessary skill sets. Although retaining employees is not an issue due to the high quality of life in the region, convincing highly skilled IT experts to relocate to a relatively unknown area is a challenge.

As with other industry groups, the IT / Software participants cited transportation as a major issue limiting the region's ability to attract technology companies and employees. Specifically mentioned were high prices and limited availability of air transportation, which caused many to use the airport in Charlotte more often than the one in Roanoke.

One of the businesses represented indicated that his company was leaving the area primarily due to the cost of doing business. Engineering and development elements of the business were being sent to India, and marketing would be handled out of the company's Silicon Valley headquarters.

The group also expressed frustration over the lack of regional cooperation among localities, a regional brand, and marketing that could help raise awareness outside of the Commonwealth.

Information Technology / Software Industry Opportunities

Information technology is the thread that weaves through all industries, businesses, and organizations. It is the backbone of critical initiatives such as electronic medical records (EMR), smart roads and transportation technology, smart grid, and virtually every field of scientific research and development (R&D). IT is core to any business' ability to communicate, market, sell, recruit, maintain records, and simply conduct daily operations.

The NewVa region has a strong base of IT businesses and expertise. Those businesses provide support to major regional employers and compete globally with innovative IT solutions and custom software applications.

Areas of particular interest to the IT / Software industry include:

- Bioinformatics
- Cloud Computing
- Web 2.0
- Data Analytics / Business Intelligence

Bioinformatics

Bioinformatics is the application of information technology and computer science to the field of molecular biology. The primary goal is to increase our understanding of biological processes by developing and applying computationally intensive techniques (e.g., pattern recognition, data mining, machine learning algorithms, and visualization) to achieve this goal.

The region is fortunate to have a national leader in the development of bioinformatics tools and processes in its own backyard. According to its website, the Virginia Bioinformatics Institute (VBI) at Virginia Tech interprets and applies "vast amounts of biological data generated from basic research to some of today's key challenges in the biomedical, environmental and agricultural sciences."

A partnership between VBI and the region's data mining and analysis expertise could provide research and commercialization opportunities in fields such as:

- Genetic sequence alignment
- Gene finding
- Genome assembly
- Drug discovery and design
- Protein structure alignment and prediction
- Prediction of gene expression and protein-protein interactions
- Genome-wide association studies

Cloud Computing

Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on-demand. In general, cloud computing customers do not own the physical infrastructure, choosing instead to avoid capital expenditure by renting usage from a third-party provider. They consume resources as a service and pay only for resources that they use.

Opportunities within the Cloud Computing model include:

- Software as a Service (SaaS)
- Utility computing, web services
- Platform as a Service (PaaS)
- Managed Service Providers (MSP)
- Service commerce
- Internet / business integration

Web 2.0

Web 2.0 websites allow users to do more than just retrieve information. They can build on the interactive facilities of “Web 1.0” to provide “network as platform” computing, allowing users to run software applications entirely through a browser. Users can own the data on a Web 2.0 site and exercise control over that data.

Business success is often determined by relationships, and Web 2.0 is all about creating and enhancing relationships. Most corporations understand the value of a presence on social networking sites but do not know how to integrate them into their business and marketing models. Web 2.0 has evolved around interactive, information sharing, user-centered and interactive creation on the web through web-based communities. Opportunities exist in helping organizations understand and use Web 2.0 in their Internet and intranet strategies through:

- Hosted services
- Web applications
- Social networking sites
- Video-sharing sites
- Wikis, blogs, etc.

Data Analytics / Business Intelligence

A strong regional industry base in information technology, software development, data storage, and business intelligence creates the foundation for opportunities in data analytics. This is the automated search of large volumes of data for usage patterns, sustained modes of operation, and correlations between different attributes.

Automated data analytics software allows businesses to:

- Uncover previously unknown and potentially useful relations in data, improving the understanding of the equipment and system
- Identify usage patterns and sustained modes of operation for the equipment and systems; this in turn provides a good foundation for modeling, estimating, and calculating energy requirements of the systems
- Track and predict energy usage using key indicators like weather and production units / volume

- Provide an objective, rigorous, consistent, and repeatable approach for analyzing data

Enablers

- Virginia Tech
- VBI
- Virginia Tech Corporate Research Center
- NCTC

Gaps

- Qualified workforce (recruit and retain)
- Broadband access
- Access to capital
- Air transportation
- Lack of serial entrepreneurs and business mentors
- Limited office space
- Regional branding and promotion
- Connectivity between Roanoke and Blacksburg (regional cooperation)

Transportation Technology Industry

Industry Participants:

Jennifer Bishop – Program Coordinator for Virginia Tech, SAIC

SAIC is a scientific, engineering, and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health. SAIC is a strong supporter of Virginia Tech research and a recruiter of Virginia Tech graduates.

Jim Flowers – Executive Director, VT KnowledgeWorks and Representative, Virginia Tech Transportation Institute (VTTI)

VT KnowledgeWorks is a regional business acceleration center serving technology-based enterprises at all stages of the corporate lifecycle. With conference and incubation facilities located in the Virginia Tech Corporate Research Center, VT KnowledgeWorks supports entrepreneurs, executives, and investors as they plan, launch, and grow companies to financial independence.

Virginia Tech Transportation Institute (VTTI) is one of the leading transportation research institutions in the nation. Its cutting-edge research is affecting significant change in public policies in the transportation domain on the state, national, and international level. VTTI's premier research facility is the Virginia Smart Road, a closed test-bed track designed for intelligent transportation systems (ITS), human factors, and safety research.

Michael Fleming – President, TORC Technologies, Inc.

TORC Technologies, Inc. is a robotics engineering and product development company focused on unmanned and autonomous vehicle systems. TORC is commercializing intelligent robotic technologies into modular, interoperable, off-the-shelf products that enable customers to rapidly integrate and deploy robotic solutions.

Mike Mollenhauer – President, Transecurity LLC

Transecurity LLC provides the state-of-the-art on-board vehicle safety systems, proactive driver crash risk analysis, and driver performance tracking. Transecurity systems monitor the driver, the vehicle, and the driving environment. They improve driver safety by providing warnings to help avoid imminent collisions, immediate feedback about the driver's safety behaviors, and data to support offline coaching and performance tracking.

Cory Donovan – Executive Director, NewVa Corridor Technology Council (NCTC)

Bethanne Trexell – Office Manager, NewVa Corridor Technology Council (NCTC)

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Support Staff participating:

Bob Stolle – Core Consulting

Daniel Harris – CIT

The Transportation Technology Industry Focus Group met at Tecton Products, LLC in Salem, VA on December 15, 2009.

Current Industry Condition

Participants indicated that the transportation industry in the region is very healthy, and they primarily attributed that to federal contracts – specifically Department of Defense (DoD) – and grants. Despite the current economy, commercial business related to the trucking industry is growing, although at a slower pace than in previous years. Partnerships with Virginia Tech and VTTI have been the source of significant business and research opportunities.

Federal regulatory policy related to safety and efficiency in the trucking industry has fueled interest in transportation technology. Increased reliance on unmanned vehicles by all branches of the military has provided opportunities for several regional technology companies.

Norfolk Southern, a shipping and transportation company in Norfolk, VA, has selected a site in Elliston, VA (Montgomery County) for a major intermodal transportation facility. Despite opposition to this site by the County Board of Supervisors, an “inland port” is likely to be located in the region.

Transportation Technology Opportunities

Transportation – specifically rail – was the first major industry in what is now referred to as the NewVa region. As rail traffic in the country grew, the region became a crossroads for coal and other rail transportation, and the industry served as the catalyst for development of the Roanoke Valley; NewVa continues to be a major center for highway and rail transportation. It also is a national leader in transportation R&D and new technologies that will increase the safety and efficiency of ground transportation in the United States.

Recently, the House Committee on Transportation and Infrastructure noted that work has begun on nearly 8,000 highway and transit projects in all 50 states as a result of the American Recovery and Reinvestment Act of 2009. The Act expanded national investment in port, freight rail, intercity rail, and high-speed rail systems. The NewVa region's history as a transportation hub and strength in transportation research and technology provide a strong foundation for future commercial opportunities.

Industry representatives identified several specific opportunities in the Transportation Technology industry including:

- Intermodal Port Operation
- Vehicle / Driver Monitoring
- Autonomous Vehicles
- Vehicle Telematics

Intermodal Port Operation

The immediate future of transportation in the NewVa region includes an intermodal port and over 2,000 related jobs. Intermodal freight transport involves the transportation of freight in an intermodal container

or vehicle, using multiple modes of transportation (rail, ship, and truck), without any handling of the freight itself when changing modes. The method reduces cargo handling, and so improves security, reduces damages and losses, and allows freight to be transported faster.

Successful freight system operations will likely rely heavily upon the adoption and use of new technologies, processes, and applications including:

- Electronic freight management
- Wireless sensors
- Freight analysis (data mining and analysis software)
- Semi-autonomous vehicles and remote system operation
- Security and surveillance
- Freight congestion mitigation

Vehicle / Driver Monitoring

Truck drivers are under a great deal of pressure to get their deliveries to their destinations on time. However, trucking companies are concerned with more than just on-time deliveries; fleet operators also need to be concerned about cost, safety of their drivers and loads, legal infractions, and other issues related to effective, cost-efficient delivery and customer satisfaction.

Increasing demand for information about vehicle and driver performance is stimulating research at Virginia Tech and other universities, and applications of that research by the trucking industry and National Highway Traffic Safety Administration. VTTI's "Naturalistic Driving Research" project has successfully spurred technology that is being evaluated for use.

Systems may be required to monitor and record not only the status of all vehicle systems and performance but also the condition, reactions, and performance of the driver. The data are collected and relayed to an operations center for analysis and action.

Opportunities identified include:

- Sensors to monitor instruments, road conditions, traffic, and driver interface
- Data collection, transmission, and analysis
- Web-based portals and dashboards
- Human factors R&D

Autonomous Vehicles

Autonomous vehicles have the potential to transform the transportation industry by virtually eliminating accidents, improving highway utilization, and maximizing vehicle efficiency. Drones and other unmanned aircraft have already become a critical part of our military's inventory, and semi-autonomous robots and ground vehicles are already in use.

Opportunities exist in both military and commercial applications. Several U.S. government-funded military efforts through the Army and Defense Advanced Research Projects Agency (DARPA) have demonstrated the ability of unmanned ground vehicles to navigate in difficult off-road terrain and in urban environments. In 2008, General Motors stated that they will begin testing driverless cars by 2015, and they could be on the road by 2018, though those plans may have changed due to recent economic considerations. Other applications include surface mining vehicles and shipyard automation.

Required technologies include:

- Sensors – understand environment
- Navigation – precise location and routing
- Motion planning analysis
- Vehicle control devices

Vehicle Telematics

Vehicle telematics is the convergence of telecommunications and information processing – specifically in automobiles – such as the emergency warning system, GPS navigation, integrated hands-free cell phones, wireless safety communications, and automatic driving assistance systems.

Remote vehicle diagnostics is another area increasingly gaining ground as it identifies mechanical or electrical problems in the vehicle, which are then automatically transmitted by the telematics system to the manufacturer’s service organization.

Regional technology opportunities:

- Wireless devices
- Wireless network access
- GPS / navigation
- Audio / video streaming
- Web 2.0

Enablers

- Virginia Tech
- VTTI
- VT KnowledgeWorks
- Department of Defense (DoD)
- Department of Transportation (DoT)

Gaps

- Air transportation
- Access to broadband
- Lack of serial entrepreneurs
- Access to capital
- Lack of a contract mechanism with the federal government