The Virginia Tech Transportation Institute (VTTI) conducts research to save lives, save time, save money, and protect the environment. Researchers and students from multiple fields are continuously developing the techniques and technologies to solve transportation challenges from vehicular, driver, infrastructure, and environmental perspectives.

As one of seven premier research institutes created by Virginia Tech to answer national challenges, VTTI has effected significant change in public policies for driver, passenger, and pedestrian safety and is advancing the design of vehicles and infrastructure to increase safety and reduce environmental impacts.
VTTI at a glance

40 million miles of data
enough to drive from Earth to Mars at their closest point

90% of the realistic driving data in the world
(2.5 petabytes)

100 private and public-sector sponsors and partners

$40,000,000+
in annual sponsored research
(includes VTT, LLC)

$30,000,000+
in advanced-vehicle research and
development conducted to date

300+ active projects

475 employees

90 vehicles in the VTTI fleet
covering more than
390,000+ miles of research in FY2017
Institute Infrastructure

VTTI has an infrastructure worth more than $110 million that includes four test beds used extensively for real-world, impactful transportation research; more than 90,000 square feet of building space located on-site in Blacksburg, Va.; and more than 60 owned and leased instrumented vehicles, including connected-automated Cadillac SRXs and an International Lone Star tractor-trailer that will soon be instrumented for automation research.

01. Test Beds

Headquartered at VTTI, the Virginia Smart Road is a 2.2-mile, controlled-access facility managed by the institute and owned and maintained by the Virginia Department of Transportation (VDOT). The road itself is built to Federal Highway Administration specifications and features seven roadside equipment units and two mobile roadside equipment sites that facilitate connected-vehicle communications; an optical fiber communication system; Ethernet fiber transceivers and Ethernet switches; a connected-vehicle-compatible intersection controller model; varying pavement sections and in-pavement sensors; 75 weather-making towers capable of producing snow, rain, and fog; a differential GPS base station for precise vehicle locating; a signalized intersection with complete signal phase and timing control; a wireless mesh network variable control system; and variable pole spacing designed to replicate 95 percent of national highway lighting systems.

In 2014, VTTI partnered with VDOT to unveil the Virginia Connected Corridors (VCC), which comprise the Smart Road and Interstates 66 and 495, as well as U.S. 29 and U.S. 50 (one of the most congested corridors in the U.S.). The VCC is facilitating the real-world development and deployment of connected-vehicle technology via dedicated short-range communications and cellular technology. Using more than 60 roadside equipment units (REUs) located along the corridors, VDOT and researchers from multiple institutes across the Commonwealth are implementing connected applications that include traveler information, lane closure alerts, and work zone and incident management. Under the umbrella of the recently completed Tier 1 U.S. Department of Transportation Connected Vehicle/Infrastructure University Transportation Center, VTTI, the University of Virginia, and Morgan State University conducted more than 20 connected projects along the VCC, including emergency vehicle-to-vehicle communications, motorcycle crash warning systems, eco-speed control, intersection management, and pavement assessment and management.

In 2015, VTTI partnered with VDOT, Transurban, the Virginia Department of Motor Vehicles, and HERE (a high-definition mapping business) to unveil the Virginia Automated Corridors (VAC). This initiative provides an automation-friendly environment that government agencies, auto manufacturers, and suppliers can use to test and certify their systems, providing a system migration path from test-track to real-world operating environments. The VAC leverages extensive experience in on-road safety research to provide efficient solutions to automated-vehicle testing. The VAC was developed in answer to the Virginia governor’s 2015 proclamation declaring Virginia “open for business” in the realm of automated vehicles. The proclamation allows the testing of any automated vehicle on Virginia roads under the guidance of VTTI. The Virginia Department of Motor Vehicles will support research efforts performed by VTTI in accordance with the proclamation. With assistance from the Commonwealth of Virginia, the VAC will advance the development, testing, and deployment of automated-vehicle technology, with the ultimate goal of helping stakeholders create robust automated and autonomous vehicles.

Faculty and students associated with the USDOT-awarded Safety through Disruption National University Transportation Center (Safe-D National UTC)—a consortium led by VTTI with partners Texas A&M Transportation Institute and San Diego State University—have access to the Virginia Connected and Automated Corridors to perform research into such disruptive technologies as automated and connected vehicles, as well as big data analytics and transportation as a service. Current UTC projects include identification of railroad requirements for the automated- and connected-vehicle environment, pavement perspectives in relation to automated vehicles, driver training for automated-vehicle technology, preparing work zones for automated/connected vehicles, behavior-based predictive safety analytics, data mining to improve planning for pedestrian/bicyclist safety, using big data to assess corridor safety, and investigating opportunities for increased safety and improved mobility among older drivers.

The Virginia International Raceway in Alton, Va., was established as a cooperative agreement through which VTTI can conduct connected and automated projects in a multi-use testing environment that includes both closed-course and open traffic conditions. On site at the raceway is a resort that features a 12-unit complex of residential villas, a lodge, a club house, a full-service restaurant and tavern, administrative offices, and a spa. The raceway track can be configured to five different courses ranging from 1.1 miles to 4.2 miles and includes such topography as hairpin curves and blind passes. The Virginia International Raceway is also home to the Virginia Motorsports
Technology Park, which contains the Global Center for Automotive Performance Simulation (GCAPS), an affiliated company of VTTI that features the globe’s premier force-and-moment tire test facility.

In partnership with VDOT and Virginia Tech, the institute is expanding upon its Smart Road testing capabilities with a rural road test bed and surface street expansion, both of which will facilitate tailored, advanced, unique test-bed options for self-driving ground vehicles. The initiatives will encompass a residential/suburban layout that features real buildings and reconfigurable buildings, roundabout/stop-controlled intersections, automation-compatible pavement markings, hills and curves, and connectivity to the Smart Road. The institute is also working on an automation hub initiative that will facilitate short turnaround projects focused on advanced-vehicle testing in collaboration with VTTI researchers, industry leaders, and Virginia Tech students, among others.

02. Blacksburg Facilities
The traditional laboratories at VTTI are housed in two buildings totaling more than 52,000 square feet. Building I is 30,000 square feet and houses office, laboratory, and garage facilities. Low-service laboratories include facilities dedicated to driver interface development, eye-glance data reduction, lighting research, accident analysis, accident database analysis, pavement research, and traffic simulation. The National Surface Transportation Safety Center for Excellence building comprises 22,000 square feet of office and laboratory space and was occupied in July 2006. VTTI expanded its on-site capacity by 7,000 square feet of warehouse space and housing for a shock tube lab, a paint booth facility, and a lighting lab. An additional 24,400 square-foot annex was opened during August 2013.

To supplement and support the focused transportation research of the institute, facilities feature a fully staffed garage and machine shop to instrument experimental vehicles. Technicians and engineers use full-scale machine and welding shops, electronics laboratories, and garage facilities to customize transportation hardware and software designed to collect large amounts of data. These facilities are also used to support the maintenance and expansion of the Smart Road systems and capabilities. Additionally, VTTI occupies an adjacent four-bay, 7,200-square-foot garage. This facility is used to store the VTTI instrumented vehicle fleet and the equipment necessary for research and Smart Road operations.

03. Accelerated Pavement Testing
VDOT and VTTI launched an accelerated pavement testing program in 2015, which uses a heavy-vehicle simulator that continuously applies a weighted load to test pavements for several months. This testing simulates the natural wear and tear caused by heavy trucks on road surfaces. The program is expected to result in cost savings in road maintenance and will enable VDOT to determine how different pavement designs and materials respond to load testing prior to integration on the road. Since its inception in 2015, the program has resulted in approximately $1.1 million in expenditures.

04. VTTI Vehicle Fleet
The VTTI vehicle fleet is uniquely instrumented for specific experiments. Researchers use the vehicle fleet for Smart Road tests, and experimental test vehicles are used to develop new instrumentation packages and complement research endeavors. Several of the vehicles are long-term loaners from vehicle manufacturers, VDOT, and other partnering organizations. All vehicles are maintained in-house when possible with fully functional garages and a machine shop. Loaned vehicles are maintained in cooperation with the organization that provided the vehicle.
RESEARCH PROJECTS

1. In November 2016, VTTI and partners Texas A&M Transportation Institute and San Diego State University – with support from the Virginia Department of Transportation (VDOT) – were named one of two national safety University Transportation Centers (UTCs) in a highly competitive grant process. The grant brings with it a total of almost $28 million across a five-year span to study how best to maximize the safety benefits of integrating technologies such as automation and connectivity into the transportation system. Motivated by an overall desire to promote safety on U.S. roadways, the Safe-D National UTC will focus on three key areas: performing innovative research that is led by the largest consortium of transportation safety researchers in the nation and is largely focused on advanced-vehicle technologies, transportation as a service, and “big data” analytics; education and workforce development; and sharing research findings with the broader transportation community. The Safe-D award is exemplary of the hard work and dedication VTTI researchers have collectively put into studying the future of transportation. It provides continued opportunity to work toward the safe and efficient development and deployment of the next generation of vehicles and technologies, inform national discourse about how best to mitigate rapidly growing transportation challenges, offer students incredible hands-on experience in the field of transportation research, and provide more opportunities in the workforce.

2. In September 2016, VTTI hosted the Virginia Tech Mid-Atlantic Aviation Partnership and X’s Project Wing, which conducted research flights to deliver food using unmanned aerial vehicles. Project Wing is an innovation lab formerly known as Google[x] that incubates new breakthroughs in science and technology. The flights marked Project Wing’s first tests involving external users in the U.S. and its first collaboration with a Federal Aviation Administration (FAA)-approved unmanned aircraft test site.

3. VTTI is serving an integral role in the Virginia Tech intelligent infrastructure initiative, particularly in the area of advanced-vehicle research and development. In partnership with VDOT, the institute is expanding upon its Smart Road testing capabilities with a rural road test bed and surface street expansion, both of which will facilitate tailored, advanced, unique test-bed options for self-driving ground vehicles. The institute is also working on an automation hub initiative that will facilitate short turnaround projects focused on advanced-vehicle testing in collaboration with VTTI researchers, industry leaders, and Virginia Tech students, among others.

4. VTTI is a subcontractor to Morgan State University on its Tier 1 UTC, Urban Mobility & Equity Center (UMEC). UMEC is federally funded as a Tier 1 research center through the Fixing America’s Surface Transportation (FAST) Act. UMEC seeks to bolster the scientific foundation and discern equity implications for policies that focus on urban mobility. UMEC will contribute to the body of knowledge on which planning and policies are based by researching transit/paratransit and freight planning and operations; buyers’ acceptance, affordability, and government promotion of connected and automated vehicles; and the distribution of transportation costs and benefits, including user fees and taxes. Research focus areas include increasing access to opportunities, smart cities, novel modes of transport, systems integration, analytical tools to optimize movement, and regional planning.

5. The Xerox Palo Alto Research Center (PARC) and VTTI were awarded an ARPA-E-funded project developing the Collaborative Optimization and Planning Transportation Energy Reduction (COPTER) control architecture. The architecture represents a complete solution for the TRANSNET goal, with comprehensive transportation network modeling, a decision-theoretic approach for system optimization, and explicit human behavior and influence modeling to maximize real-world impact. This project leverages PARC competencies in model-based control of complex systems and human cognitive modeling, the recognized leadership of VTTI in transportation modeling and control, and substantial incumbency of Xerox as a provider of transportation service solutions to U.S. cities to create a project that is meaningful, executable, and transitionable.

6. VTTI was awarded a U.S. Department of Energy project to develop a novel Eco-Cooperative Automated Control (Eco-CAC) system that integrates vehicle dynamics (VDI) control with connected- and automated-vehicle (CAV) applications. The approach
is revolutionary in that it develops a next-generation, VD-controlled CAV system that builds on existing CAV technologies to reduce the energy/fuel consumption of internal combustion engine vehicles (ICEVs), battery-only electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and hybrid electric vehicles (HEVs). The development of the Eco-CAC system will involve the following key steps and components: 1) Develop a CV eco-routing controller that can be used with the above vehicle types. This unique eco-router will compute vehicle routings optimized for the individual user and entire system. 2) Develop a speed harmonization controller that regulates the flow of traffic approaching bottlenecks in the network. This controller will be fully integrated with the vehicle router, resulting in a unique strategic controller that can route traffic away from congested areas and regulate the flow of traffic entering congested areas. 3) Develop a multi-modal (ICEVs, BEVs, PHEVs, and HEVs) Eco-Cooperative Adaptive Cruise Control-1 (Eco-CACC-I) controller that computes and implements optimum vehicle trajectories along multi-intersection roadways in consideration of dynamic vehicle queue predictions. 4) Develop an Eco-CACC-U controller that provides local longitudinal energy-optimal control in consideration of the homogenous and non-homogeneous vehicle platooning of ICEVs, BEVs, PHEVs, and HEVs. 7. VTTI continued to work with the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) to provide data sets and support to nine state DOT research teams working on Phase II Implementation Assistance Program projects. The goal of these efforts is to identify safety problems and generate countermeasures that reduce risk and prevalence. 8. VTTI worked with FHWA to provide data sets to six research teams working in their respective Broad Agency Announcement efforts. These efforts are targeted toward the generation of safety interventions that reduce the incidence and severity of vehicular crashes. 9. As part of its role as operator of the Second Strategic Highway Research Program (SHRP) 2) Naturalistic Driving Study data set, VTTI provided data to support dozens of research projects, primarily geared toward advancing transportation safety as sponsored and performed by academic institutions, state DOTs, the federal government, research organizations, and private industry partners. 10. VTTI submitted a proposal to the Transit IDEA program to evaluate a computer-based operator education and training program. 11. VTTI submitted and was recently awarded a National Science Foundation (NSF) proposal to conduct a workshop on the challenges, benefits, and research needs of displaced workers from autonomous trucks. This proposal was recommended for funding in the Work at the Human-Technology Frontier: Shaping the Future convergence area. 12. VTTI was awarded a project from Transport Canada to develop guidelines for limiting driver distraction for devices with visual displays. 13. For the first time, VTTI was awarded two projects funded by the Federal Transit Administration (FTA). The first award addresses collision avoidance systems in transit buses and involves several new collaboration partners: Pierce Transit, ROSCO-MobilEye, DCS Technologies, NewFlyer, and Washington State Transit Insurance Pool. The second project addresses the evaluation of a new bus mirror design and involves New York City Transit, NewFlyer, RECARO (seat supplier), and SafeFleet. 14. VTTI was awarded a subcontract to the Intelligent Automation, Inc. (IAI) in a Small Business Innovation Research (SBIR) project where the main contractor is the U.S. Department of Defense/Navy. 15. VTTI was awarded a contract with Volvo Trucks to work in the QUADRAE national Swedish project on driver modeling and simulation. The project involves several other new collaboration partners that include Volvo Cars, Autoliv, and VTI (the Swedish National Road and Transport Research Institute). 16. In collaboration with the University of Utah, VTTI resubmitted an National Institutes of Health (NIH) R21 proposal to estimate the overall prevalence of obesity, diabetes mellitus and medication use, kidney disease, dipstick urinalysis results, and hypertension in a large cohort of truck drivers. 17. VTTI resubmitted a National Institute for Occupational Safety and Health (NIOSH) R21 proposal to assess the prevalence of mental disorders on long-haul truck drivers. 18. Institute researchers submitted an internal NIOSH proposal (i.e., acting as a subcontractor for NIOSH) to evaluate a fatigue management program in commercial trucking operations. The proposal is expected to be awarded in October 2017. 19. VTTI continues to collaborate with 36 organizations, including Booz Allen Hamilton, Bosch, GM, Google, Honda, Mercedes-Benz, Nissan, and Volkswagen/Audi, under the NHTSA Vehicle Electronic Systems Safety IDIQ contract. This team was organized to respond to all aspects of the National Highway Traffic Safety Administration (NHTSA) project, including electronics safe reliability, cybersecurity, vehicle automation, and related human factors considerations. To date, VTTI has received awards of nearly $7 million under this contract. 20. VTTI continues to propose task orders released under a contract from the Transportation Research Board (TRB) of the National Academy of Sciences potentially worth an initial $2 million (with the possibility of additional funds). The task orders are designed to: 1) Identify critical issues associated with connected and automated vehicles that state and local transportation agencies and AASHTO will face, 21. For the first time, VTTI was awarded two projects funded by the Federal Transit Administration (FTA). The first award addresses collision avoidance systems in transit buses and involves several new collaboration partners: Pierce Transit, ROSCO-MobilEye, DCS Technologies, NewFlyer, and Washington State Transit Insurance Pool. The second project addresses the evaluation of a new bus mirror design and involves New York City Transit, NewFlyer, RECARO (seat supplier), and SafeFleet. 14. VTTI was awarded a subcontract to the Intelligent Automation, Inc. 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FY17

PROJECT HIGHLIGHTS

2) Conduct research to address those issues, and 3) Conduct related technology transfer and information exchange activities.
21. VTTI is collaborating with National Surface Transportation Safety Center for Excellence (NSTSCE) and the National Occupational Research Agenda (NORA) Oil and Gas Extraction Sector through affiliates within the Center for Disease Control (CDC) and NIOSH to investigate factors among oil and gas service fleets (e.g., shift, roadway, and driver performance) that are associated with a high number of vehicle-related fatalities. A pilot study was completed, and efforts are underway to identify good practices among large fleets and distribute them among small fleets while collecting naturalistic driving and in-vehicle monitoring system data.
22. VTTI is continuing its collaboration with IAI to develop a robust Multi-modal Driver Distraction and Fatigue Detection/Warning System (MDF) for commercial vehicle operations. This Federal Motor Carrier Safety Administration (FMCSA)-sponsored SBIR project was recently awarded Phase II funding. VTTI is providing expertise in the areas of driver fatigue, drowsiness, and distraction; access to its large vehicle monitoring system data; and Fatigue Detection/Warning System (MDF) for vehicle monitoring system data.
23. VTTI began an active sponsored research program with Transurban, a roadway operator currently overseeing major segments of Virginia’s infrastructure, such as the I-95 and I-495 high-occupancy toll (HOT) lanes in Northern Virginia. This program is furthering advanced infrastructure and automated-vehicle technologies.
24. VTTI began a formal research relationship with the District DOT (DDOT) during FY17, thus expanding its relationship with roadway operators. The DDOT program is focused on developing operational benefits from connected vehicles through improving the department’s fleet operations.
25. As in previous years, VTTI continues to develop relationships with both public and private sponsors. This year, VTTI initiated several new relationships with proprietary sponsors, which are likely to result in continued funding in future years. In addition, VTTI has continued to develop its relationship with the Alliance of Automobile Manufacturers (AAM), working closely with AAM members on proprietary projects.
26. In conjunction with VDOT, VTTI continues to expand the capability and utility of the Virginia Connected and Automated Corridors (VCC/VAC), with expenditures during FY17 of nearly $700,000. VTTI extended the VCC Mobile Android phone application to support inputs from the VDOT Active Traffic Management System. VTTI also created a data interface and handling system that supports the broadcast of signal phasing and timing and geographic mapping data from six intersections in the Tyson’s Corner area of Northern Virginia. The VCC Mobile application can also receive and present the signal timing and phasing data to the driver through a user interface.
27. VTTI extended the VCC to support testing of new standardized message concepts for the Advanced Message Concept Development project with the Crash Avoidance Metrics Partnership (CAMF). These extensions supported the test and evaluation of the concepts in a real operational traffic environment.
28. VDOT and VTTI launched an accelerated pavement testing program, which uses a heavy-vehicle simulator that continuously applies a weighted load to test pavements for several months. This testing simulates the natural wear and tear caused by heavy trucks on road surfaces. The program is expected to result in cost savings in road maintenance and will enable VDOT to determine how different pavement designs and materials respond to load testing prior to integration on the road. Since its inception in 2015, the program has resulted in approximately $1.1 million in expenditures.
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30. Revenue of the VTTI-affiliated Global Center for Automotive Performance Simulation (GCAPS) grew by more than 30% during FY17. This increase is largely due to new clients and a substantial growth in testing conducted with established customers.
31. VTTI researchers have assembled a team of nine police agencies, including the Virginia State Police, to perform a field operational assessment of the lighting and markings of police vehicles.
32. VTTI built a partnership with Thomas Jefferson University to work on issues involving light and human health.
33. VTTI has made initial arrangements to create a Virginia Tech Smart Outdoor Lighting Laboratory in partnership with the Virginia Tech Corporate Research Center.
34. VTTI successfully partnered with WSP Parsons Brinkerhoff to work on the National Cooperative Highway Research Program (NCHRP) Project 05-22 – LED Lighting Specifications.
35. In 2014, VTTI began work in collaboration with several departments across campus to develop a health and injury control center. This evolving center is designed to enhance research opportunities that promote driver health and wellness and reduce injuries. To date, collaborating departments include Fralin; Psychology; Biomedical Engineering; Human Nutrition, Foods, and Exercise; the Virginia Tech Center for Autism Research; Computer Science; Gerontology; Construction; the Virginia Tech Carilion Research Institute; the Virginia Tech Child Study
16 17

PROJECT HIGHLIGHTS

Center; and the Virginia Tech Child Development Center. During 2017, faculty and researchers working under this initiative submitted white papers and proposals to several organizations, including NSTSCE, FMCSA, NIH, NIOSH, NCHRP of the TRB, and FTA. Through these efforts, the team continues to search for funding opportunities and possible collaborations.

36. Institute researchers are collaborating with the FHWA to establish and provide support for a secure data enclave at the Safety Training and Analysis Center, which allows secure access of the SHRP 2 Naturalistic Driving Study data to federal employees, state DOTs, and their research partners.

37. VTTI partnered with the Virginia Tech Psychology Department and Texas A&M University to evaluate tacit communication behaviors of drivers at pedestrian crosswalks.

38. VTTI led a project funded by FTA on collision avoidance in transit buses, which involves collaboration with the University of Washington.

39. VTTI was awarded a contract with Volvo Trucks in Sweden to represent the company in a Swedish national research project on driver modeling and simulation (QUADRAE). This work involved a close collaboration with Chalmers University in Sweden.

40. VTTI submitted a proposal with the Virginia Tech Mining Engineering Department and University of Kentucky to the Alpha foundation on automated shuttle cars in coal mines. The award decision is expected in October 2017.

41. VTTI is leading collaborative projects leveraging departments across Virginia Tech under the Safe-D National UTC. VTTI faculty are actively developing collaborative projects with faculty and students in the College of Engineering, the College of Architecture and Urban Studies, and the College of Science. As new projects are awarded bi-annually, more collaborative projects across more departments on campus are expected.

42. VTTI is collaborating with the Virginia Center for Autonomous Systems (Vacas) and the Hume Center on a five-year, $25 million IDIQ contract awarded by NHTSA.

43. The VTTI-affiliated National Tire Research Center (NTRC) in Southern Virginia and Virginia Tech Materials Science faculty are collaborating to study ways to recycle the materials in tires to substantially reduce the resulting carbon footprint.

44. VTTI is analyzing the potential link between roadway lighting levels and physical activity levels such as walking and running with faculty from the Virginia Tech Urban Affairs and Planning, School of Public and International Affairs.

45. VTTI is a subcontractor to North Carolina A&T State University on its Tier 1 Center for Advanced Transportation Mobility (CATM) UTC. CATM is a consortium consisting of four higher education institutions: North Carolina Agricultural and Technical State University (lead), Virginia Tech, Embry-Riddle Aeronautical University – Daytona Beach, and the University of the District of Columbia – Community College. These four institutions collaborate on projects focused on identifying solutions to mobility concerns within two primary areas: 1) Enabling safe and efficient mobility for vulnerable road users and 2) Optimizing mobility in emergency situations. The center will address the transportation needs of an extremely broad spectrum of the U.S. population, thereby helping the nation maintain its competitive advantage in the global economy.

46. VTTI is collaborating with the Virginia Tech Psychology Department and the Virginia Tech Carilion Research Institute on an adolescent risk/brain development study. Questionnaire/survey data and MRI data are being collected on a sample of 180 teenagers in rural Appalachia. VTTI will be instrumenting 20 of these participants’ vehicles to obtain objective measures of driving performance to add to previous metrics, resulting in an overall assessment of risky behavior in these adolescents.

47. VTTI collaborated with the Virginia Tech Child Study Center to submit an NIH RO3 proposal to investigate the impact of ADHD on risky driving behavior.

48. VTTI and the Children’s Hospital of Philadelphia (CHOP) submitted a proposal to the NSF Big Data RFP to evaluate the driving behavior of drivers in various age cohorts. The project was recently awarded to the CHOP/VTTI team.

49. VTTI collaborated with a consortium of Australian driving researchers to submit a proposal to the Australian Research Council. The proposal seeks to obtain funding to conduct a naturalistic driving study of Australian teenage drivers. The proposal consortium comprised researchers from University of New South Wales and Monash University.

50. VTTI is partnering with the Science Applications International Corporation (SAIC) to investigate the prevalence of non-alcohol drugs in drivers arrested for impaired driving.

51. VTTI collaborated with the Virginia Tech Center for Autism Research (VTCAR) to conduct a survey of attitudes of teens with autism and their parents toward driving.

52. VTTI is leading an ongoing collaboration with researchers from the University of Virginia medical school to study the driving performance of novice teen drivers with autism. The study is using real and simulated driving metrics.

53. VTTI is collaborating with researchers at the Texas A&M Transportation Institute to study the use of child seats in ride-share vehicles. The study is part of a Safe-D National UTC project.

54. As part of a CATM UTC project, VTTI researchers are collaborating with peers at North Carolina Agricultural & Technical University to develop a mobility assistance application for pedestrians with physical disabilities.
VTI formed a collaboration with researchers at the University of North Carolina Highway Safety Research Center to author papers and conduct outreach as part of the FHWA Pedestrian & Bicycle Information Center program.

**EDUCATION AND OUTREACH**

(For more information about student involvement, please refer to the Publications and Presentations sections of this report).

1. VTTI houses close to 90% of national and international naturalistic driving data in the world. With onsite data reduction labs and extensive analysis experience, the institute realized the role it could play in helping others mine and reduce its data to answer subsequent research questions about driver behavior and performance. From a student perspective, the labs provide myriad opportunities for both undergraduates and graduates to receive advanced training and participate in data reduction and analysis activities conducted at VTTI. During FY17, the data reduction lab at VTTI employed 87 Virginia Tech students, of which 78 (90%) were undergraduates.

2. The VTTI-affiliated GCAPS has provided internships for Virginia Tech mechanical engineering students and has actively supported the Patrick Henry Community College Motorsports Program. GCAPS representatives also sit on advisory committees for Danville Community College and host interns from the Danville-area Academy for Engineering and Technology program, which comprises high school students interested in engineering careers.

3. With support from the Virginia Tech Graduate School and in collaboration with affiliated faculty in civil and environmental engineering, industrial and systems engineering, psychology, and statistics, VTTI is offering the Human Factors of Transportation Safety Graduate Certificate Program (HFTS GCP). The certificate program is designed to create and deliver to students in-depth knowledge and marketable skills applied to the research, evaluation, maintenance, improvement, and protection of all ground transportation users and their communities – all from a human factors perspective, which is a strong educational focus of VTTI and Virginia Tech. Students enrolled in the program will become leaders in the field of transportation safety within the Commonwealth, across the nation, and internationally. Four graduate students are currently enrolled in the certificate program, and four certificates have been awarded since the program began in 2014.

4. In collaboration with the TRB of the National Academy of Sciences, VTTI generates and makes available transportation data sets that are delivered free-of-charge to graduate students, selected through a competitive process, to support their thesis and/or dissertation project. Safe-D research projects currently fund 17 students across its partnering institutes of Virginia Tech, Texas A&M Transportation Institute, and San Diego State University (two undergraduate, nine masters, six Ph.D.), including five students from underrepresented populations. Of these 17 students supported, four are from Virginia Tech. Furthermore, faculty involved with Safe-D reported teaching 15 graduate courses (reaching 204 students) and 11 undergraduate courses (reaching 588 students).

5. The Safe-D National UTC is currently supporting a collaborative summer internship program held at Texas A&M Transportation Institute during the summer of 2017. Through this program, interns are matched with mentors and research projects, including many led by Safe-D faculty, to gain hands-on experience in transportation research. Of the 16 applications received, nine students were selected for the Summer 2017 internship program. VTTI and the Safe-D National UTC are currently developing plans for the VTTI Automation Hub. This hub is both a program and a physical structure that will be located adjacent to VTTI test tracks and garages. With support from public and private sponsors and Safe-D, the Automation Hub will provide advanced training and practical hands-on experience to students in a variety of transportation-related areas and the opportunity to collaborate with faculty across Safe-D consortium universities.

6. Graduate students employed by various departments at VTTI worked together to coordinate the Transportation Seminar—The Future of Transportation. The event was held August 31 – September 1, 2016, at the Inn at Virginia Tech and brought together women accomplished in the transportation field. The seminar also included a poster session for undergraduate and graduate students and speed-mentoring sessions where students could receive guidance directly from professionals.

7. VTTI currently employs more than 20 undergraduate and graduate students as on-road and in-vehicle experimenters.

8. VTTI played an important role in the Sixth International Symposium on Naturalistic Driving Research, held in The Hague, The Netherlands, on June 8 and 9, 2017, VTTI served on both the Scientific and Panel tracks and garages. With support from public and private sponsors and Safe-D, the Automation Hub will provide advanced training and practical hands-on experience to students in a variety of transportation-related areas and the opportunity to collaborate with faculty across Safe-D consortium universities.
and Organizing committees. The Symposium was held in conjunction with the UDRIVE Final Event (UDRIVE is a European Union naturalistic driving study) and was primarily organized by the SWOV Institute for Road Safety Research. Several researchers from VTTI presented findings from the SHRP 2, motorcycle, and older driver naturalistic studies. A VTTI representative will co-edit a special issue of Safety Science highlighting papers from the 2017 Symposium. VTTI will host the 2018 Symposium, while researchers from Australia have offered to host the 2019 Symposium to highlight the results of their Australian Naturalistic Driving Study.

11. VTTI hosted the Fifth International Naturalistic Driving Research Symposium in August 2016, with Ron Medford of X (formerly Google[x]) and Dr. Bruce Simons-Morton of NIH serving as keynote speakers. Eight sessions of panels and papers, plus a poster session, were held during this biennial event that attracted representatives from government, industry, and academia worldwide. The symposium was followed by two additional conferences: the Motorcycle Research and Technology Workshop and the Women in Transportation Seminar – The Motorcycle Research and Technology Workshop was followed by two additional conferences: the industry, and academia worldwide. The symposium that attracted representatives from government, industry, and academia worldwide. The symposium was followed by two additional conferences: the Motorcycle Research and Technology Workshop and the Women in Transportation Seminar – The Motorcycle Research and Technology Workshop was followed by two additional conferences: the industry, and academia worldwide. The symposium was followed by two additional conferences: the Motorcycle Research and Technology Workshop and the Women in Transportation Seminar.

12. Planning has begun for the Seventh International Naturalistic Driving Research Symposium to be held in Blacksburg in August 2018. Select papers from the Fifth Symposium, which was held in Blacksburg in August 2016, will be published in a special edition of the Journal of Safety Research.

13. The Commercial Motor Vehicle (CMV) Driving Safety website was created to provide CMV drivers and trucking company safety managers with information on various topics relevant to their line of work. A current project is reviewing and revising the website to ensure that the latest information available is provided.

14. The Driving Healthy website is continually updated to provide tips and information for commercial motor vehicle drivers. The information includes Eating & Living Healthy and Prevention & Screening. The website is useful not only to professional drivers but also to the general public.

15. A VTTI researcher continues to serve on the TRB Human Factors Workshop Committee, providing valuable input into the full-day workshops that bring together the international transportation human factors community to work on the most pressing problems in the field.

16. A VTTI researcher participated in the Research Data Alliance International Data Week, the Virginia Tech Big Data Science Workshop, and the NSF West Big Data Hub Transportation Data Challenge kick-off to assess and improve VTTI capabilities as a transportation data repository.

17. Along with fellow organization committee members from the National Transportation Safety Board (NTSB), FMCSA, NHTSA, Nissan, and the University of Liege, VTTI co-hosted the 10th International Conference on Managing Fatigue. The conference was held in San Diego, CA, from March 20-23, 2017. This conference was bookended by the Practical Fatigue Management for Safety and Productivity workshop and the 2017 Fatigue Risk Management Regional Meeting. Keynote speakers included Christopher A. Hart, Chairman of the NTSB; and Dr. Mark Rosekind, former NHTSA Administrator. The conference had nearly 400 international attendees and 100 presentations. Select papers from the conference were included in a special issue of Accident Analysis & Prevention.

18. VTTI presented at the monthly Southwest Virginia Transportation Council. The presentation provided an overview of VTTI and current and past research.


20. VTTI established close contacts with NIOSH in the oil and gas area. This involved joining the NORA Transportation Warehouse and Utilities Counsel. VTTI also gave presentations at the Oil and Gas & Motor Vehicle working groups and held a focus group with Pioneer Energy on coaching and in-vehicle monitoring systems. VTTI also presented at the Oil and Gas Safety and Health conference organized by NIOSH.

21. VTTI gave an invited presentation at the American Trucking Association (ATA) 90st Technical Advisory Group (TAG) meeting on truck and bus maintenance. A similar presentation was held at the American Bus Association (ABA) Bus Maintenance and Repair Council.

22. VTTI presented at the RAMSES Human Modeling Conference in Troy, MI.

23. VTTI presented at the Mid-America Truck Show at the request of Northland Insurance on the results of its Collision Avoidance System Field Operational Test (CAS FOT) project. The conference was focused mainly on fleets; Northland wanted VTTI to provide information about the technology and allow fleets a chance to ask questions about the technology.
24. NHTSA and VTTI presented on the results of the CAS FOT project in the session Crash Avoidance #1: Advanced Driver Assistance Systems: Product Evolution, Evaluation and Real World Deployment Challenges.

25. VTTI presented on the results of the CAS FOT project during the 2016 SAE COMVEC.

26. VTTI gave an invited presentation at the Edulog (a school bus software routing company) user conference in Las Vegas, NV.

27. From September 2012 to November 2016, VTTI led the Connected-Vehicle/Infrastructure (CVI) UTC. As part of outreach efforts associated with this program, CVI-UTC research was displayed at the Women in Transportation Seminar – The Future of Transportation, which was held August 31-September 1, 2016, in Blacksburg, VA. In addition, a researcher from VTTI displayed CVI-UTC research and demonstrated connected-vehicle technologies leveraged in VTTI/ CVI-UTC projects at the VDOT 12th Annual Transportation Career Fair on October 6, 2016, in Manassas, VA. This event, which drew more than 100 employers and 1,400 high school students from the area, provided an opportunity to encourage high school students to enter careers in all fields related to transportation, building the future workforce.

28. A representative from the Safe-D National UTC presented program activities to high school students at the Thomas Jefferson Symposium to Advance Research (tjSTAR). VTTI emphasized careers available in transportation and opportunities available to students under the Safe-D EWD Program.

29. VTTI staff remain active on the IES Roadway Lighting Committee, the Resiliant Lighting Committee, and the Outdoor Environmental Lighting Committee.

30. VTTI remained active in the International Commission on Illumination (CIE), with one faculty member sitting on the CIE board and in charge of a research division on outdoor lighting.

31. VTTI is a subcontractor to North Carolina A&T State University on its Tier 1 CATM UTC. This center will afford students from participating institutions (North Carolina A&T, Virginia Tech, Embry Riddle, and University of District of Columbia) to effect meaningful learning opportunities across the field of transportation safety.

32. VTTI continues to support driver’s education programs at nine Virginia high schools in Montgomery and Roanoke counties. During these programs, VTTI teen driving researchers speak to parents and teens about the risks of teen driving. They also discuss how parent/teen driving contracts may help keep teens safe while they learn to drive.

33. VTTI research staff are active members of the Blue Ridge Transportation Safety Board, a regional committee chaired by the Roanoke County Police Department. Members of this board also include safety advocates from the community and researchers from VDOT and Virginia Tech.

34. VTTI research staff are active in presenting information about impaired driving. During FY17, researchers provided the keynote address for the New Hampshire Traffic Safety Conference, led a roundtable of leading national experts on the topic of countermeasures to over-the-counter and prescription drug-impaired driving, and gave an invited lecture to Hokie Wellness peer educators about college alcohol consumption and impaired driving.

35. VTTI research staff organized and presided over the Human Factors Workshop of Cognitive Perspectives on Aging Driver Safety and Mobility at the 2017 Annual TRB Meeting in Washington, D.C., in association with the TRB Committee for Safe Mobility of Older Persons (ANB60).

36. VTTI participated in the ITF Roundtable on Commercial Vehicle On-Board Safety Systems, which was held January 5-6, 2017, at the USDOT Conference Center in Washington, D.C. The roundtable covered the need to identify, develop, test, and deploy innovative onboard technology solutions and practices, which has been identified as an area of priority.

37. VTTI partnered with the Virginia Tech Mechanical Engineering Department and Electrical and Computer Engineering Department on the EcoCAR 3 project. This effort is a competition between selected universities in North America to design the most efficient electric vehicles.

38. VTTI is participating in the AutoDrive project with faculty from Virginia Tech Mechanical Engineering (leading the effort), Electrical and Computer Engineering, Computer Science, and Civil and Environmental Engineering. The AutoDrive project entails engaging undergraduate students in the development of an autonomous vehicle.

39. Institute researchers collaborated with Virginia Tech departments, including Biomedical Engineering and Mechanics (BEAM), to foster dual appointment opportunities among VTTI faculty where strategically advantageous.

ADDITIONAL ACCOMPLISHMENTS

1. 2017 U.S. Government Award for Safety Engineering Excellence (Myra Blanco)

2. Best Paper Award, 2nd International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS), Rome, Italy, 2016 (Hesham Rakha)
VTTI Centers, Groups, and Initiatives

Center for Advanced Automotive Research (Zac Doerzaph, Director)

The Center for Advanced Automotive Research focuses on the research, development, and evaluation of next-generation automotive systems. The center is staffed by a multidisciplinary team of dedicated individuals who are passionate about improving the safety and efficiency of our nation’s transportation system. This team strives to solve a broad set of challenges associated with integrating cutting-edge technologies into the vehicles of tomorrow. The primary research areas of the center include crash warning/avoidance/mitigation systems, connected vehicles, driver-vehicle interfaces, crash causation, and vehicle automation.

Center for Automated Vehicle Systems (Shane McLaughlin, Director)

The Center for Automated Vehicle Systems uses an interdisciplinary approach to studying all aspects related to the automation life cycle in the field of transportation. The center conducts pragmatic research based on a scientific approach that emphasizes the importance of safety, security, reliability, and user acceptance. The center is anchored in applied research and is strengthened by collaborations with national and international partners in vehicle automation, including Google, General Motors, and other groups involved in the research, planning, policy, and production of automated vehicles. The goal of this center is to strengthen the safety benefits of automation across all levels of the transportation industry.

Center for Data Reduction and Analysis Support (Miguel Perez, Director)

The Center for Data Reduction and Analysis Support provides standardized access to and analysis of naturalistic driving study data sets housed at the Institute; these data sets currently comprise 2.5 petabytes of information about real-world driver behavior and performance. Users include researchers within and outside of the Institute, government entities, and automotive manufacturers and suppliers. Center services include coding of video and audio data, data quality assurance, data standardization, data mining, event selection, and data analysis. The center actively supports data analysis collaborations with external institutions.

Center for Infrastructure-based Safety Systems (Ron Gibbons, Director)

The Center for Infrastructure-based Safety Systems focuses on roadway-based safety systems, such as lighting, visibility treatments, pavement markings, signage, signals, barriers, the interaction of visibility with roadway design, and weather considerations. The center is conducting research into myriad topics that include: increasing active sign legibility during foggy conditions; evaluating the effects of lighting source, type, and power on driver performance; assessing airport garage lighting; and determining the durability of pavement markings. The center contains the Eco-Transportation and Alternative Technologies Group, which is currently conducting an investigation into the potential use of paired types of commercially available vehicle detection technologies designed to reduce false readings at intersections that result in inefficient traffic flow.

Center for Injury Biomechanics (Warren Hardy, Director)

The Center for Injury Biomechanics is a partnership between VTTI, the Virginia Tech Department of Mechanical Engineering, and the Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences. The center conducts research into injury biomechanics, injury modeling, and transportation-related injury biomechanics. Center work includes an in-depth study of road-departure crashes in the U.S. to determine conditions such as speed and topography. Other transportation-related injury research includes car crash tests, large-scale tissue testing, NASCAR-Indy restraint testing, advanced restraint tests, guardrail evaluations, child seat evaluations, airbag-induced eye injuries, the development of a synthetic eye, elbow joint injuries from side airbags, wrist injuries, upper extremity dummy design, posterior rib fractures from side airbags, child dummy neck evaluations, small female neck interactions with side airbags, airbag out-of-position testing, and the development of a pregnant occupant model.

Center for Public Policy, Partnerships, and Outreach (Myra Blanco, Director)

The Center for Public Policy, Partnerships, and Outreach assists with the needed models of regulations for advanced vehicles, such as driver assistance systems and connected and/or automated vehicles. The center provides research to ensure state and federal policies are based on relevant data, develops partnerships to assist in the advancement of new systems, and enhances the research areas and sponsorship diversity of VTTI. The center works with stakeholders whose interests are affected by governmental decisions on federal, state, local, or international levels in the development and implementation of automated-vehicle systems.
The Center for Sustainable Mobility focuses on asset management; pavement design, analysis, and scheduling, vehicle energy and environmental modeling, artificial intelligence techniques, transit bus real-time routing and scheduling, vehicle energy and environmental modeling, transportation system modeling, and eco-transportation applications. The Center for Sustainable Mobility has worked and is currently working on numerous projects funded by the U.S. Department of Transportation, the U.S. Department of Energy, the Virginia Department of Transportation, and the Federal Transit Association. The center is developing eco-routing, eco-cooperative adaptive cruise control systems, and traffic signal control systems that enhance the efficiency, mobility, and safety needs. The center translates the results of research into realistic and workable applications, creates and provides tools needed to apply developed knowledge and processes, and educates qualified engineers to meet today’s transportation demands and tomorrow’s transportation challenges in the areas of transportation network control, large-scale transportation system modeling, traffic state prediction using large data and artificial intelligence techniques, transit bus real-time routing and scheduling, vehicle energy and environmental modeling, transportation system modeling, and eco-transportation applications. The Center for Sustainable Mobility has worked and is currently working on numerous projects funded by the U.S. Department of Transportation, the U.S. Department of Energy, the Virginia Department of Transportation, and the Federal Transit Association. The center is developing eco-routing, eco-cooperative adaptive cruise control systems, and traffic signal control systems that enhance the efficiency, mobility, environmental impacts, and safety impacts of the transportation system.

The Center for Technology Development specializes in developing, implementing, and maintaining innovative systems for transportation research. The center includes the Mechanical Systems Group, which is responsible for mechanical fabrication to suit the needs of all research projects; the Data Acquisition Group, which is responsible for electronic hardware design; and the Advanced Development Group, which is responsible for software development. The Data Acquisition Group is a pioneer in distributed data acquisition systems. The Advanced Development Group includes specialists in machine vision, road tracking, and data analysis.

The Center for Technology Implementation was created to facilitate technology deployment and leverage existing research investments. The center makes it possible for the Institute and its sponsors and clients to participate in early-stage technology implementation programs. Center personnel can help develop a toolbox of modular software solutions that can be applied in new jurisdictions, building smart solutions that combine the best commercial products with customization that can fully address agency goals.

The Center for Truck and Bus Safety focuses on the research, development, and evaluation of heavy-vehicle systems. The center is dedicated to the design, delivery, and implementation of leading-edge research and development efforts aimed at improving the health and safety of heavy-vehicle drivers. The center comprises the Behavioral Analysis and Applications Group, the Human Factors and Advanced System Testing Group, and the Safety and Human Factors Group. Center research includes refining and testing rear-lighting configurations to reduce the number and severity of rear-end crashes, determining safe hours of service for commercial motor vehicle drivers, evaluating causes of drowsiness and providing countermeasures, and developing education programs to keep drivers healthy and alert.

The Center for Vulnerable Road User Safety conducts research and outreach designed to enhance safety for all vulnerable road users, including senior and teen drivers, bicyclists, and pedestrians. Vulnerable road users comprise all age groups and a variety of demographics; their one shared trait is an increased risk of suffering a traffic-related crash or injury. The center includes the Teen Risk and Injury Prevention Group and the Senior Mobility Awareness, Safety, and Health Group. Research includes a naturalistic driving study of novice teen drivers with the aim of providing real-time feedback, gathering information for driver training, and keeping teens’ parents informed. The center has undertaken outreach initiatives designed to provide recommendations for coordinating public and private services for the aged, disabled, and indigent populations.
The I-81 Corridor Coalition (Andy Alden, Executive Director)

The I-81 Corridor Coalition is a consortium of stakeholders dedicated to improving the safety, continuity, and efficiency of commercial and personal travel along the I-81 corridor that extends from Tennessee to the Canadian border in New York. The coalition comprises state DOTs, Metropolitan and Regional Planning Organizations, non-governmental organizations, and private entities from the six corridor states. The primary focus of the coalition is to study and implement innovative solutions to address challenges specific to travel on a freight-intensive highway serving a wide variety of geopolitical regions and users. Current study areas include incident management, development planning, and truck parking.

International Center for Naturalistic Driving Data Analysis at Virginia Tech (Clark Gaylord, Chief Information Officer)

The International Center for Naturalistic Driving Data Analysis incorporates Virginia Tech's petabyte-scale, high performance data storage system into the VTTI data infrastructure. This allows data from multiple naturalistic driving studies to be analyzed using high performance computational systems to perform more complex computational algorithms and data mining.

The 48-node compute cluster of the Institute moves data between the field and the data center, decrypts data, prepares data files for ingestion to a 3-petabyte scientific data warehouse, processes video files, and provides a platform for advanced analytical processing. A petabyte archive file system will ultimately facilitate the long-term storage of numerous petabytes of data while maintaining data in an online state.

VTTI data center features include a computational cluster, the application of the Virginia Tech High Performance Computing Storage System, and a significant upgrade to the storage system supporting the scientific data warehouse environment at VTTI. These systems compose the foundation for data-intensive scientific research programs conducted at VTTI, particularly the Second Strategic Highway Research Program Naturalistic Driving Study.

Motorcycle Research Group (Shane McLaughlin, Group Leader)

The Motorcycle Research Group was born from a history in transportation research; concern about an increasing number of motorcyclist fatalities and injuries; and the excitement of a large number of VTTI engineers, staff, researchers, and family who are riders. The group focuses on riders and their machines while considering other factors in the surrounding transportation system. Group researchers have conducted the first large-scale naturalistic motorcycle study, the aim of which is to explore motorcycle crash causation and to develop crash countermeasures.

National Surface Transportation Safety Center for Excellence (Jon Hankey, Director)

The National Surface Transportation Safety Center for Excellence was established by the Federal Public Transportation Act of 2005 to develop and disseminate advanced transportation safety techniques and innovations in both rural and urban communities. Center research focuses on four major objectives: 1) To develop and test transportation devices and techniques that enhance driver performance; 2) To evaluate the roadway environment and infrastructure-based safety systems; 3) To address mobility for vulnerable road users; and 4) To examine driver impairment issues.

Safety through Disruption (Safe-D) National University Transportation Center (UTC) (Zac Doerzaph, Director)

Fueled by an inevitable transformation of our transportation system, the Safe-D National UTC endeavors to maximize the potential safety benefits of disruptive technologies through targeted research that addresses the most pressing transportation safety questions. The center focuses on four potential disruptive technologies: connected vehicles, automated vehicles, transportation as a service, and big data analytics. The U.S. Department of Transportation awarded the center in November 2016 as a highly competitive national UTC grant. The national grant entails a planned $2.8 million each year in federal funding for five years, matched by an equal amount of cost-share funds from university, state, and private sources.

The nation’s top safety researchers will perform work under the center while leveraging existing and upcoming world-class research facilities across the universities, such as the Virginia Automated and Connected Corridors and the Smart Road, all of which will collectively enable robust real-world testing of automated and connected vehicles.
Sponsors, Clients, and Partners

The continued success of VTTI is due, in large part, to its sponsors, partners, clients, and stakeholders. VTTI would like to acknowledge the contributions and support of the following organizations:

3M
AAA
AAA Foundation for Traffic Safety
AAA Mid-Atlantic
ACELAUS Research Solutions, Inc.
ACI
ACI
Alliance of Automobile Manufacturers
American Association of Motor Vehicle Administrators
American Association of State Highway and Transportation Officials
American Transportation Research Institute
Amoco
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Arete Associates
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Asia University
Association for Unmanned Vehicle Systems International
Association of Global Automakers
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Carlspan
Cambridge Systematics
Canadian Council of Motor Transport Administrators
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Capital Area Transit System / Baton Rouge
Carnegie Mellon Robotics Institute
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Clean Air Tech International
Clemson University
Columbia University
Colorado Department of Transportation
Commercial Vehicle Safety Alliance
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Con-way
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Louisiana Public Transit Association
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Lutron Network Access Systems
Mikronix
Midwest Research Institute
Midwestern State University
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NACFE
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NASCAR
National Highway Traffic Safety Administration
During FY17, numerous representatives of current and potential sponsoring/partnering organizations, marketing groups, and conference groups visited VTTI and/or the Smart Road, including:

In partnership with employees from VDOT, the institute hosted an open house for the general public and a school day event (grades K-12) in April 2017, with nearly 400 in attendance.

The Smart Road and other VDOT/VTTI facilities (e.g., VAC/VCC) were well represented at several international and national industry conferences, including:

- AAA Foundation for Traffic Safety
- AAA Mid-Atlantic
- Center for Advanced Transportation Mobility University Transportation Center
- Engineering Research and Science Committee for the Canadian Deputy Ministers of Transport
- Federal Highway Administration
- Flagger Force
- General Motors
- Meridian International Center
- Montgomery County Regional Tourism
- NASA Langley
- National Highway Traffic Safety Administration
- National Institute of Advanced Industrial Science and Technology
- National Safety Council
- National and local media
- Office of the Mayor of Roanoke
- Transportation Research Board Annual Meeting
- VDOT Career Fair
- VDOT Construction Inspectors Conference
- West Virginia State
- WESTAT
- Western Research Institute
- Windwalker Corporation
- Wright State University
- York University
- ZF-TRW
- Virginia Tech administration
- Virginia Tech Bridges, Builders, and Society (student organization)
- Virginia Tech Civil and Environmental Engineering (students)
- Virginia Tech Corporate Research Center
- Virginia Tech Psychology Department
- Virginia Tech University Relations
- Visitors from India

3rd International Street Lighting + Smart Controls Conference, Brisbane, Australia
10th International Conference on Managing Fatigue Automated Vehicles Symposium
Department of Energy LED R&D Workshop
5th International Symposium on Naturalistic Driving Research
Governors Highway Safety Association
Illuminating Engineering Society Annual Conference
International Association of Chiefs of Police
95th Annual Meeting of the Virginia Statewide ITS
ITS World Congress
ITS America Annual Meeting
VTTI Annual Meeting
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<td>SPORT SHORE MAGAZINE</td>
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<td>WASHINGTON POST*</td>
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PRESENTATIONS, HONORS, AWARDS, and SERVICES

PRESENTATIONS


**Student Presentations**
Includes presentations made in collaboration with student author(s)


**HONORS, AWARDS, AND SERVICE TO THE PROFESSION**

**Andy Alden**
Appointed to the National Academies Transportation Research Board ADC60 Committee on Roadside Ecology
Appointed Vice-Chair of the National Academies Transportation Research Board ADC60 Resource Conservation and Resource Conservation Committee
TRB Project Panel, Comparison of Cost, Safety, and Environmental Benefits of Routine Mowing and Managed Succession of Roadside Vegetation, 2017

Virginia State Legislature Virginia Department of Transportation Briefing on Interstate 81, 2017
Myra Blanco
2017 U.S. Government Award for Safety Engineering Excellence

Tom Dingus
Member, Board of Directors, Intelligent Transportation Society of America
Member, Board of Directors, Association for Unmanned Vehicle Systems International
Moderator, International Naturalistic Driving Research – Challenges and Solutions, Fifth International Symposium on Naturalistic Driving Research, Blacksburg, VA

Cristian Druta
Member, AH010 Committee on Surface Transportation Weather

Johan Engstrom
Voting member, SAE Safety and Human Factors Standards Steering Committee
Chair, SAE DVT Task Force 4: Evaluation Approaches, Prioritization and Mitigation
Liaison member, SAE Onroad Automated Driving Committee
Member, U.S. delegation of the US-EU-JP Trilateral Working Group on Human Factors

Gerardo Flintsh
Associate Editor, International Journal of Pavement Engineering, Taylor & Francis
Secretary and Vice-Chair, Committee TC D.1 Road Asset Management (representing AASHTO), World Road Association/Permanent International Association of Road Congresses (PIARC)
Chair, Subcommittee AFD00(1) on Sustainable Pavements, Transportation Research Board
Chair (founding), Committee AFD00 General and Emerging Pavement Design, Transportation Research Board
Member, Committee AFD80 Strength and Deformation Characteristics of Pavement Sections, Transportation Research Board
Member, Committee AFD20 Pavement Data Collection, Transportation Research Board
Member, Committee AFD40 Full Scale/Accelerated Pavement Testing, Transportation Research Board
Member, Committee ABC40 Transportation Asset Management, Transportation Research Board
Co-Chair, World Conference on Pavement and Asset Management, Pushing the evolution of transportation infrastructures: let’s shape the future of pavement and asset management, Baveno, Italy, 2017.

Rich Hanowski
Invited to serve on the Advisory Committee of the Occupational Injury Prevention Research Training program, University of Utah, 2017
Invited by the National Safety Council to serve on the ANSI Subcommittee for the development of standards to address automated vehicles in fleets (Z15.3), 2017
Invited to serve on the Society of Automotive Engineers (SAE) COMVEC Executive Council, 2016
Lead organizer for the 10th International Conference on Managing Fatigue, 2017

Jeff Hickman
Chair, ANB70 Health and Wellness subcommittee
Member, Transportation Research Board’s Committee on Truck and Bus Safety (ANB70)

Kathy Oliver
Virginia Tech Diversity Ally Certificate
Virginia Tech Diversity Advocate Certificate

Hesham Rakha
Associate Editor, IEEE Transactions on Intelligent Transportation Systems
Associate Editor, Journal of Intelligent Transportation Systems: Technology, Planning and Operations
Editorial Board, Transportation Letters: The International Journal of Transportation Research
Editorial Board, IET Intelligent Transport Systems Journal
Editorial Board, International Journal of Transportation Science and Technology
Scientific Committee, 19th EURO Working Group on Transportation Meeting, Istanbul, Turkey, 2016
Associate Editor, 19th IEEE International Conference on Intelligent Transportation Systems (ITSC), Rio de Janeiro, Brazil, 2016
Associate Editor, IEEE Intelligent Vehicles Symposium, Gothenburg, Sweden, 2016
Member, ITS America Benefits Evaluation and Cost Committee
Friend, Transportation Research Board Committee on Highway Capacity and Quality of Service (AHB40)
Friend, Transportation Research Board Committee on Artificial Intelligence (ABJ0)
Member, Professional Engineers of Ontario (PEO)
Member, Egyptian Syndicate of Engineers (No. 281/14)
Member, American Society for Civil Engineers (ASCE)
Member, Institute for Transportation Engineers (ITE)
Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, Transportation Research Board (TRB)
Member, Society of Automotive Engineers (SAE)
Member, Transportation Research Board Committee on Air Quality

Andy Schaudt
Moderator and Organizer, Human Factors Breakout Session, Automated Vehicles Symposium, San Francisco, CA
Co-Convenor, Automated Vehicles Terms & Definitions Task Force, ISO TC22/SC38 (Road Vehicle Ergonomics)
Reviewer, Journal of Safety Research


Hickman, J. S., & Hanowski, R. J. (in press). Effectiveness of fleet cell phone policies and state cell phone laws in reducing commercial motor vehicle drivers’ cell phone use while driving.


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<tr>
<th>Name</th>
<th>Department/College</th>
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<tr>
<td>THANASSIS RIKAKIS</td>
<td>OFFICE OF THE PROVOST</td>
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<tr>
<td>DWIGHT SHELTON</td>
<td>OFFICE OF THE VICE PRESIDENT FOR FINANCE AND CHIEF FINANCIAL OFFICER</td>
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<td>THERESA MAYER</td>
<td>OFFICE OF THE VICE PRESIDENT FOR RESEARCH AND INNOVATION</td>
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<td>JULIA ROSS</td>
<td>ENGINEERING</td>
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<td>PAM VANDEVORD</td>
<td>BIOMEDICAL ENGINEERING AND MECHANICS</td>
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<td>CIVIL AND ENVIRONMENTAL ENGINEERING</td>
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<td>EILEEN VAN AKEN</td>
<td>INDUSTRIAL AND SYSTEMS ENGINEERING</td>
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<td>COLLEGE OF ARCHITECTURE AND URBAN STUDIES</td>
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<td>HUNTER PITTMAN</td>
<td>ARCHITECTURE + DESIGN</td>
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<tr>
<td>ANNE KHADEMIAN</td>
<td>PUBLIC ADMINISTRATION &amp; POLICY</td>
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<tr>
<td>TOM DINGUS</td>
<td>VIRGINIA TECH TRANSPORTATION INSTITUTE</td>
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<tr>
<td>PASCHA GERNI</td>
<td>VIRGINIA TECH TRANSPORTATION INSTITUTE</td>
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<tr>
<td>JON HANKEY</td>
<td>VIRGINIA TECH TRANSPORTATION INSTITUTE</td>
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