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Reinventing Transportation: Change Is Coming. Are We Ready?

TEXAS TRANSPORTATION

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Who's Driving the Revolution?

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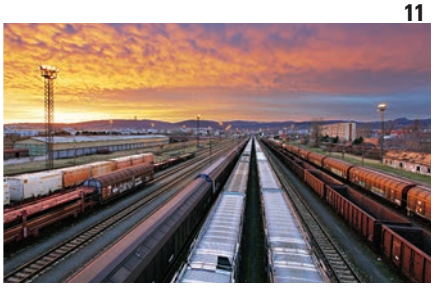
ON THE COVER: New technologies are revolutionizing our transportation system. In a few decades, cars could be driving themselves. How the private and public sectors work together to implement these new technologies will prove key to ensuring a seamless, safe and secure transportation network in the future.



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ROPING REVOLUTION: CV/AV Deployment and Public Policy

by Dennis Christiansen
Agency Director

Transportation research often focuses on the technological side of things: how a process is done, what materials are used, and what minimum standards should be applied to promote our transportation system's safety and sustainability.

That's certainly the case when it comes to implementing connected and automated vehicle (CV/AV) technologies on our nation's roadways. Although transportation has steadily evolved in the United States over time, rarely has its evolution approached a true revolution. The deployment of CV/AVs certainly qualifies, however. Not only how we drive but if we drive (or if our vehicles do it for us) are big-picture issues that impacts how our transportation system operates seamlessly, securely and safely.

We need to understand how these new technologies work, of course, but we also need to understand their impacts on transportation policy and society. Policy leaders who make investment decisions for our transportation system have questions about long-term implications of CV/AVs. How will these vehicles improve safety and mobility in the near future? How should the infrastructure adapt and support the technology to improve its safety and reliability for society? How will CV/AVs transform our roadway system over the long term? How will they influence land use and development patterns?

We need to understand how these new technologies work, of course, but we also need to understand their impacts on transportation policy.

There are accountability considerations, too. The operation of automated vehicles, for instance, involves large amounts of data, some of which fall under the statutory definition of "personal identifying information." How this information is gathered and secured has significant implications for citizens' personal privacy rights. Given these variables (and more), what are the public policy implications in deploying these new technologies?

In this issue of the *Texas Transportation Researcher,* you'll read about how the Texas A&M Transportation Institute's (TTI's) Transportation Policy Research Center is leading the nation in researching policy implications related to CV/AV implementation. In addition, through a National Cooperative Highway Research Program project, TTI is studying CV/AV policy and planning actions for state and local governments. But advances aren't just being made on our roadways. The revolution is system wide, so TTI groups like our Freight Mobility Program are looking at how other aspects of the network can also improve to facilitate economic development in Texas.

As TTI's work in CV/AV deployment has increased, it's become apparent that we need a leader to coordinate the Institute's advanced transportation research initiatives. It gives me great pleasure to announce that Dr. Christopher Poe, senior research engineer and assistant agency director, will be TTI's connected and automated transportation strategy lead. In this role, he'll focus on developing collaborations within the agency and beyond, and will lead the planning and implementation efforts for the Institute's research and test beds in all areas of connected transportation.

Thought leadership, innovation and cultivating understanding among stakeholders — all are keys to effectively implementing new technologies and strategies that make our transportation system safer, more efficient and more reliable. TTI has more than 65 years of experience producing research excellence, reliability of results, and sponsor satisfaction. The area of CV/AVs provides the latest opportunity for TTI to continue that good work for Texas and the nation. ■

Technology, New Concepts Drive Future Freight Movement Investments

Although we often take the safe, efficient movement of freight for granted, our local and global economies depend on it. Whatever the path — highways, railways, waterways, airports, ports of entry, pipelines — reliably getting goods to market drives the heartbeat of our economy.

Texas A&M Transportation Institute (TTI) researchers are at the forefront of freight mobility research, investigating innovative technologies and analytical approaches to ensure the efficient movement of goods to market.

Getting the Future of Texas Freight Movement on Track

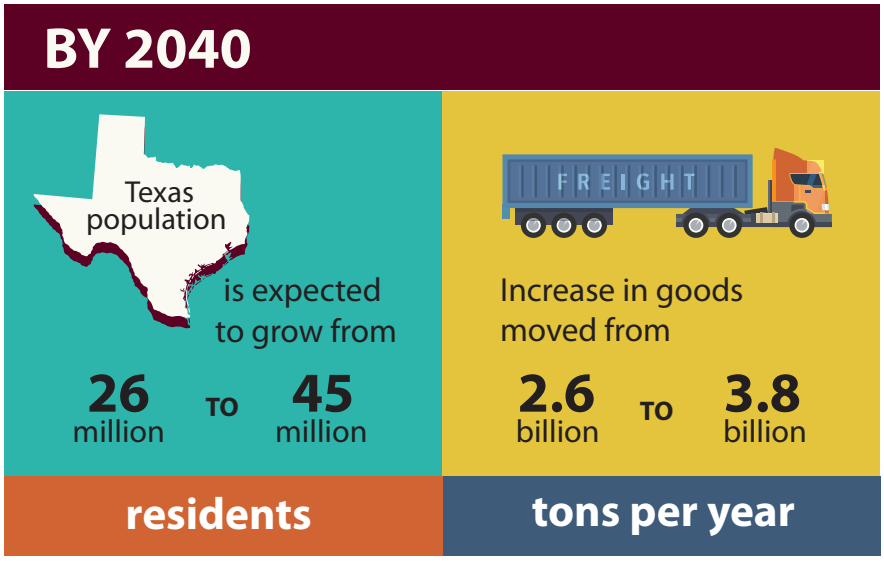
"In Texas, freight transportation is at a crossroads," explains Curtis Morgan, manager of TTI's Multimodal Freight Program. "We have to make critical improvements soon in both efficiency and capacity to prepare for big changes coming in the next 25 years." According to a draft of the Texas Department of Transportation's (TxDOT's) Freight Mobility Plan, by 2040, the Texas population is expected to grow from 26 million to 45 million residents, with an increase in goods moved per year from 2.6 billion to 3.8 billion tons.

Morgan and his team are finishing an initial report for TxDOT that identifies more than 50 innovative or automated freight strategies and technologies from around the world. Among these are the use of automated and driverless trucks, specialized software that connects all the operators in a supply chain, truck-only roadways, and the unmanned aerial vehicle delivery of goods.

"For each freight strategy we evaluated, we looked at how it works, its potential use in Texas compared to how it's used elsewhere, and costs associated with implementation and use," Morgan says. "Our next job is to help TxDOT narrow down the possibilities to the ones that make the most sense for future deployment in Texas."

DEFINITION:

Freight fluidity **focuses on transportation supply chain performance measurement — the measurement of travel time, travel time reliability, and cost of moving freight shipments from end-to-end of a supply chain.**



Freight Fluidity: TTI's New Approach to Measuring Shipping Efficiencies

To improve the reliability and efficiency of its supply chains, Transport Canada coined the term *freight fluidity* to describe a new way of measuring the various freight components of the overall transportation system.

"Transport Canada turned to TTI because of our extensive experience with performance measures developed as part of the Urban Mobility Scorecard, including freight measures," says Bill Eisele, senior research engineer and manager of TTI's Mobility Analysis Program. "With those tools, we helped them develop travel-time-based measures to monitor their global supply chains. Since then, the freight fluidity concept has gained tremendous momentum at the national level in the United States and with individual states."

Eisele is now working extensively with University of Maryland researchers to implement freight fluidity in Maryland. "Freight movement in a safe, efficient and reliable manner is a key priority for our administration and rightly so," says Subrat Mahapatra, transportation manager of the Maryland Department of Transportation State Highway Administration. "The better we can understand what's on the road and where, the better we can operate our systems, plan transportation investments, and ensure goods are moving most efficiently to serve our people and businesses. TTI is helping us with that."

The growing popularity of the freight fluidity concept is keeping Eisele and other TTI researchers, like Juan Villa, busy. Villa, TTI's regional manager for Latin America, has extensive experience studying freight movements across the congested Texas-Mexico border. The freight fluidity approach has opened the door to a more comprehensive way of looking at the problems associated with moving goods across the border.

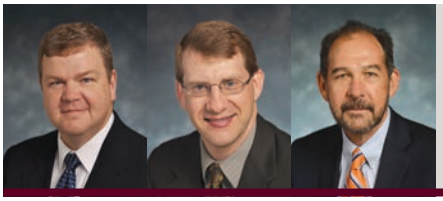
"With freight fluidity, we take into consideration the entire supply chain," says Villa. "We can now identify potential improvements to the transportation system based on performance measures that analyze not only network congestion or border wait times or delays, but end-to-end supply chain movements."

"The better we can understand what's on the road and where, the better we can operate our systems, plan transportation investments, and ensure goods are moving most efficiently to serve our people and businesses. TTI is helping us with that."

Subrat Mahapatra, Transportation Manager with the Maryland Department of Transportation State Highway Administration

Villa recently secured a project to develop a supply-chain-based Border Fluidity Index, allowing TTI to apply the fluidity concept to cross-border supply chain movements. Freight planning stakeholders can use the index to analyze the efficiency of the region's cross-border supply chains. TxDOT and the Federal Highway Administration are co-sponsors of the project, which began in October.

"It's imperative that public agencies have a better understanding of how freight is moving and how to move it most efficiently. I expect the freight fluidity approach to inform investment decision making for years to come," states Eisele. ■



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A Look into Tomorrow

What-If Scenarios and Planning the Future of Transportation

Many experts agree: the deployment of connected and automated vehicle (CV/AV) technology is just a matter of time. Some say we could see wide-scale deployment in 10 years, while others think it will take much longer. The real question is, what do we do when it happens?

Researchers at the Texas A&M Transportation Institute (TTI) recently formulated scenarios for how CV/AV technologies might be deployed. Using the scenarios as context, the research team interviewed state and local transportation agency personnel and then created flexible strategies to prepare for potential issues arising from implementation.

As Senior Research Scientist Johanna Zmud explains, "The goal was to identify strategies that state and local agencies can adopt now to prepare for the future, regardless of which scenario, or mixture of scenarios, comes to pass."

The study examines two scenarios — the Revolutionary Path and the Evolutionary Path. In the Revolutionary Path, the private sector pushes technologies to market through aggressive research-and-development investments. Progress is not halted by regulatory or policy issues, and self-driving vehicles are on the road in significant numbers by 2025. In the Evolutionary Path,

"Research of this nature is critical to the future of our transportation system because it helps agencies anticipate some of the changes coming down the pike."

Ginger Goodin,
Director of the TTI Transportation Policy Research Center

the private sector makes step-wise improvements in advanced driver-assistance systems. Policy, regulatory and technical issues slow testing and deployment. Significant numbers of self-driving vehicles don't appear on roadways until 2050.

Zmud and her team found the following from talking with public-sector stakeholders:

- By small margins, interviewees from state departments of transportation thought that the Evolutionary Path scenario would be most likely, and it was also the most preferred path because it's assumed to be less disruptive for agencies.
- Most local and regional transportation agencies interviewed considered the Revolutionary Path scenario most likely and most preferred. The rationale was that if the private sector pushes this quickly, it would bring financial resources with it to support deployment at the local level.
- A few thought that AVs would follow a Revolutionary Path, while CVs would follow an Evolutionary Path.

"Research of this nature is critical to the future of our transportation system because it helps agencies anticipate some of the changes coming down the pike," says Ginger Goodin, director of TTI's Transportation Policy Research Center. "Using predictive scenarios, we can better prepare for the impact to our system."

Suggested strategies from the study to prepare for the future of CV/AV deployment include:

- reviewing current legislation and policies that could impact the implementation of CV/AV technologies,
- designating a specific individual within an organization to be responsible for CV/AVs,
- reaching out to state and local policy makers to familiarize and educate them about CV/AVs,
- participating in the national discussion on CV/AVs, and
- establishing a working relationship with resources in the state or region with useful expertise (e.g., universities, university transportation centers and national laboratories).

"The beauty of scenarios like these is that they give us a range of possibilities," says Zmud. "The actual future of transportation will unfold somewhere between them. Effective planning and policies are robust and can meet the needs of system users regardless of which scenario comes to fruition." ■

TTI Leading National Study into CV/AV Implementation

The potential benefits to society of CV/AV technology are many — safer roads, improved mobility, fewer emissions and more efficient land use, to name a few. However, with a high level of uncertainty in deployment scope and time frame, public agencies are unclear how best to incentivize private-industry actions and consumer adoption to accelerate these possible benefits.

The project, NCHRP 20-102(01): Policy and Planning Actions to Internalize Societal Impacts of CV and AV Systems into Market Decisions, sponsored by the National Cooperative Highway Research Program, will help transportation decision makers at the state and local levels recognize and understand their potential roles in harnessing market forces to realize the benefits of these technologies, while taking the necessary steps to minimize associated disadvantages.

Ginger Goodin, director of TTI's Transportation Policy Research Center, says, "The purpose of this research is to help state, regional and local transportation agencies understand how to use policy and planning actions to help with some basic questions — what can we do to spur positive CV/AV deployment without creating barriers? How can we best plan long term for this deployment? And how do we understand what the trade-offs are related to deployment?" ■

For more information, contact **Johanna Zmud** at (512) 407-1140 or j-zmud@tti.tamu.edu, or **Ginger Goodin** at (512) 407-1114 or g-goodin@tti.tamu.edu.

Reinventing Transportation:

Change Is Coming. Are We Ready?

The transportation revolution is on its way. In fact, it's already here. Partially automated vehicles (AVs) are on the nation's roadways right now, connected vehicles (CVs) are just around the corner, and autonomous vehicles may not be far behind.

Standards and polices are evolving as well. For example, the National Highway Traffic Safety Administration is preparing to mandate CV hardware on all new light-duty vehicles. But linking both normal vehicles and AVs into the CV system — and, in turn, to the roadway infrastructure — is a challenge that has many states scratching their figurative heads. In order for public policy to advance hand in glove with developing technologies, policy makers must first be aware of how these technologies could change the nature of the transportation system.

"We're working to provide that understanding," says Texas A&M Transportation Institute (TTI) Senior Research Engineer Ginger Goodin. Goodin directs TTI's Transportation Policy Research Center (PRC), which supports the Texas Legislature by researching and reporting on transportation-related public policy issues. "We can help lawmakers understand the capabilities and limitations of technology in order to craft the best policy possible for the people of Texas."

Defining Security Concerns for CV/AVs

Securing the data enabling connected and automated vehicles to safely reach their destinations is a primary concern.

"It's not just a question of finding the right technology to guarantee data security," explains TTI Associate Transportation Researcher Jason Wagner. "Good policy creates a hospitable environment in which effective security administration can thrive. The policy has to support the right solution to make it work."

"Good policy creates a hospitable environment in which effective security administration can thrive," says TTI Associate Transportation Researcher Jason Wagner.

The issues surrounding CV/AV data security are varied and complicated. As Wagner notes in the report *Revolutionizing Our Roadways: Cybersecurity Considerations for Connected and Automated Vehicle Policy*, there are important questions some agencies simply aren't looking at. Security designs and policy considerations related to transportation infrastructure

and non-safety applications are two such areas. Wagner, along with ITS security specialists from Booz Allen Hamilton, developed the white paper outlining detailed considerations that can help direct future research and analysis, as well as frame policy considerations, as CV/AV deployment moves forward.

Concerns regarding system design, governance and administration, standards development and data systems interoperability, how CV/AV security issues interrelate, and how the transportation system can address system security (and who's responsible if that fails) are just some of the broad-stroke questions identified in the report.

"Good policy and administration create the context for keeping information secure," explains Wagner, "but there's also the related, almost inseparable issue of maintaining privacy for the individual citizen. How do we monitor, manage and ensure the system functions optimally and securely while balancing the need to protect drivers' privacy?"

Maintaining the privacy of personally identifiable information is currently a hot topic in policy discussions.

Determining the Need-to-Know Basis

Maintaining the privacy of personally identifiable information (PII) is currently a hot topic in policy discussions, as evidenced by the 2015 Texas legislative session. Legislators introduced seven measures addressing the protection of PII in one form or another. Since the lifeblood of CV/AV implementation is information management, how these data are handled can influence how private they're kept.

The study Revolutionizing Our Roadways: Data Privacy is separate but related to the effort investigating security concerns. The PRC study's report, which Wagner coauthored with RAND researcher Karlyn Stanley, focuses specifically on defining the privacy issues surrounding CV/AV implementation.

"Personal information is a valuable but challenging tool to use," explains Wagner. "As it becomes omnipresent, its research and application value can increase, but so do the chances for its misuse. Carefully crafted public policy and vigilance in administration are needed to ensure individual privacy."

There's no consistent statutory standard or treatment for personal, private or sensitive information.

The most important PII considerations as outlined in Wagner's report are the following:

- Different areas of state and federal law define PII in different ways. There's no consistent statutory standard or treatment for personal, private or sensitive information.
- Anonymization — the process of stripping names and other identifiers from data to preserve their anonymity — was found inadequate in a recent Massachusetts Institute of Technology study; this has broad implications since many organizations rely on anonymization as a cornerstone for their data privacy protection.
- Who owns vehicle data? The general public might assume people own their personal data, but stakeholders — from private companies to public agencies — disagree. Who owns personal data can directly impact how they're protected and who can see what when.
- Those who can profit from certain data — insurance and telematics companies, for example — are rushing to do just that. Not only will those interests have concerns about how the data are regulated legally, but business often gets ahead of policy when the bottom line is at stake.
- The amount of data AVs and CVs generate will be huge. State agencies, which will likely play a role in managing these data, are not yet prepared for the amount they'll need to manage to keep an information-driven transportation system operating smoothly and safely.

"Outlining these issues for policy makers is a perfect role for PRC," says Goodin. "Good policy founded upon solid, independent research will help smooth the anticipated transition to an automated, connected transportation system for Texans in the coming decades." ■

For more information, contact **Jason Wagner** at (512) 407-1106 or j-wagner@tti.tamu.edu, or **Ginger Goodin** at (512) 407-1114 or g-goodin@tti.tamu.edu

Next Level Trucking: Autonomous Truck Platooning a Game Changer for Fuel Efficiency, Safety

It's a technique that's been used for years in the trucking industry, but now drafting, or truck platooning, is about to enter the world of autonomous driving known as level 2 truck platooning.

The Texas A&M Transportation Institute (TTI) is beginning phase one of a project to test the feasibility of level 2 truck platooning and create a concept of operations and design. Building upon past and current research, the TTI team seeks to demonstrate the safety benefits, fuel savings and emission reductions achieved by extending vehicle automation to freight truck platoons. The project is sponsored by the Texas Department of Transportation's Innovative Research Program.

Level 2 truck platooning is an extension of cooperative adaptive cruise control that uses automated lateral and longitudinal vehicle control, while maintaining a tight formation of vehicles with short following distances. A platoon is led by a manually driven truck and allows the drivers of the following truck(s) to disengage from the driving tasks and monitor the system performance. Driving in a platoon formation has demonstrated the potential for significant fuel savings benefits and associated reductions in emissions from the vehicles within the platoon.

"While there are still many unknowns and challenges ahead for truck platooning, this project, in partnership with industry and government, aims to explore solutions and pave the way toward deployment."

Mohammad Poorsartep, TTI Research Scientist

According to TTI Senior Research Engineer Beverly Kuhn, truck platooning technology offers benefits for the trucking industry.

"Research suggests that platooning technology can provide a 5 to 20 percent fuel savings, depending on the gap, speed, number of vehicles and location of a vehicle within a platoon," explains Kuhn. "Platooning also offers other benefits, such as emission reductions, additional vehicle safety features and increased highway throughput, just to name a few."

"Truck platooning not only demonstrates an application of both connected and automated vehicle technologies, but it's also one of the few applications that have a better understood value proposition," says Mohammad Poorsartep, TTI research scientist and co-principal investigator. "While there are still many unknowns and challenges ahead for truck platooning, this project, in partnership with industry and government, aims to explore solutions and pave the way toward deployment." ■

TTI's research partners include:

- Argonne National Laboratory
- Denso
- Great Dane Trailer
- U.S. Army TARDEC
- Ricardo N.A.
- Navistar
- ZF-TRW
- Lytx
- Bendix

For more information, contact **Beverly Kuhn** at (979) 862-3558 or b-kuhn@tti.tamu.edu, or **Mohammad Poorsartep** at (972)994-2252 or m-poorsartep@tti.tamu.edu.

TTI Researchers Aid TxDOT in Future Freight Planning

The Texas A&M Transportation Institute (TTI) recently completed a wide-reaching effort to help expand the Texas Department of Transportation's (TxDOT's) freight transportation planning into the second half of the 21st century.

The TxDOT-sponsored project partnered TTI with the Center for Transportation Research (CTR) at the University of Texas at Austin. TTI Research Scientist Jolanda Prozzi and her team explored factors impacting future freight flows in Texas — including global trade patterns, changing business models, sociodemographic trends, climate change, technology trends and TxDOT's role in freight planning.

The growing demand for rail transportation between Canada, Mexico and the United States has large impacts on Texas. TTI Research Scientist Juan Villa used national data sources to provide the most up-to-date rail infrastructure and traffic-flow information (i.e., imports/exports) for the project. This information will allow TxDOT districts and divisions, the Federal Highway Administration, and other local and regional planners to more easily plan for and respond to freight demands in the short and long terms.

In another key task, TTI and CTR researchers facilitated a Freight 2055 Roundtable that brought over 90 freight industry stakeholders together for a one-day workshop. Participants included representatives from ports, rail, highways, cities, corporations, metropolitan planning organizations, logistics service providers, engineering and planning firms, consulting firms, and academia.

"The roundtable facilitated an open discussion of major trends and factors that influence freight company decisions, as well as what Texas freight stakeholders expect of TxDOT in planning for and developing a future freight transportation system that will meet business needs," says Prozzi.

Freight stakeholders are looking to TxDOT to pilot new technologies and strategies, such as enhanced weigh-in-motion deployment, truck-only lanes and overweight/oversize urban corridors. These strategies are just a few of the many suggested by roundtable participants to prepare Texas' freight transportation system for 2055.

"This project demonstrates how important it is to communicate and partner with all public, private and international stakeholders in moving forward," Prozzi explains. "The people whose lives revolve around freight agree that TxDOT's leadership in proactive planning will ensure an efficient, reliable and safe freight transportation system by 2055." ■

For more information, on the Freight 2055 Roundtable discussion contact, **Jolanda Prozzi** at (512) 401-1104 or j-prozzi@tti.tamu.edu.

For more information on international freight rail data, contact **Juan Villa** at (979) 862-3382 or j-villa@tti.tamu.edu.

TTI National Geotechnical Experimentation Site Has Long History of Problem Solving, Education

In 1978, Jean-Louis Briaud, a recent arrival at Texas A&M University, heeded the advice of Dr. Karl Terzaghi. Considered the father of soil mechanics, Terzaghi said that the action in geotechnical engineering occurs in the field. With the assistance of Texas A&M researchers Harry Coyle and Richard Bartoskewitz, Briaud began conducting full-scale testing of how structures and soils interact at the University's Riverside Campus.

In the late 1980s, the Federal Highway Administration and the National Science Foundation were searching for sites with known soil characteristics for their National Geotechnical Experimentation Sites (NGESs). Two sites were finally selected for major funding: one at Texas A&M and one at the University of California, Berkeley. Today, only the Texas A&M site remains.

The Texas A&M facility's 40 feet of medium-dense sand and 40 feet of stiff clay sites are perfect for researchers to conduct full-scale studies of drilled shafts, retaining walls, shallow and deep foundations, and tie-back walls.

"We now know how to design a retaining wall to resist the pressure exerted on it by a drilled shaft support. There was not a standard for this before."

Jean-Louis Briaud,
TTI Research Engineer and Professor
Texas A&M's Civil Engineering Department

"We know the soil very well. That's what people like. They can come here without having to redo soil testing," says Briaud, now manager of the Texas A&M Transportation Institute's Geotechnical and Geoenvironmental Program and professor in Texas A&M's Civil Engineering Department.

Briaud just finished a study for the Texas Department of Transportation (TxDOT) titled Interaction Between Drilled Shafts and Mechanically Stabilized Earth Walls. Bridge abutments are sometimes built through mechanically stabilized walls on drilled shaft supports. TxDOT wanted to know if bridge loads could exert undesirable pressure on the wall when the drilled shaft moves toward the retaining wall.

"As a result, we now know how to design a retaining wall to resist the pressure exerted on it by a drilled shaft support," explains Briaud. "There was not a standard for this before. As a result, the drilled shaft support can be smaller than is currently designed because of the strength of the retaining wall, which saves money."

The list of sponsors using the NGES reads like a who's who of geotechnical research. While one-third come from Texas A&M, two-thirds hail from around the world, making it a truly international site.

Because regulations require a Texas A&M representative to be at the site during project work, the University's engineering students benefit from investigations conducted at the NGES. Besides working with instrumentation and drill rigs, students also assist geotechnical researchers performing state-of-the-art studies.

"They see and learn," says Briaud. "It has a big impact on them." ■

For more information, contact **Jean-Louis Briaud** at (979) 845-3795 or j-briaud@tti.tamu.edu.

TTI Advisory Council Holds Annual Meeting in Waco

The Texas A&M Transportation Institute (TTI) Advisory Council meeting in Waco, Texas, in October provided updates on TTI research initiatives, a panel discussion on connected and automated vehicle research, a Texas Department of Transportation (TxDOT) update, and Council discussion on post-legislative session transportation priorities.

Council member Drayton McLane, chairman of the McLane Group, hosted the meeting in the President's Club of McLane Stadium. He was the speaker for the Council dinner and shared some of his experiences in leading a major freight logistics company.

TTI Agency Director Dennis Christiansen opened the Council meeting by providing an update on TTI research initiatives. Steve Roop, TTI senior research scientist, provided an update on the Freight Shuttle System demonstration project. Tim Lomax, TTI research fellow, gave a summary of the results of the *Urban Mobility Scorecard*, a comprehensive analysis of traffic congestion measures in 471 urban areas across the United States, which was released in August.

Drayton McLane, TTI Advisory Council member and chairman of the McLane Group, hosted the meeting in the President's Club of McLane Stadium, in Waco, Texas.

Other briefings included a panel discussion moderated by Ginger Goodin, director of the TTI Transportation Policy Research Center, focused on CV/AV research needs. The three panelists were Council members Mike Heiligenstein, executive director of the Central Texas Regional Mobility Authority; Robert Spillar, transportation director for the City of Austin; and Linda Watson, president/CEO of the Capital Metropolitan Transportation Authority. The panel addressed the role of technology in meeting challenges in public transportation agencies and the role that transportation research should play.

A full Council discussion centered on the transportation outcomes of the recent legislative session, and additional actions the state should pursue to prepare the transportation system for the next decade. A number of ideas were shared, including further updating the *Texas 2030 Committee Report* first completed in 2009 and updated in 2011, examining the shifts in transportation mode choices by the millennial generation, and seeking methods to relieve freight congestion on the state's roadways.

The Council meeting luncheon speaker was Marc Williams, TxDOT interim deputy executive director and director of planning. He provided an update on TxDOT plans and priorities. The meeting concluded with tours of McLane Stadium. ■

Hudson Awarded Grant to Study the Unintended Highway Pedestrian

The Texas Department of Transportation (TxDOT) has selected TTI to conduct a one-year project on reducing the number of motor-vehicle-related pedestrian fatalities in Texas. Project manager and TTI Associate Researcher Joan Hudson has been awarded the one-year project titled The Unintended Highway Pedestrian — What Would You Do? The grant funding comes from the National Highway Traffic Safety Administration.

This project aims to equip motorists, passengers and the general public with the tools needed to make the safest decisions when stranded on the highway. Texas had 24,000 reported crashes involving pedestrians and motor vehicles between 2010 and 2014. In 2014, Texas was ranked the highest state in the nation for the number of interstate pedestrian fatalities, with the most reported cases in Houston, Dallas, San Antonio, Fort Worth and Austin.

Hudson and her team of communication specialists at TTI will develop an educational campaign for TxDOT and other supporting organizations across the states, including the City of Austin Pedestrian Advisory Council and Austin's Vision Zero Traffic Safety Task Force.

"A time may come in some of our lives when we are on the side of a busy highway," says Hudson. "My goal for this campaign is that it will equip motorists with the knowledge of what to do if they find themselves in that situation." ■

Poe Selected as Strategy Lead for TTI's CV/AV Transportation Research

Poe

TTI has selected Christopher Poe, senior research engineer and assistant agency director, as its connected and automated transportation strategy lead. Poe comes to the position with more than 30 years of experience in transportation system operations and intelligent transportation systems research and in leading and executing large, high-visibility research initiatives.

"Currently, the Institute is involved in some 40 connected and automated vehicle [CV/AV] projects at the local, state and national levels," says Agency Director Dennis Christiansen. "Appointing a leader to help achieve our strategic direction in CV/AV research is a natural next step. This new position signals that TTI is taking an enhanced leadership role in researching and implementing CV/AV technologies and best practices to improve the safety, mobility and infrastructure of our nation's transportation system."

Poe will focus on developing collaboration and strategic direction for advanced transportation research at TTI, and will lead the planning and implementation efforts for the Institute's research and test beds in all areas of connected transportation. He will organize the CV/AV Strategy Team across multiple divisions within TTI and coordinate with Texas A&M University's CV/AV efforts. ■

89th Annual Transportation Short Course Brings Research, Implementation Together for Texas

The Texas Department of Transportation (TxDOT) held its 89th Annual Transportation Short Course on the campus of Texas A&M University Oct. 12–14. The annual event, organized and co-hosted by TTI and TxDOT, briefs the department's employees about the latest innovations resulting from TxDOT's transportation research. It also gives the department an opportunity to look back over the past year and recognize accomplishments, and to set goals for the coming year.

"The greatest accomplishment of TxDOT this year was to solidify and re-earn the respect of the people of Texas and the Texas Legislature," declared TxDOT Executive Director LtGen Joe Weber USMC (Ret.) at the opening session. "The expectations for us are very, very high."

Weber spoke at the opening session, where TxDOT's Extra Mile Awards were given to personnel who, during the course of their jobs, help — and in some cases save the lives of — their fellow Texans. Break-out sessions then highlighted recent research innovations by TTI and the department's other research partners for those destined to use them in the field: TxDOT personnel and practitioners.

"Short Course is always a highlight of the year for the Texas A&M Transportation Institute," says TTI Agency Director Dennis Christiansen. "It's a very visible example of the partnership that exists between TxDOT and the state universities and has led to innumerable advances in transportation innovation — not only in Texas but throughout the country." ■

Center for Infrastructure Renewal to Address Aging Roadways, Structures, Pipelines, Power Grid

To meet the challenges of the state's aging transportation infrastructure, the Texas Legislature has appropriated $5 million for a joint venture between TTI and the Texas A&M Engineering Experiment Station (TEES) to construct the Center for Infrastructure Renewal (CIR). The world-class facility will develop advanced and sustainable materials and structural systems that will reduce cost and extend infrastructure life, safety, resiliency and durability.

"We need viable solutions for solving our infrastructure needs without putting more burden on the taxpayers of Texas," says John Sharp, chancellor of The Texas A&M University System. "By investing in new technology development now, we could save hundreds of millions of dollars in construction expenses over the long term."

Roadways and bridges are aging at a faster rate than they can be repaired. The U.S. power grid is more than 130 years old and vulnerable to natural disasters and terror attacks. There is also a concern regarding the integrity of the nation's oil, gas, water and wastewater pipeline systems. Modernizing these infrastructures will require interdisciplinary research teams, 21st century technologies and innovative solutions for the demands of a growing population.

"We expect CIR research to address issues such as developing new methods to repair and replace infrastructure at a lower cost, in less time and with new materials that will have a longer lifespan," says M. Katherine Banks, vice chancellor and dean of engineering at Texas A&M University and director of TEES.

The facility — at 200,000 square feet one of the largest of its kind in the world — will connect researchers and field experts to develop partnerships with industry to help address Texas' infrastructure needs. A nationwide search is underway for a director for CIR and is expected to be completed in 2018.

"In our mission to train the next generation workforce that will plan, develop and maintain our roads, bridges, pipelines and electrical infrastructure into the future, this facility offers a living laboratory," says Dennis Christiansen, TTI agency director. ■

Newcomb to Head TTI Materials and Pavement Division

Newcomb

Wimsatt

TTI Senior Research Engineer David Newcomb has been appointed head of the TTI Materials and Pavement Division. Newcomb replaces Andrew Wimsatt, who's retiring from the position to lead a TTI effort to coordinate and expand the infrastructure assessment and management duties across the Institute. During Wimsatt's tenure, the division experienced growth and diversification of its sponsor base, improved relationships with private industry and associations, and increased field activities and support for academic endeavors.

"I want to thank Andrew for his leadership over the last decade, and I look forward to working with David as we continue our efforts to grow and diversify the program," says TTI Executive Associate Director Jon Epps.

Newcomb joined TTI in 2011 following 12 years as vice president of research and technology at the National Asphalt Pavement Association. He's the recipient of multiple prestigious awards from the Transportation Research Board (TRB) and has been the chair of the International Society of Asphalt Pavements, president of the Association of Asphalt Paving Technologists, and chair of the TRB Committee on Pavement Rehabilitation.

"As head of the Materials and Pavement Division, I will work to forge new relationships as we continue efforts to broaden our funding base," Newcomb says. "We also want to address bigger issues, like asset management and speed of construction strategies, by reaching out to other experts within TTI." ■

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PUBLICATIONS

A full catalog of TTI publications and other products is online at http://tti.tamu.edu/publications. You can find the publications by searching for either the title or publication number listed here. Most of these publications are available as free downloads in portable document format (PDF).

Printed, bound versions of these reports are also available through the URL above.

RESEARCH VIDEOS

Access the research topics listed below via the URLs shown.

TTI Selects Strategy Lead for CV/AV Transportation Research:
https://vimeo.com/147641712

Research & Implementation Program – El Paso:
https://vimeo.com/143167340

Researching Critical Solutions to Critical Border Issues:
https://vimeo.com/130477644

TTI Enhances Its Proving Ground with New Research Facilities:
https://vimeo.com/131557369

Connected Transportation Is Just Up the Road:
https://vimeo.com/97270483

TTI's Air Quality Program:
https://vimeo.com/123978706

TECHNICAL REPORTS

Alternative Fuel Vehicle Forecasts, by Trey Baker, **PRC 14-28 F,** March 2015.

Considerations for Public Freight Rail Projects in Texas, by Allan Rutter, **PRC 15-57 F,** September 2015.

Evaluation of Existing Smartphone Applications and Data Needs for Travel Survey, by Yan Huang, **0-6767-1,** May 27, 2015.

Improved Business Driveway Delineation in Urban Work Zones, by LuAnn Theiss, **0-6781-1,** April 22, 2015.

Improved Trip Generation Data for Texas Using Workplace and Special Generator Surveys, by Ed Hard, **0-6760-1,** May 18, 2015.

Oil and Gas Energy Developments and Changes in Crash Trends in Texas, by Cesar Quiroga, **PRC 15-35 F,** October 2015.

Project Consistency with Transportation Plans and Air Quality Conformity Workshops: Technical Report, by Reza Farzaneh, **5-6758-01-1,** April 29, 2015.

Reducing Lane and Shoulder Width to Permit an Additional Lane on a Freeway: Technical Report, by Karen Dixon, **0-6811-1,** May 21, 2015.

Revolutionizing Our Roadways: Data Privacy Considerations for Automated and Connected Vehicles, by Jason Wagner, **TTI-2015-13,** November 2015.

Spread Prestressed Concrete Slab Beam Bridges, by Mary Beth Hueste, **0-6722-1,** May 8, 2015.

Texas Freight Survey, by Chris Simek, **PRC 15-43 F,** September 2015.

PROJECT SUMMARY REPORTS AND PRODUCTS

Binder Utilization Maps, by Amy Epps Martin, **5-6616-01-P5,** April 28, 2015.

Equipment Replacement/Retention Decision Making, by Fan Wei, **0-6693-S,** September 4, 2015.

Guidelines for Analyzing the Capacity of D-Regions with Premature Concrete Deterioration of ASR/DEF, by John Mander, **0-5997-P2,** April 22, 2015.

Improved Nighttime Work Zone Channelization in Confined Urban Projects, by LuAnn Theiss, **0-6781-S,** April 10, 2015.

Improved Trip Generation Data for Texas Using Workplace and Special Generator Surveys, by Ed Hard, **0-6760-S,** April 21, 2015.

Improved Trip Generation Data for Texas Using Workplace and Special Generator Surveys: Workshop Materials, by Ed Hard, **0-6760-P2,** May 4, 2015.

Project Consistency with Transportation Plans and Air Quality Conformity Workshops: Materials, by Reza Farzaneh, **5-6758-01-P5,** April 8, 2015.

Reducing Lane and Shoulder Width to Permit an Additional Lane on a Freeway, by Karen Dixon, **0-6811-S,** May 22, 2015.

Seal Coat Binder Performance Specifications: Technical Briefing Presentation, Task 1, by Amy Epps Martin, **5-6616-01-P1,** April 28, 2015.

Short Radius MASH TL-3 Guardrail Treatment, by Akram Abu-Odeh, **0-6711-S,** April 7, 2015.

SPG Specification for 2015 Implementation, by Amy Epps Martin, **5-6616-01-P4,** April 28, 2015.

Spread Prestressed Concrete Slab Beam Bridges, by Mary Beth Hueste, **0-6722-S,** April 7, 2015.

Texas Trip Generation Manual, by Ed Hard, **0-6760-P1,** May 4, 2015.

Thin Overlay Guidelines: Project Selection, Design, and Construction, by John Mander, **0-6742-P1,** April 22, 2015.