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Implementing Intercity
Passenger Rail

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to Test CV/AV Technologies

TEXAS TRANSPORTATION Researcher

VOL. 52 | NO. 4 | 2016

*New Director,
New Opportunities*

 Texas A&M
Transportation
Institute

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Handing Over the Reins:

A Final Word, A Fond Farewell

TTI will do well going forward because of the expertise, facilities and people we have, and because we are a member of The Texas A&M University System with its vast research capabilities.

This is my final issue of the *Texas Transportation Researcher* as agency director

of the Texas A&M Transportation Institute (TTI). I want to take the opportunity to thank all of you who have followed and supported the Institute over many years. The most enjoyable part of being TTI's director has been having the opportunity to work with, and get to know, a lot of wonderful people.

My successor will be Greg Winfree. Greg is stepping down as assistant U.S. secretary of transportation to accept this position. Greg brings a proven record of leadership and a network of contacts, all of which will be extremely valuable to TTI. Greg has been a good friend of mine for several years, and he is an excellent choice to step in and lead the Institute. I could not be more pleased.

Life can take some interesting turns. I arrived in College Station in 1971 to work on a master's degree. My firm plan was to get that degree and be out of College Station in 18 months. Somehow those plans got derailed, as 45 years later, I am retiring from The Texas A&M University System.

And it was TTI and the TTI people that derailed those plans. This really is a special place. My predecessors as TTI director — people with names like Benson, Keese, Wootan and Richardson — created an organization and a culture that attracts smart, entrepreneurial researchers. We owe so much to the early leaders who established that culture and set the course for the Institute.

In the 1940s, two long-time transportation leaders in the state, Dewitt Greer and Gibb Gilchrist, had a vision that the universities should be a valuable partner with the (then) Texas Highway Department to build the best and safest system of roads in the world. That vision led to the creation of the Texas Transportation Institute in 1950 as the official research arm of the Highway Department. It also led to the establishment of the best state department

of transportation research program in the United States. As they say, the rest is history.

The success of the TTI research program is all about our people. The talent that has been assembled at TTI is, quite simply, incredible. We have a breadth and depth of capability unmatched in university transportation research. We have dozens of staff who are recognized national experts in their fields and have chosen to be associated with TTI. This is, by far, our greatest strength and what assures our success going forward.

The word unique is very overused, but TTI in many respects truly is unique. TTI will do well going forward because of the expertise, facilities and people we have, and because we are a member of The Texas A&M University System with its vast research capabilities. And, even better, the need for what we do is greater than it ever has been.

A sincere thank-you for all you have done to support us over many years. Let's stay in touch. ■



by Dennis Christiansen
Agency Director

Follow the Leader: Two-Truck Automated Platoon Test Is a Winner

Can an automated, commercial two-truck platoon be deployed on specific corridors in Texas in the next five to ten years? Thanks to a successful test by the Texas A&M Transportation Institute (TTI), the Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT), the agencies are one big step closer to answering that question.

TTI hosted a first-of-its-kind two-truck platooning technology demonstration at The Texas A&M University System RELLIS Campus on July 22, 2016, highlighting one of the TxDOT Innovative Projects. TTI System Reliability Division Head Beverly Kuhn and a team of 15 researchers and in-kind private partners collaborated on the successful test. Representatives from TxDOT, FHWA, the A&M System, TTI leadership and Ricardo Rail, a private-sector partner, viewed the test. Besides Ricardo, the other private-sector partners involved in the project are Navistar, TRW, Denso, Bendix, GreatDane Trailer and Lytx. In addition, Argonne National Laboratory and the U.S. Army Tank Automotive Research, Development and Engineering Center are also participating.

The system successfully executed all platooning scenarios planned for the demonstration. Two Navistar 18-wheelers first linked up and traveled in a figure eight at about 40 mph, followed by an increased gap distance, and ended with left and right lane changes in both directions.

“I’m not surprised at all that this type of innovation is happening in Texas,” says Al Alonzi, administrator of FHWA’s Texas Division. “These kinds of partnerships — between TxDOT, TTI, USDOT [U.S. Department of Transportation], and private-sector contributors — are the glue to innovation where the rubber is really going to meet the road, and that’s what makes me most proud. I have no doubt that the best is yet to come.”

“The benefits to this type of system are numerous. With safety as the primary driver for this technology, the average projected fuel savings is up to 12 percent, and highway throughput will be notably better as well.”

*Beverly Kuhn, Head
TTI System Reliability Division*



A first-of-its-kind two-truck platooning technology was demonstrated at The Texas A&M University System RELLIS Campus on July 22, 2016.



What Is Truck Platooning?

Truck platooning is an extension of cooperative adaptive cruise control and forward collision avoidance technology that provides automated lateral and longitudinal vehicle control to maintain a tight formation of vehicles with short following distances. A platoon is led by a manually driven truck and allows the driver(s) of the following truck(s) to disengage from driving tasks and monitor system performance. ■

Platooning fits neatly into TxDOT's long-term vision for freight. "Freight improves the quality of life for citizens and businesses," says TxDOT Transportation Engineer Marco Cameron. "And commercial truck platooning provides a way for freight to be delivered in a more efficient and cost-effective way."

The demonstration project's unique features include combining lateral and longitudinal control to provide automated steering, acceleration and braking without the driver in the loop. When the system is engaged, the two trucks travel together as one, while maintaining a consistent driver-adjustable separation distance.

Each truck is equipped with radar, cameras, sensors, vehicle-to-vehicle communications and a driver-monitoring system. The combination of these technologies, along with control algorithms, allows the trailing vehicle to safely and closely follow the lead truck. The lead driver operates the truck manually. The second driver is present in the following truck and can take over control if necessary but isn't required to

Truck Platooning Benefits



SAFETY. By reducing the number of drivers making decisions, the incidence of driver error decreases, thus increasing roadway safety for others.



ECONOMICAL. Projected fuel savings of up to 12 percent can drive transportation costs down, and that results in reduced prices at the grocery store.



ENVIRONMENTAL. With reduced drag on both trucks, fuel efficiency increases, bringing down carbon monoxide and other pollutants.

"Freight improves the quality of life for citizens and businesses. And commercial truck platooning provides a way for freight to be delivered in a more efficient and cost-effective way."

Marco Cameron
TxDOT Transportation Engineer

steer or control speed. The system keeps the trucks perfectly aligned.

"The benefits to this type of system are numerous," says Kuhn. "With safety as the primary driver for this technology, the average projected fuel savings is up to 12 percent, and highway throughput will be notably better as well."

TTI Research Scientists Mike Lukuc and Mohammad Poorsartep co-led this concept feasibility phase.

According to Lukuc, "Now that we've demonstrated that the platooning concept works, our phase-two focus will include

fine-tuning the vehicle system, adding to the capabilities and robustness of this platform, and continuing the policy and concept-of-operations work that was done in the earlier foundational studies."

The ultimate goal in future phases of this research is to operate these vehicles on the road. The project identified candidate locations where two-truck platoons would provide benefits to the operators and a safe environment for other road users. ■

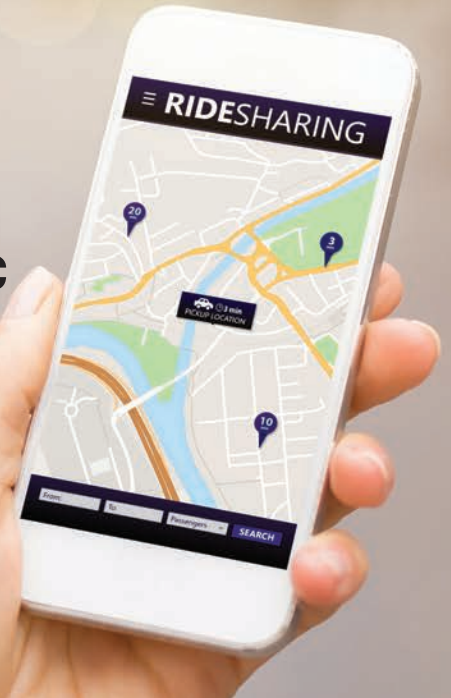


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SURVEY SAYS:

More Texans Turning to Phone Apps, Websites to Avoid Traffic

TEXANS ARE RELYING more on information from smartphones and websites to make routine travel decisions than they did two years ago, according to new research from the Texas A&M Transportation Institute (TTI).



Conducted this summer, the survey found that 70 percent of respondents had recently used a smartphone app for navigation or route guidance, up from 51 percent in 2014. And 41 percent visited a website for traffic information or route planning, more than double the 18 percent from two years ago.

Smartphone and Internet use has been trending modestly upward for years, but researchers point out that the increased use specifically for daily travel planning by Texans is outpacing those broader trends, which could have implications in a number of ways.

“If drivers, for instance, are telling us in growing numbers how they want to get their traffic information, that compels us to consider how we’ve been providing that information up to now,” says Ginger Goodin, director of TTI’s Transportation Policy Research Center, which conducted the study.

“If drivers, for instance, are telling us in growing numbers how they want to get their traffic information, that compels us to consider how we’ve been providing that information up to now.”

*Ginger Goodin, Director
Transportation Policy Research
Center*



70% of travelers use a smartphone app



to get current traffic information, up from 51% in 2014.

Smartphone Use

The findings are among those from the 2016 Texas Transportation Poll, a statewide assessment of travel behaviors and attitudes first conducted by TTI in 2014. In 2016, researchers surveyed more than 4,000 Texans aged 18 or older, posing questions in four areas:

- travel behavior,
- travel solutions,
- transportation funding, and
- customer satisfaction with governmental agencies.

Increased reliance on technology to avoid traffic was just one way in which

Texans' travel behaviors have changed in only two years. In 2016, they were also slightly more likely to rely on their own vehicles for daily trips and less likely to use alternate transportation modes than they were two years earlier.

“The question of how TNCs are regulated is driving a lot of robust discussion involving both travelers and policy makers.”

Chris Simek
Assistant Research Scientist

Automobiles served as the primary transportation means for 93 percent of survey respondents this year, up slightly from 91 percent in 2014. Only 14 percent had made at least one trip in the previous month using public transit, compared with a quarter of respondents in 2014. Bicycle use dropped from 11 percent to 7 percent, and walking dropped from 33 percent to 30 percent.

Respondents also reported a 29 percent increase in the number of miles they drove, up from 13,351 two years ago to 17,321 this year. In 2014, 61 percent of respondents said they tried to travel less because of high fuel prices, but in 2016, only 29 percent reported traveling less for that reason.

More miles and more reliance on personal autos suggest a link between those travel choices and gas prices, which at the time of the recent survey cost two-thirds what gas cost in 2014.

“Our findings from the first poll two years ago confirmed the widely held belief that Texans really depend on their cars and trucks,” says TTI Research Scientist Tina Geiselbrecht, a co-author of the study. “The follow-up study this year suggests that’s even more true when gas prices are taking a smaller bite out of their personal budgets.”



7% have used a car-share service (such as Zipcar or Car2Go).

22% have used a transportation network company (such as Lyft or Uber).

Ride Sourcing

The share of Texans who believe transportation funding should be increased was also up, from 64 percent in 2014 to 73 percent this year.

Respondents in 2016 also seemed slightly less familiar with the central source of transportation funding in Texas. Those who correctly identified the state’s fuel tax as a flat tax (remaining constant regardless of gas prices) decreased from 51 percent to 46 percent. Those who incorrectly said it was a sales tax rose from 47 percent to 53 percent.

New in this year’s survey was a series of question regarding transportation network companies (TNCs) like Uber

and Lyft. Respondents generally believe that TNCs should be regulated at the state level, and that local governments should treat TNCs and taxi companies similarly.

“The question of how TNCs are regulated is driving a lot of robust discussion involving both travelers and policy makers,” says Chris Simek, TTI assistant research scientist and co-author of the report. “We hope that our work can help to inform those discussions.”

Researchers plan to repeat the survey again in 2018 to monitor changes in Texans’ travel behaviors and opinions. ■



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TTI Investigates Traffic Safety Impacts of Marijuana Use



As part of a new Texas Department of Transportation (TxDOT) project,

Texas A&M Transportation Institute (TTI) researchers are looking into Texans' attitudes on marijuana use and analyzing the traffic safety impacts in states that have legalized, decriminalized or made marijuana available for medical purposes.

Several U.S. states have relaxed their marijuana laws, and during the 2016 election, four more states legalized recreational marijuana use. In 2015, Texas legalized the use of low-tetrahydrocannabinol (THC) marijuana oil for patients with certain medical conditions. But its effect on driving is not really known, and the Governors Highway Safety Association has recognized this as a key traffic safety area needing further study.

"As our country moves toward more relaxed marijuana use and possession laws, more research is needed on the impact that will have on traffic safety," says TTI Assistant Transportation Researcher Jena Prescott, principal investigator on the project.

Data from the National Highway Traffic Safety Administration's 2013–2014 National Roadside Survey of Alcohol and Drug Use by Drivers show alcohol use prior to driving is decreasing, while drug use (specifically marijuana) is increasing.

"With the passage of the 2015 law, learning more about the traffic safety implications of medicinal and legalized marijuana use is critical for the future of our state," says Troy Walden, director of TTI's Center for Alcohol and Drug Education Studies.

As part of the TxDOT project, titled Marijuana and Driving: A Look at Texans' Attitudes and Impact on Driving Under the Influence, researchers will:

- survey residents of Texas counties on attitudes toward marijuana use;
- conduct a literature review of the effects of marijuana use on the human body, the driving task and crash risk;
- conduct a crash analysis of drug-impaired-driving crashes (fatal and serious injury) in Texas from 2010 to 2015 and compare them to similar crashes in states with decriminalized marijuana laws; and

- conduct a policy review of Washington, Alaska, Colorado, Oregon (states where marijuana use is legal), Washington, D.C., and Texas.

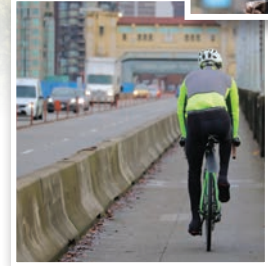
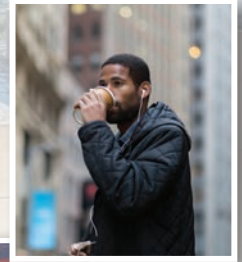
Researchers will also create public education and outreach materials to be used in impaired-driving outreach and education campaigns in the Lone Star State.

"We will look at the crash factors and work to determine the types of crashes that are more likely to be drug involved," says Prescott. "We hope to determine the degree to which relaxed marijuana laws impact crashes in states with these new laws and their neighboring states." ■



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Spike in Pedestrian/Bicyclist Deaths Prompts Year-Long Study by TxDOT



A sharp increase in the number of pedestrian fatalities in Texas has prompted researchers with the Center for Transportation Safety at the Texas A&M Transportation Institute (TTI) to examine what factors contributed to the 550 deaths in 2015 — nearly a 13 percent increase from the year before. In fact, since 2010, pedestrian fatalities have risen an alarming 54 percent, representing 17 percent of all roadway deaths. That's up from 13 percent of all fatalities in 2010.

"This is certainly an issue that has safety experts concerned," says TTI Associate Transportation Researcher Stephanie Quinn. "But at this point we can only speculate about the cause of this dramatic increase. Are there simply more people walking? Have infrastructure changes contributed to the problem? Or is there a common human behavior, such as distraction for example, playing a role?"

Quinn and TTI Assistant Transportation Researcher Neal Johnson are co-leading a one-year Texas Department of Transportation research project. They will examine both pedestrian and bicycle crash data to determine where and on what types of roads the crashes occurred, and what caused them.

"We'll also be conducting observational surveys in high-crash areas in Harris County, which is leading the state in the number of fatalities," Johnson explains. Though only representative of 17 percent of the state's population, he says, Harris County has been home to one-third of all pedestrian/bicycle crashes in Texas over the last five years. "We'll be observing behaviors of drivers, riders and pedestrians in these areas to see if there's anything we can pinpoint that might be contributing."

Researchers will document where the pedestrians and bicyclists are walking or riding, the proper or improper use of crosswalks, bicyclist helmet use, and actions of surrounding

motorists. The surveyors will also take note of the surrounding pedestrian and bicycle infrastructure (such as bike lanes and sidewalks) to see how it might affect behavior.

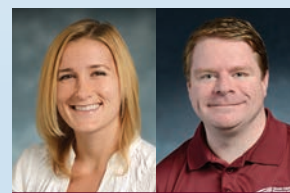
"Following the data collection stage, we will create a public outreach and educational campaign that uses the crash and behavioral data to educate and motivate safe behaviors among pedestrians, bicyclists and motorists," Johnson says.

"We're approaching this project with no preconceived notions about what we might find, but we all agree it's essential we find ways to end these deaths."

Stephanie Quinn
Associate Transportation Researcher

The researchers plan to highlight their results through social media outlets and public events such as fun runs and cycling events. Additionally, interactive seminars will be conducted to educate local residents on safe behaviors to help reduce these types of crashes.

"We're approaching this project with no preconceived notions about what we might find," Quinn says. "But we all agree it's essential we find ways to end these deaths." ■



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Winfree Appointed to Lead Texas A&M Transportation Institute

Board of Regents Selects Senior USDOT Official



On December 12, 2016, The Texas A&M University System Board of Regents appointed former Assistant Secretary of the U.S. Department of Transportation (USDOT) Gregory D. Winfree, J.D., as agency director for the Texas A&M Transportation Institute (TTI). Winfree began his new role on December 15, replacing Dennis L. Christiansen, P.E., Ph.D., who stepped down after 10 years as TTI agency director and 45 years of service at TTI.

“TTI is the best transportation research agency on the planet, and Greg Winfree’s vast experience in the national transportation arena and proven leadership will serve TTI and the A&M System well,” says Texas A&M University System Chancellor John Sharp. “We are fortunate to attract such an innovative leader to head up our excellent team at TTI.”

Winfree comes to TTI from the USDOT Office of the Assistant Secretary for Research and Technology, which he joined as chief counsel in March 2010 and where he was later sworn in as the assistant secretary in January 2014. During his tenure, Winfree also served as deputy administrator and administrator of a predecessor agency, the Research and Innovative Technology Administration (RITA).

As assistant secretary, he was the senior executive responsible for a

\$450 million budget and oversaw more than 1,000 scientific, data analysis and administrative staff members who supported USDOT’s multi-modal transportation initiatives. The program offices under his purview include: the John A. Volpe National Transportation Systems Center; the Research, Development and Technology Coordination Office; the Bureau of Transportation Statistics; the Positioning, Navigation, Timing and Spectrum Management Office; the Intelligent Transportation Systems Joint Program Office; and the Transportation Safety Institute.

“Mr. Winfree has an outstanding record of transportation research at the national level and is well positioned to connect TTI with funding opportunities,” said M. Katherine Banks, Ph.D., vice chancellor and dean of Texas A&M Engineering. “He is a fantastic hire for TTI and the Texas A&M System,

and I look forward to fully supporting him as he identifies and implements new opportunities and initiatives for TTI.”

Prior to his USDOT appointments, Winfree served as corporate counsel for several Fortune 500 corporations operating in a number of technical industries, including natural resources and metals, pharmaceuticals, and chemicals and polymers. Prior to his corporate legal work, Winfree was a trial attorney in the Housing and Civil Enforcement Section of the U.S. Department of Justice Civil Rights Division.

“I am delighted to join TTI — the preeminent university transportation research institute nationwide — to help identify solutions and opportunities to address our transportation challenges and keep Texas and America moving forward,” says Winfree. “I am humbled by this once-in-a-lifetime opportunity and appreciate the confidence of the Board of Regents, Chancellor Sharp and Vice Chancellor Banks.” ■



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TTI Provides Guidance for Maintaining Pavements at General Aviation Airports

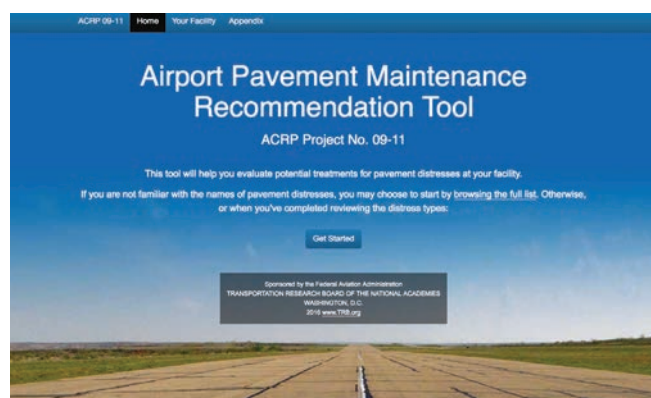
ALL AIRPORTS HAVE ONE THING IN COMMON: PAVEMENT,

and a lot of it. In fact, in many cases, maintaining runways represents the largest expenditure at an airport. It's critical that airport management inspect and maintain its pavements in a timely fashion for safety reasons and to avoid costly, full-pavement rehabilitation projects.

Researchers at the Texas A&M Transportation Institute (TTI) recently completed a project, Pavement Maintenance Guidelines for General Aviation Airport Management, sponsored by the Airport Cooperative Research Program (ACRP) of the Transportation Research Board of the National Academies of Sciences, Engineering and Medicine.

"This project provides tools for general aviation airport managers to go out, walk the pavement, and identify common pavement distresses," says TTI Pavement Management Program Manager Tom Freeman, who led the project. "General aviation airports are often smaller, with limited staff and resources. The airport managers in many cases do not have experience identifying when there is a pavement problem or what they should do when one occurs. They may wait too late to take action."

The project yielded four products: a technical report, a field guide for quick reference, a more in-depth guidebook and a website.



The Airport Pavement Maintenance Recommendation Tool (<https://acrp-pavement-tool.tti.tamu.edu/>) can be accessed via phone, tablet or desktop computer.

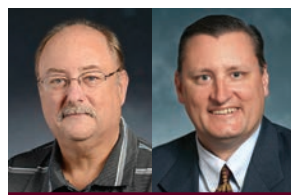
"The website and field guide allow a user to quickly determine what type of cracking or surface distress they may be looking at."

*Jeff Borowiec
Research Scientist*

"A key to this project was the production of deliverables that could easily be interpreted and used in the field," notes TTI Research Scientist Jeff Borowiec. "The website and field guide allow users to quickly determine what type of cracking or surface distress they may be looking at."

One of the features of the website is a cost estimator tool that can be accessed via phone, tablet or desktop computer. If users see a pavement distress, they can identify it using pictures provided on the website. The website takes them through a series of steps to determine the severity of the distress and best repair option. The users are then provided with a cost estimate that can be taken to local officials.

"I like to equate pavement maintenance with maintaining your vehicle," says Freeman. "If you invest resources into keeping it in good shape, then it will save you costly repairs in the future. We hope the tools we've developed in this project assist airport managers in making key decisions." ■



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A Platform for Change: TTI Provides FHWA a New Way to Test CV/AV Technologies

Self-driving cars. Seamless communication between vehicles and the roadside. The ability to multitask while driving from point A to point B reliably, safely and on time.

It all sounds a bit like the George Jetson future we were promised in the 1960s, minus the flying cars. The difference is that the connected vehicle/automated vehicle (CV/AV) revolution is happening now. But to help make it a reality, the technologies need to be vetted, validated and successfully deployed. And before that can happen, we must have a reliable, standardized way to test those technologies.

The Texas A&M Transportation Institute (TTI) has developed an augmented-reality environment where real entities (e.g., vehicles and traffic signal operation) are combined with simulated traffic and displayed on a screen. This is similar to a Pokémon Go app, but instead of showing Pokémon, the screen shows simulated vehicles superimposed on the roadway. The first-of-its-kind ap-

proach — called CONVAS (CONnected Vehicle Assessment Simulation) — marries the cost-effectiveness of computer simulation with actual roadway operations to produce an efficient yet dependable evaluation mechanism for the Federal Highway Administration (FHWA). TTI has been developing the platform since January 2014.

“The limitations of traditional simulation come from having to model every entity to be as realistic as possible,” explains TTI Research Engineer Srinivasa Sunkari, principal investigator on the project. “For example, operating agencies can assess CV applications using a simulation environment that can accurately represent a mix of real vehicles with simulated vehicles simultaneously in real time.”

To mitigate the effects of modeling while improving reliability under actual driving conditions, Sunkari and his team used hardware-in-the-loop (HITL) simulation. This approach introduces hardware components into the simulation model. In HITL, devices like traffic signals are fed information (e.g., simulated data indicating a vehicle is passing a detector), and the signals react in real time. That reaction is then fed back into the simulation model, and the simulated vehicle proceeds or stops accordingly.

Sunkari and his team developed an enhanced HITL simulation in this project by incorporating an actual CV on a roadway network into a simulation model and displaying simulated CVs inside the real vehicle at the same time. This enables development and testing of advanced CV applications or strategies by allowing assessments of how CVs respond to each other. This is the first time HITL simulation has been applied in this way.

“CONVAS provides the most advanced, realistic evaluation tool for emerging CV/AV applications that rely on wireless communications.”

*Srinivasa Sunkari
Research Engineer*

To more accurately represent CV communications, TTI researchers integrated the commercial microscopic traffic simulator VisSim with the open-source wireless network simulator ns-3. Doing so enables simulated vehicles to adapt to variability in the communication environment, providing a more realistic assessment of CV applications in the simulation model. Similar to its application of HITL simulation, TTI’s integration of the two simulators had also never been done before.

“CONVAS provides the most advanced, realistic evaluation tool for emerging CV/AV applications that rely on wireless communications,” says Sunkari. “And in the future, that’ll be just about every aspect of our transportation system.”

On June 22, 2016, Sunkari and his research team demonstrated CONVAS to visiting FHWA sponsors at The Texas



TTI has developed an augmented-reality environment where real entities (e.g., vehicles and traffic signal operation) are combined with simulated traffic and displayed on a screen.

A&M University System’s RELIS Campus. The field test confirmed the successful integration of the Vissim and ns-3 simulators and showed the seamless data flow between the simulation model and the test vehicle’s onboard unit.

With the delivery of CONVAS in December, FHWA now has a way to test the realistic impact of wireless communications on the performance of large-scale CV applications while minimizing evaluation costs. Through simulation, technologies can be fine-tuned, and engineers can use the results to design advanced algorithms that, in turn, will govern how vehicles drive tomorrow’s roadways. In short, thanks to CONVAS, the wireless solutions connecting our future transportation system will be safer, more dependable and less expensive to build.

“The technology used in developing this platform will bring benefits in CV research for many years to come as we work to improve our transportation network to become a more intelligent, more reliable and safer system,” says FHWA Highway Research Engineer Peter Huang, who manages the Turner-Fairbank Intelligent Intersection Traffic Control Laboratory. ■



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TTI Selected for \$10.75 Million Federal Contract to Evaluate Connected Vehicle Projects

The Texas A&M Transportation Institute (TTI) has been selected by the Federal Highway Administration (FHWA) to evaluate connected vehicle projects in southern Wyoming, New York City, and Tampa, Fla. The multiyear federal contract is for \$10.75 million.

Vehicle challenges and opportunities have driven the need for the pilot tests and evaluations. Roadway congestion in the United States contributes to the alarming rate of crash injuries and fatalities, and a growing number of people — particularly younger people — are beginning to favor safer shared-mobility options that are more efficient, reliable and affordable. At the same time, electronic and wireless technology holds the potential to improve mobility in ways that don't require building more roadway capacity.

“These projects have the potential to transform the way we travel. It's pretty cool to be on the leading edge of evaluating these deployments and to see the extent to which they can impact safety, mobility and the environment for the future.”

Kevin Balke
Senior Research Engineer

These sites are deploying a wide range of connected vehicle applications and systems to improve safety, mobility, environmental and agency efficiencies in select corridors. These pilot deployments will involve both vehicle-to-vehicle and vehicle-to-infrastructure communications.

“The work we will do for FHWA will help to ensure that we're bringing forth new solutions that take full advantage of the innovative communication technology tools that we have available to us,” says Dennis Christiansen, TTI agency director.

To advance transformative approaches, FHWA has funded efforts in two areas, each of which will be evaluated by a team led by TTI and supported by several other public- and private-sector partners:

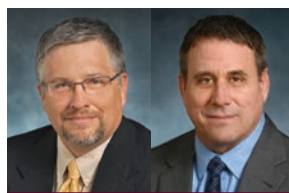
- Connected Vehicle Pilots Deployment Program, with projects in southern Wyoming, New York City, and Tampa, Fla.
- Beyond Traffic: The Smart City Challenge, which is providing up to \$40 million in funding for technology-based mobility solutions in Columbus, Ohio.

“We are extremely excited to have an opportunity to lead the evaluation effort for the CV pilot deployment sites,” says TTI Senior Research Engineer Kevin Balke, one of two project leads for the Institute. “These projects have the potential to transform the way we travel. It's pretty cool to be on the leading edge of evaluating these deployments and to see the extent to which they can impact safety, mobility and the environment for the future.”



In addition, federal officials say, the various technologies focus on providing all Americans with safe, reliable and affordable connections to employment, education, health care and other essential services.

“Applying technology to make transportation more efficient is one of The Texas A&M University System's top research priorities,” notes A&M System Chancellor John Sharp. “With TTI staff and the development of our new RELLIS Campus, we have both the talent and the facilities to serve as a leader in transforming the way Americans travel, and at the same time create ladders of opportunity for more Americans.” ■



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“WHEREAS, Dennis Christiansen has faithfully served The Texas A&M University System for 45 years — from 1971 through 2016 — most recently as the fifth Agency Director of the Texas A&M Transportation Institute, which is widely known as the largest and finest higher education-affiliated transportation research center in the United States....”

*— The Texas A&M University System
Board of Regents Resolution
Honoring Dennis Christiansen*



Visionary Leader

Christiansen's Vision Led TTI to New Opportunities, Steady Growth

When The Texas A&M University System Board of Regents selected Dr. Dennis Christiansen as the Texas A&M Transportation Institute's (TTI's) fifth agency director in late 2006, the board tapped a seasoned leader, with 35 years of experience in advancing the national and international reputation of TTI already under his belt. In the subsequent 10 years that Christiansen served as agency director, TTI research expenditures increased by 60 percent, the total operating budget increased by 52 percent, and TTI facilities expanded from 216,000 square feet to more than 324,000 square feet — stellar accomplishments in the midst of changing research landscapes and funding cycles.

A major initiative identified and guided by Christiansen was the repositioning of TTI to expand and diversify its research portfolio to attract nontraditional sponsors. Christiansen's strategy enabled the Institute to not only expand its expertise in traditional research areas, but also to become a recognized leader in new, significant areas of study such as finance, policy, environment and technology. His vision will ensure that TTI remains strong and well positioned to be our nation's thought leader in addressing the next generation of transportation changes and challenges, which are certain to be revolutionary.

The Christiansen Era: A Decade of Growth,



Dennis Christiansen
appointed director

Adoption of the landmark *Texas 2030 Committee Transportation Needs Report* by the Texas Department of Transportation (TxDOT) initiated and staffed primarily by TTI



- ARTBA recognizes TTI with the Glass Hammer Award for advancing women leaders in transportation
- First five-year strategic plan created for the Institute

2006

2008

2009

2010

2011

2012



Groundbreaking for new State
Headquarters and Research Building

"Dennis turned TTI into the greatest transportation research organization in America. He and I had a close personal working relationship. I will miss him dearly."

John Sharp, Chancellor
The Texas A&M University System

"Dennis Christiansen's leadership of TTI built on its existing excellent research reputation and navigated the organization to the world-class go-to source for transportation information. By building collaborative relationships with state and federal policy makers, as well as industry professionals and transportation consumers, Dennis focused TTI's resources to anticipate and provide solutions for issues of the next decade as well as meeting the current challenges."

Judy Hawley
*Former Commission Chair
Port of Corpus Christi*



- State Headquarters and Research Building and Visibility Research Laboratory open
- U.S. State Department awards TTI multimillion-dollar contract for perimeter security testing
- Office opens in Mexico City
- Environmental and Emissions Research Facility established
- TxDOT awards TTI multimillion-dollar contract to support reconstruction of 96 miles of I-35 in Central Texas



"Under the leadership of Dr. Dennis Christiansen, TTI has set the standard for opportunities for women in the transportation industry. This was illustrated in 2011 when ARTBA awarded TTI the inaugural Glass Hammer Award, recognizing the Institute's advancement of women, not only internally at TTI, but nationally in promoting TTI's women leaders for prominent positions in organizations like ours."

Alison Premo Black
*Senior Vice President
Policy and Chief Economist
American Road and Transportation
Builders Association (ARTBA)*

"Dennis made major contributions to the Institute of Transportation Engineers (ITE) during his career at TTI, including serving as international president in 1996. ITE is proud that Dr. Christiansen has been a member of ITE since 1972 and was recognized for his outstanding service and contributions to the profession with honorary membership in 2010 and the Theodore M. Matson Award in 2016."

Jeffrey F. Paniati
*Executive Director and CEO
ITE*

- Center for Railway Research established
- Collaboration begins with the University of Michigan Transportation Research Institute (UMTRI) in automated and connected transportation research

Enhanced Opportunity for TTI



- Grand reopening of expanded, enhanced Sediment and Erosion Control Laboratory
- Transportation Policy Research Center formed under the direction and support of the Texas Legislature



- Teens in the Driver Seat® program reaches landmark 1,000 schools and 1 million teens nationwide
- Federal Highway Administration (FHWA) Office of Safety selects TTI as team leader for a multiyear contract worth up to \$19 million

2013

2014

2015

2016



- Leadership Enhancement and Development program created for TTI employees
- UMTRI partnership with TTI's Center for Transportation Safety on the Center for Advancing Transportation Leadership and Safety, a U.S. Department of Transportation University Transportation Center
- Destination Aggieland, award-winning smartphone app, developed to ease traffic congestion after Texas A&M University's Kyle Field stadium expansion
- TTI office opens in Washington, D.C.



- Premier Texas A&M Transportation Technology Conference held during which The Texas A&M University System's \$250 million RELLIS Campus is announced
- New TTI Headquarters at RELLIS Campus announced
- Campus Transportation Technology Initiative launched with Texas A&M University
- Texas Gov. Greg Abbott and other dignitaries publicly unveil TTI's Autonomous Freight Shuttle System
- Groundbreaking for Center for Infrastructure Renewal at RELLIS Campus
- FHWA awards TTI a multiyear contract worth up to \$10.75 million to evaluate connected vehicle projects
- FHWA Office of Safety Research and Development awards TTI a multiyear contract worth up to \$50 million to improve traffic safety

"The Texas 2030 Committee and resulting *Transportation Needs Report* elevated the game for Texas' transportation funding and for TTI. Then came the new headquarters, a Mexico City office and TTI's first strategic plan, among his many noteworthy accomplishments. TTI's recent initiative on transportation technologies might well prove Dennis' most enduring. A decade of leadership and accomplishment. Congratulations."

David M. Laney, *Chairman*
LBJ Infrastructure Group

"Dennis has worked strategically with TTI Advisory Council members to accomplish many important objectives, such as the formation of the Transportation Policy Research Center. The center has made TTI the go-to transportation resource for policy makers because of the reliable information provided to them quickly and in an understandable format."

David Cain, *CEO*
DC Strategic Consulting
Chair, TTI Advisory Council

"The partnership that TxDOT has enjoyed with Dr. Christiansen and his team at TTI has benefited the department and state by allowing us to make great progress developing and maintaining the best transportation system in the country. We are truly grateful for the years of service and dedication to the state and to transportation."

James M. Bass
Executive Director
Texas Department of Transportation

"During his 45 years of service with The Texas A&M University System, Dennis has made a significant impact in advancing and elevating the national and international reputation of TTI and transportation research. Dennis is a respected scholar and visionary leader, and his many contributions have built a solid legacy that will continue to serve the agency for generations to come."

M. Katherine Banks
Vice Chancellor and Dean
Texas A&M Engineering



TTI-Led Team Develops New Guidebook for States Implementing Intercity Passenger Rail

The world seems to be moving faster. Our transportation system, however, seems to be slowing down.

Expanding economies place increasing demands on our current transportation system. While economic growth is good, increased freight and commuter traffic is filling roadways that, when built 50 years ago, seemed luxurious in their emptiness. Given this reality, how can we continue to move people and goods between major metropolitan areas reliably, safely and efficiently?

Intercity passenger rail (ICPR) has, until very recently, been the domain of Amtrak, owned and operated by the National Railroad Passenger Corporation. Because Amtrak relies on congressional appropriations to function, it's limited in how much service it can provide. In 2008, the Passenger Rail Investment and Improvement Act (PRIIA) created mechanisms for the U.S. Department of Transportation to establish strategic partnerships with states interested in working with Amtrak and others on potentially implementing ICPR services.

"PRIIA required states to develop formal state rail plans and talk with local stakeholders to determine their needs in formulating those plans," explains Texas A&M Transportation Institute (TTI) Associate Research Scientist Curtis Morgan, who heads TTI's Multimodal Freight

Program. "Guidance for how to do that has been lacking. And that's what our project was all about."

Morgan led a multidisciplinary research team consisting of TTI, Ohio University, David P. Simpson Consultants, ESH Consult and the Law Office of Walter E. Zullig, Jr., Esq., to develop the National Cooperative Rail Research Program's *Guidebook for Intercity Passenger Rail Service and Development*. The team researched existing best practices and conducted targeted interviews to fill in knowledge gaps. They created a user-friendly, flexible set of guidelines for state officials, rail-service advocates and other interested parties to use when considering ICPR options.

"For more than 30 years, growth and innovation in our nation's rail system have been primarily and most successfully associated with the movement of freight," says Lawrence D. Goldstein, staff officer for the Transportation Research Board, which managed the project. "Since 2008, however, billions of federal and state dollars have been invested in intercity passenger rail, responding to opportunities and challenges arising from changing travel demand and other factors."



Besides better organizing procedures, the guidebook also recognizes that each state has individualized resources and needs. While there is no one-size-fits-all approach, there are some questions every state must answer, and those form the core of the guide's contents:

- What is the proposed route, and where will stations be located?
- How do we measure success operationally?
- What should our contracts with public agencies and the private-sector railroads look like?
- How do we optimize performance and provide maximum public benefit?

"Our research involved more than just collecting the best practices in one place. We also produced five targeted syntheses to fill in specific gaps in the industry's practical knowledge."

*Curtis Morgan, Manager
Multimodal Freight Program*

The answers to these questions are pragmatic and presented in the context of existing regulations, the current intercity passenger rail environment, and the past experiences of those who have built ICPR services. Interviews with national stakeholders — such as private- and public-sector operators, Amtrak, state departments of transportation, and private railroads — complement the team's study of existing intercity rail lines. The result is a guidebook that covers all phases of a project, from visioning, planning and design to construction, operations and maintenance.

"Our research involved more than just collecting the best practices in one place," says Morgan. "We also produced five targeted syntheses to fill in specific gaps in the industry's practical knowledge."

These areas, which are still emerging, include:

- liability and insurance requirements for new ICPR service,
- PRIIA Section 209 cost-formula transparency and an increasing level of detail between states and Amtrak,
- guidelines for developing robust and resilient ICPR services,
- ICPR performance measurement and quality assurance techniques, and
- the role and purpose of the U.S. Surface Transportation Board related to ICPR service.

A detailed discussion of each of these topics ensures users are fully aware of not only the planning and operational issues they'll face, but also the broader contexts of accountability and policy they'll need to consider. An appendix links readers to current research and regulatory documents providing the background knowledge for this growing area of transportation service. ■



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TTI Awarded Major FHWA Safety R&D Contract

“This is a tremendous award for TTI and Texas A&M University’s engineering program. TTI, along with TEEX and other partners, has an opportunity to significantly improve traffic safety for our nation’s roadways and save many lives in the process.”

*M. Katherine Banks, Vice Chancellor and Dean
Texas A&M Engineering*

Recognized for its longstanding history of excellence in safety research, the Texas A&M Transportation Institute (TTI) has been awarded a multiyear, multimillion-dollar contract by the Federal Highway Administration (FHWA) Office of Safety Research and Development.

The contract, which could provide as much as \$50 million in funding over the next five years, supports the FHWA Office of Safety Research and Development in its efforts to determine why traffic crashes occur and better understand what affects the severity of injury outcomes.

“For more than 65 years, TTI has been a leader in the highway safety and highway infrastructure areas through successful implementation of innovative research,” says TTI Senior Research Engineer Kay Fitzpatrick, who manages TTI’s Roadway Design Program. Fitzpatrick will serve as the project’s co-principal investigator along with TTI Senior Research Scientist Sue Chrysler. “For this contract, TTI assembled and will lead a carefully chosen team that offers the best from both the academic and consulting worlds, with the added implementation and outreach capabilities of one of the largest international communities of transportation professionals, the Institute of Transportation Engineers.”

The Texas A&M Engineering Extension Service (TEEX), recognized worldwide as a leader in workforce training, is also a team member.

“This is a tremendous award for TTI and Texas A&M University’s engineering program,” says M. Katherine Banks, vice chancellor and dean of Texas A&M Engineering. “TTI, along with TEEX and other partners, has an opportunity to significantly improve traffic safety for our nation’s roadways and save many lives in the process.”

More than 168,000 people representing every U.S. state and territory and 82 countries are served annually through TEEX’s on-site and online resources for specialties from homeland security to economic development and workforce training.

“This is a great chance for us to partner with TTI,” says TEEX Director Gary Sera. “Our mission at TEEX is to make a difference by providing training, developing practical solutions, and saving lives. This award allows us to do just that.”

The contract complements another that was awarded last year to TTI from the FHWA Office of Safety for up to \$19 million. For the next five years, the Institute is heading up the only university-led team working in conjunction with both these offices to help make the nation’s roadways safer.

“TTI is pleased to provide support to both the research and implementation arms of FHWA’s safety program. Working with both groups enables us to understand agency priorities

“For more than 65 years, TTI has been a leader in the highway safety and highway infrastructure areas through successful implementation of innovative research.”

*Kay Fitzpatrick, Manager
Roadway Design Program*

and safety goals,” says Chrysler. “We will work with the FHWA Office of Safety Research and Development to conduct research to evaluate safety countermeasures and with the FHWA Office of Safety to develop and refine programs for states and other stakeholders to implement those countermeasures.”

The FHWA Offices of Safety and Safety Research and Development work together to make highway travel safer by conducting research to develop, evaluate, and employ lifesaving countermeasures; advance the use of scientific methods and data-driven decisions; foster a safety culture; and promote a multidisciplinary approach to safety.

“TTI is recognized around the world as a leader in highway safety research, often pushing the envelope and innovating new technology, methods and hardware to improve highway safety,” says TTI Senior Research Engineer Paul Carlson. “TTI’s vast array of highway safety experts and its state-of-the-art research facilities — along with other Texas A&M University System partners such as TEEX — provide FHWA with direct access to some of the most experienced transportation researchers in the country and the most advanced research tools available today.”

TTI has multiple task orders in process under the Office of Safety contract, ranging from pedestrian and bicycle assessment methodology to performance monitoring of high-friction surfacing treatments. The active task orders also include a technical support project for roadway departure safety and a training development project for safety fundamentals. ■



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Officials at the Center for Infrastructure Renewal groundbreaking ceremony participate in the ceremonial shovel turning for the first building to be constructed on the RELLIS Campus.

TTI Participates in Groundbreaking for New State-of-the-Art Center for Infrastructure Renewal

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. And the safety and security of our nation's oil, gas, water and wastewater pipeline systems is an increasing concern. Modernizing infrastructure will require interdisciplinary research teams, 21st-century technologies and innovative solutions to meet the demands of a growing population and expanding economy.

This fall, officials at The Texas A&M University System broke ground for the new Center for Infrastructure Renewal (CIR). The Texas A&M Engineering Experiment Station, the Texas A&M Transportation Institute (TTI) and the private sector are collaborating on the center, housed at the new 2,000-acre RELLIS Campus.

"We are creating an economic and education magnet that will offer the best of our state agencies and universities in one location," said John Sharp, chancellor of the A&M System, at the groundbreaking. "RELLIS is a new approach necessary to educate the next generation of Texans and expand the state economy through research and innovation."

Authorized by the Texas Legislature, the center is a prime example of that innovation. CIR will focus on research and testing related to robotics, driverless and connected vehicles, advanced manufacturing, and smart power grids and water systems, among other initiatives. The 138,000-square-foot

facility will help reduce the cost and extend the life of infrastructure with newer, better materials and improved construction methods. Its director, Dr. Bjorn Birgisson, brings with him from Europe an approach that looks at the systemic impact of research innovation.

"We are creating an economic and education magnet that will offer the best of our state agencies and universities in one location."

*John Sharp, Chancellor
The Texas A&M University System*

"In Northern Europe, you're taught to think of things from a systems perspective," Birgisson explains. "For example, how does an efficient construction supply chain help in cost-effectively repairing this particular road? In the United States, it's often more about the methodology itself involved in repairing the road, and the best way to do that."

Birgisson hopes to combine both — a European appreciation for the bigger picture with the focused know-how of the U.S. approach to maintenance — as he shapes CIR's strategic direction. His philosophy is an inclusive one that seeks a holistic, multidisciplinary method to solve problems of infrastructure management and development.



John Sharp, chancellor of The Texas A&M University System, explains his vision for the RELLIS Campus to the audience during the groundbreaking ceremony for the new Center for Infrastructure Renewal building.



The Texas A&M University System RELLIS Campus is creating a new paradigm for the future of applied research, technology development and education.

“Texas is at a critical juncture: an aging infrastructure system is costing billions of taxpayer dollars in construction projects using outdated technology,” said M. Katherine Banks, vice chancellor and dean of Texas A&M Engineering, during the ceremony. “This facility will bring together the best engineers to address these challenges in ways that are more efficient, effective and economical.” ■



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Bjorn Birgisson *Director, CIR*

Trained as a professional engineer in the United States and with extensive experience in the United Kingdom and Sweden, Bjorn Birgisson is an expert on the current state of infrastructure research and implementation. And he brings that broader perspective to his new role as CIR director.

He sees the center as an anchor for establishing true leadership in infrastructure engineering around the globe: a place where professionals from various disciplines can come together and share ideas to find unique solutions. Ultimately, the kinds of projects pursued will need to not only fix the potholes of the past, but also look to smart technologies, such as embedded sensors, to help improve the science and timeliness of preventive maintenance.

“Our roads are getting smarter, and that’s a good thing,” says Birgisson. “Our research methodologies have to get smarter, too. So, beyond the day-to-day projects in the center, I want to work with center contributors to create three to five innovative research directions that have the potential to really make a difference. Better sustainability, reduced maintenance costs, safer systems — we must design with these in mind.”

CIR will house researchers developing advanced and sustainable materials and structural systems aimed at reducing cost and extending infrastructure life, safety, resiliency and durability.

“I’m a consensus builder,” says Birgisson. “I like to listen, to talk to people. As we learn to do more with less in terms of resources, finding new efficiencies across disciplines will prove essential to that process.” ■



THE POWER OF PARTNERSHIP:

90th ANNUAL TRANSPORTATION SHORT COURSE FOCUSES ON THE FUTURE

"Texas is the only state in the country I've seen that has actually taken advantage of [the DOT/university collaboration model], and you can see the results. You can see the innovations and the cutting-edge work that goes on to improve the quality of transportation. Texas has become a model for other states."

*Michael K. Young, President
Texas A&M University*

CONTINUING THE BENEFICIAL RELATIONSHIP between the Texas Department of Transportation (TxDOT) and state universities was the underlying message of this year's Transportation Short Course, hosted by the Texas A&M Transportation Institute (TTI) and held on the Texas A&M University campus Oct. 10–12.

As part of its longstanding research partnership with TxDOT, TTI has hosted the Transportation Short Course after two Texas transportation pioneers (Dwight Greer and Gibb Gilchrist) began the collaboration between the two agencies. Their vision was formalized with the Cooperative Research Agreement in 1950.

"It was their belief that the then-Texas Highway Department and the state's public universities should be valued partners in building the best and safest transportation system in the world," TTI Agency Director Dennis Christiansen told nearly 2,400 attendees.

The primary purpose of the event is for research practitioners and department personnel to meet and share information about the latest research innovations that TxDOT

engineers and planners can put into practice as part of their ongoing mission to maintain and develop the Texas transportation system. Meetings highlight the latest techniques and innovations in numerous transportation fields, including road and bridge construction, highway design, pavements, traffic operations, and planning. TxDOT also takes the opportunity to honor its employees, especially those who risked their lives in the previous year to help motorists. These deserving individuals receive TxDOT's Extra Mile Awards.

Welcoming attendees during the opening session of the three-day event, Texas A&M University President Michael K. Young said he has been a long-time proponent of partnerships between states, universities and the private sector in order to improve the quality of life for the public.

"I'm extremely proud of the work that we've done, and I'm looking forward to the work that we'll do together.... It's now our turn to create the next generation of TxDOT employees that we will be talking about at future Short Courses. I look forward to that challenge, and let's keep up the great work."

James M. Bass, TxDOT Executive Director

"Texas is the only state in the country I've seen that has actually taken advantage of that, and you can see the results," Young said. "You can see the innovations and the cutting-edge work that goes on to improve the quality of transportation. Texas has become a model for other states. This [the TxDOT/TTI collaboration] is one of those great partnerships."

TxDOT Executive Director James M. Bass told the crowd that the department is about to begin a new era in transportation, thanks to the passage of Propositions 1 and 7, which will fund billions of dollars in new road projects over the next 10 years.

"I'm extremely proud of the work that we've done, and I'm looking forward to the work that we'll do

together," Bass said, referring to TxDOT employees as "family." Bass has worked at the agency since 1985 and was named executive director in 2015. "It's now our turn to create the next generation of TxDOT employees that we will be talking about at future Short Courses. I look forward to that challenge, and let's keep up the great work."

Recently appointed Texas Transportation Commissioner Laura Ryan praised the TxDOT/TTI partnership as the state tackles transportation issues, especially congestion. "Let's keep the innovative momentum going so we can deliver the transportation system that Texans have told us they want. Texas has

set the standard for transportation," Ryan said. "You have my support and appreciation."

Next year, TxDOT will celebrate its 100th anniversary. "What was set in motion in 1917 has made a huge impact in the development of this state, its economy and its quality of life," Christiansen told attendees. "The challenge for us now is to take that legacy and move it to the next 100 years." ■



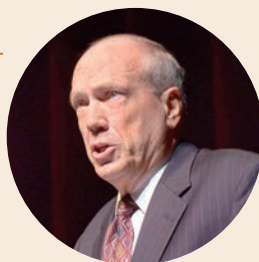
*For more information, contact **Terri Parker** at (979) 862-8438 or t-parker@tti.tamu.edu.*



Texas A&M University President Michael K. Young addresses Short Course attendees.

"What was set in motion in 1917 has made a huge impact in the development of this state, its economy and its quality of life. The challenge for us now is to take that legacy and move it to the next 100 years."

Dennis Christiansen, Agency Director



Save the date

91st ANNUAL
TRANSPORTATION SHORT COURSE
Oct. 9-11, 2017
TEXAS A&M UNIVERSITY

TTI Advisory Council Annual Meeting



TTI's Ginger Goodin (far left) led a panel discussion on truck traffic at Texas ports. Panelists included (left to right) Allan Rutter, TTI Freight Mobility; Michael Plank, the Plank Companies, Inc.; and Rigo Villarreal, City of McAllen.



TxDOT Deputy Director Marc Williams provided an update on TxDOT priorities and activities.

THE TEXAS A&M TRANSPORTATION INSTITUTE (TTI) ADVISORY COUNCIL MET in College Station Oct. 19–20, 2016, at the Thomas D. Hildebrand, DVM '56 Equine Complex on the Texas A&M University campus. The meeting began with a reception, dinner and update on the Port of Houston Authority from Roger Guenther, Port Authority executive director and TTI Advisory Council member.



On behalf of the TTI Advisory Council, Council Chair David Cain recognized Dennis Christiansen for his 10 years of service as TTI's agency director.

The business meeting commenced with a welcome and introductions by David Cain, chair of the council. TTI Agency Director Dennis Christiansen provided an update on the Institute and its recent research initiatives. A panel discussion on truck traffic at Texas ports, moderated by TTI Transportation Policy Research Center Director Ginger Goodin, followed.

TTI research project updates included presentations on the Texas A&M Campus Transportation Technology Initiative, given by Bob Brydia, senior research scientist; an update on the RELLIS Campus development, provided by Ed Seymour, associate agency director; an update on The Texas A&M University System/TTI Infrastructure Technology Initiative, provided by Christopher Poe, assistant director and connected/automated transportation strategy lead for the Institute; and an update on the Texas A&M Gameday Traffic Initiative, provided by Tim Lomax, research fellow. Following these updates, TTI Executive Associate Director Bill Stockton led a discussion about potential research opportunities and transportation issues facing the state.



TTI Advisory Council members participated in a briefing and demonstration of the Freight Shuttle System developed at TTI.

The lunch program was led by Marc Williams, deputy director of the Texas Department of Transportation (TxDOT), who provided an update on current TxDOT initiatives. After the meeting adjourned, members made a trip to the Freight Shuttle System Test and Evaluation Site in Bryan for a briefing and demonstration of the technology. ■



For more information, contact **Terri Parker** at (979) 862-8438 or t-parker@tti.tamu.edu.

Teens in the Driver Seat® Launches Driver App to Curb Distracted Driving

AS PART OF NATIONAL TEEN DRIVER SAFETY WEEK

in October, teen advocates of the Texas A&M Transportation Institute (TTI) Teens in the Driver Seat® (TDS) program launched Teen Driver, a new smartphone app created by MobiSoft Infotech, LLC. The launch was held at Creekview High School in Carrollton, Texas, and highlighted the app's functionality, as well as TDS's 15-year record of helping teens across the nation drive more safely.

In a recent study of more than 1,200 teen drivers in three states by Aceable, a provider of driver education courses, teens reported 72 percent of their peers driving distracted; 43 percent of those texted while driving. A landmark TTI research study published in 2013 found that, on average, texting drivers take their eyes off the road for 4.6 seconds. At a speed of 50 mph, that's like driving the length of a football field with your eyes closed.

"Vehicle crashes are the number-one cause of teen injury and death in the nation," states Russell Henk, founder of TDS and manager of TTI's Youth Transportation Safety Program. "About 2,800 U.S. teens die each year in car crashes; that's the equivalent of a school bus loaded with teenagers crashing once every week for an entire year."

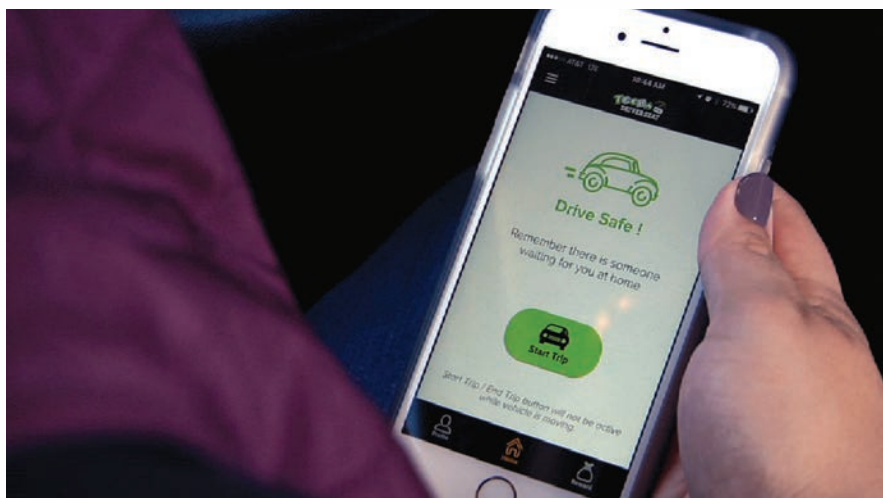
Teen Driver helps teens drive more safely by encouraging them to leave their phones alone while driving. Teens



start the app before beginning a trip, and — so long as they don't access their phones while driving — the app logs undistracted miles at their destination. Teen drivers receive rewards for successfully reaching certain thresholds. For example, they can earn points toward the annual TDS Cup competition, an honor that includes cash awards for high schools that demonstrate an outstanding commitment to promoting teen driving safety.

"As a father of a teen, a high school senior, this is the number-one thing we care about when our kids get behind the wheel," said Carrollton's Deputy Mayor Pro Tem Steve Babick, who spoke at the launch. "There are many adults who could take to heart the lessons you're sharing today."

The Teen Driver app is currently available in the Apple and Google Play app stores. ■



A driver begins their undistracted trip using the Teen Driver app. Visit safedriverapp.com for more information on the app.

Teen Driver helps teens drive more safely by encouraging them to leave their phones alone while driving. Teens start the app before beginning a trip, and — so long as they don't access their phones while driving — the app logs undistracted miles at their destination.



For more information, contact **Russell Henk** at (210) 321-1205 or r-henk@tti.tamu.edu.

Hall of Honor Inducts Dwight D. Eisenhower

Former President Dwight David Eisenhower was inducted into the Texas Transportation Hall of Honor Dec. 6 in a ceremony at the Eisenhower Birthplace State Historic Site in Denison, Texas.

Eisenhower's induction recognizes his leadership in creating the U.S. Interstate Highway System, which is 60 years old this year. During his early years in the army, traveling across the country impressed upon Eisenhower the importance of good roads. In June 1956, then-President Eisenhower signed the act that created a 41,000-mile National System of Interstate and Defense Highways.

Today, Texas has more interstate highway mileage than any other state. The system has contributed some \$3.2 trillion dollars to the Texas economy over its lifetime and more than \$126 billion in 2015 alone.

"The purpose of the hall is quite simple," said TTI Agency Director Dennis Christiansen at the event. "From the period of Texas statehood to present, to give recognition to those who have made a difference in transportation in the state of Texas."



Speakers at the ceremony included (left to right): The Honorable Larry Phillips, State Representative District 62, Texas House of Representatives; Dennis Christiansen, TTI agency director; Mary Jean Eisenhower, granddaughter of Dwight Eisenhower and president and chief executive officer of People to People International; The Honorable Jared Johnson, mayor of Denison; Bob Kaufman, director of communications and customer service at the Texas Department of Transportation; and John Akers, site manager for the Eisenhower Birthplace State Historic Site.

Eisenhower's granddaughter, Mary Jean Eisenhower of Kansas City, Missouri, attended the event and accepted the honor on his behalf. "[My grandfather] saw the interstate highway system as a solution," Eisenhower noted. "It is so touching and dear to us that this is being memorialized for our family and for future generations."

Eisenhower is the 42nd member of the Hall of Honor, which was established in 2000 by TTI. Each individual inducted is recognized by a plaque on permanent display in the Hall of Honor, which is located at TTI on the campus of Texas A&M University. ■

Researchers Testify on Funding and Truck Weight Issues for Texas House Subcommittees

Researchers from TTI's Transportation Policy Research Center (PRC) shared research findings on Sept. 28 with two subcommittees of the Texas House Committee on Transportation. PRC Director Ginger Goodin and Senior Research Scientist Rafael Aldrete outlined their research on transportation reinvestment zones for the Subcommittee on Long-Term Infrastructure Planning. Subcommittee Chairman Ron Simmons voiced his appreciation for TTI's work in this area and expressed his desire for TTI to continue research into financial tools for transportation.

Goodin was joined by Research Scientist Jolanda Prozzi in an afternoon hearing convened by the Subcommittee on Contraflow Lanes and Gross Weight Allowances. They addressed the issue of state highway corridors designated for shipments involving oversized and/or overweight vehicles, and explained that TTI has studied how these corridors are currently designated in Texas, the details of each implementation, and potential metrics that can be used for corridor designation and performance monitoring. Rep. Celia Israel



TTI researchers Rafael Aldrete and Ginger Goodin share testimony on transportation reinvestment zones with Committee Chairman Ron Simmons and State Rep. Celia Israel.

asked TTI a series of questions about how to make overweight corridors safer, and Prozzi described the most effective possible approaches. ■

TTI Leads New USDOT Center, Assists with Two Others



Zietsman



Tooley

Joe Zietsman, head of TTI's Environment and Air Quality Division, will lead the Center for Advancing Research in Transportation Emissions, Energy and Health (CAR-TEEH),

one of three new University Transportation Centers (UTCs) recently awarded through the U.S. Department of Transportation's competitive grant program. Other consortium members include the Georgia Institute of Technology, Johns Hopkins University, The University of Texas at El Paso, and the University of California, Riverside.

In addition to leading CAR-TEEH, TTI joins San Diego State University as a member of the National Tier center Safety Through Disruption: Goal Zero, led by the Virginia Tech Transportation Institute. The Institute is joined by Jackson State University, Louisiana State University, the University of New Orleans and Vanderbilt University as a member of the Tier 1

Maritime Transportation Research and Education Center, led by the University of Arkansas.

"I am delighted with TTI's success in the 2016 UTC Grant Competition, which is the culmination of almost 30 years of experience in the UTC program," says TTI Director of External Initiatives Melissa Tooley.

The UTC program affords educational opportunities to graduate students who help conduct research alongside leading experts in their fields of study. Hundreds of students have worked on TTI's UTC projects since the 1980s. The three centers could receive as much as \$50 million in research funding over five years.

"The new center led by Dr. Zietsman will provide leadership in the emerging area of transportation and public health, while our partnerships with VTTI and the University of Arkansas will enable us to continue to enhance the body of knowledge in safety and maritime transportation," says TTI Agency Director Greg Winfree. "We're looking forward to working with our faculty partners to implement the educational initiatives in these new centers." ■

Christiansen Honored by Board of Regents

TTI Agency Director Dennis L. Christiansen was presented with a resolution in honor of his 45 years of service to TTI, including 10 years as agency director, at the Nov. 10 meeting of The Texas A&M University System Board of Regents. The resolution recognizes the significant growth of TTI's research program and reputation under his leadership. The resolution states that during his tenure as agency director, TTI research expenditures increased by 60 percent, the total operating budget increased by 52 percent, and TTI's intellectual property portfolio generated more than \$76 million in gross royalties. The resolution also notes Christiansen's emphasis on research diversification, the creation of new research programs and products, and the expansion of TTI's offices and research facilities during his leadership, among other accomplishments.



Left to right: Texas A&M University System Chancellor John Sharp; Regent Phil Adams; Student Regent Stephanie Martinez; Regent Charles Schwartz; Regent Bill Mahomes; Vice Chairman Elaine Mendoza; Chairman Cliff Thomas; Dennis Christiansen; Vice Chancellor and Dean of Engineering M. Katherine Banks; Regent Morris Foster; Regent Robert Albritton; Regent Judy Morgan; and Regent Anthony Buzbee.

Christiansen thanked Chancellor John Sharp and board members for their support of him and of TTI, saying that the agency is in a strong position to move forward under incoming Agency Director Greg Winfree's leadership. ■

*For more information about TTI News, contact **Rick Davenport** at (979) 862-3763 or r-davenport@tti.tamu.edu.*

Texas Senate Transportation Chairman Visits TTI

On Nov. 2, Texas Sen. Robert Nichols (R-Jacksonville) visited TTI to learn more about the agency's work. First elected to the Texas Senate in 2006, Nichols chairs the Transportation Committee after serving eight years on the Texas Transportation Commission.

At TTI, Nichols toured research facilities at the Gibb Gilchrist Building and Texas A&M University's RELLIS Campus. The senator was hosted by Dennis Christiansen, TTI agency director; Tommy Williams, vice chancellor for state and federal relations for The Texas A&M University System; and Norman Garza, assistant vice chancellor for government relations for the A&M System. TTI staff who provided briefings to Sen. Nichols included Agency Director Dennis Christiansen, Executive Associate Director Katie Turnbull and Transportation Policy Research Center Director Ginger Goodin.

"It's a great privilege to provide our legislators a glimpse of TTI's capabilities," Goodin says. "It's hard for busy elected officials to schedule time in College Station, so when we can get them here, we really like to show off our work. They always leave impressed with the innovations we produce every day, the passion of researchers, and the potential for making transportation in the state faster, safer, cheaper and better." ■



Texas Sen. Robert Nichols gets a hands-on demonstration of pavement recycling equipment with the help of TTI Research Technician Jason Huddleston.

Turnbull Appointed Vice Chair of TRB's Executive Committee



Turnbull

TTI Executive Associate Director Katie Turnbull has been appointed vice chair of the Transportation Research Board (TRB) Executive Committee. Marcia McNutt, president of the National Academy of Sciences and chair of the National Research Council (NRC), made the appointment. The Executive Committee is responsible to NRC for recommending policy and providing administrative oversight for all TRB programs and activities.

"This is a significant milestone not only for Dr. Turnbull, but also for TTI," states TTI Agency Director Dennis Christiansen. "She has served TRB with distinction for nearly three decades. We are extremely proud, and her appointment to vice chair is well deserved."

Active in TRB committees, conferences and projects, Turnbull has served as chair at the task force, committee, section and group levels. She served as the chair of the Technical Activities Council (2011–2014) and was appointed to the Executive Committee in 2016. Turnbull was named a lifetime national associate of NRC in 2012 and honored with TRB's W.N. Carey Distinguished Service Award in 2015.

"It is an honor to be named vice chair of the TRB Executive Committee," Turnbull notes of the appointment. "Contributing to TRB has been very rewarding, and I look forward to working with TRB staff, Executive Committee members, and other groups in continuing to address critical transportation issues." ■

TTI Staff Plays Major Role in Automated Vehicles Symposium

TTI researchers helped organize breakout sessions at the Automated Vehicles Symposium (AVS 2016) held July 19–20 in San Francisco on topics such as truck platooning, ways to shape policy, physical infrastructure and traffic flow. Over 1,200 people attended, making it one of the largest gatherings in the world of automated vehicle research. The symposium was co-sponsored by the Transportation Research Board (TRB) and the Association for Unmanned Vehicle Systems International.

“TTI’s significant involvement in TRB translated into our significant role in the Automated Vehicles Symposium,” explains TTI Assistant Agency Director and Connected Automated Transportation Research Lead Christopher Poe.

Institute researchers organizing breakout sessions included Mike Manser, Ginger Goodin, Johanna Zmud, Chris Poe, Paul Carlson, Jerry Ullman and Alireza Joshaghani.

Katie Turnbull is completing a summary for TRB.

“A central theme that permeated TRB AVS16 was the need to consider the driver as a critical element contributing to safety within an automated vehicle environment,” says TTI Human Factors Program Manager Michael Manser. “The driver, vehicle and infrastructure form a close partnership to ensure overall levels of safety are maintained.”

TTI Senior Research Engineer Paul Carlson moderated the Physical Infrastructure Breakout Session and has been involved in the symposium since its inception.

“This is TRB’s second largest conference of the year behind annual meetings,” notes Carlson. “Attendance increased by nearly 50 percent from last year, and it is becoming an important conference where industry, academia and government come together to talk about research and deployment of automated vehicles.” ■

TTI Participates in TRB Transformational Technologies Research Symposium

TTI was a Platinum Patron of the Transportation Research Board (TRB) Partners in Research Symposium: Transformational Technologies, held in Detroit, Mich., Oct. 31–Nov. 1. Sponsored by the Michigan Department of Transportation and the National Cooperative Highway Research Program (NCHRP), the symposium brought together researchers, industry representatives and agency personnel to discuss issues and opportunities for deploying transformational technologies to improve the transportation system.

Allan Rutter, head of TTI’s Freight Mobility Division, provided comments in the breakout session on heavy-duty vehicles. Executive Associate Director Katie Turnbull served as co-moderator for the infrastructure breakout session. Associate Director Ed Seymour served as a breakout session recorder. Assistant Director Christopher Poe also participated in the symposium, as did John Barton, Texas A&M University System associate vice chancellor and director of the RELLIS Campus.

The results from the breakout groups will be used to develop research problem statements for NCHRP and other programs, as well as to expand the dialog within the TRB standing committees and to reach out to diverse stakeholders. ■

Traffic Safety Conference
SAVE the DATE
June 7 - 9, 2017

Omni Mandalay
 Las Colinas, TX

June 7-9
2017

Texas A&M Transportation Institute
Center for Transportation Safety
Save a Life
ATLAS CENTER

TEXAS A&M TRANSPORTATION INSTITUTE

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 PDF.

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

RESEARCH VIDEOS

Access the research topics listed below via the URLs shown.

Commercial Truck Platooning: Phase 1 Demonstration:
<https://www.youtube.com/watch?v=dydR15tgeKo&t=2s>

Connected Vehicle Wrong-Way Driving Detection and Mitigation Demonstration: https://www.youtube.com/watch?v=T_DkTNq45g4

Continued Implementation of High Performance Thin Overlays in Texas Districts:
<https://www.youtube.com/watch?v=gV37q-H-fWk>

Freight Movement Redefined:
<https://vimeo.com/183842437>

Making Traffic Demand Models More Realistic Representations of Congestion:
<https://vimeo.com/170486486>

Mitigation of High Sulfate Soils in Texas:
https://www.youtube.com/watch?v=Nd6zIQm0M_k

Pre-construction and Next Generation Concrete Surface Noise Monitoring:
<https://www.youtube.com/watch?v=UITY3dUZB0M&t=36s>

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

TECHNICAL REPORTS

2016 Texas Transportation Poll, by Chris Simek, **PRC 16-16 F**, October 2016.

Creep Behavior of Soil Nail Walls in High Plasticity Index (PI) Soils: Technical Report, by Marcelo Sanchez, **0-6784-1**, August 4, 2016.

Cross-Border ITS Systems with Traffic Management Centers: Technical Report, by Roberto Macias, **0-6879-1**, October 20, 2016.

Design-Build Highway Projects: A Review of Practices and Experiences, by Jeff Borowiec, **PRC 15-53 F**, November 2016.

Identifying Best Practices for Managing Operating Costs for Rural and Small Urban Transportation Systems: Technical Report, by Suzie Edrington, **0-6694-1**, August 4, 2016.

Installation of Dynamic Travel Time Signs and Efforts to Obtain and Test a Graphical Route Information Panel (GRIP) Sign in Austin, by Jerry Ullman, **5-9049-03-7**, August 12, 2016.

Managed Lanes in Texas: A Review of the Application of Congestion Pricing, by Nick Wood, **PRC 15-47 F**, September 2016.

Maximizing Mitigation Benefits: Research to Support a Mitigation Cost Framework — Final Report, by Kristi Miller, **0-6762-01-1**, August 3, 2016.

Oil and Gas Freight Transportation Alternatives, by Allan Rutter, **PRC 15-50 F**, November 2016.

Performance Evaluation and Specification of Trackless Tack, by Bryan Wilson, **0-6814-1**, September 12, 2016.

Potential Metrics for Designating and Monitoring Oversize/Overweight Corridors, by Jolanda Prozzi, **PRC 16-10 F**, November 2016.

A Review of Alternative Financing Methods for Roadway Projects in Small Urban and Rural Areas of Texas, by Nick Norboge, **PRC 15-52 F**, September 2016.

Revolutionizing Our Roadways: Modeling the Traffic Impacts from Automated and Connected Vehicles in a Complex, Congested Urban Setting, by Jeff Shelton, September 2016.

Sediment and Erosion Control Laboratory Facility Expansion, by Jett McFalls, **5-9048-01**, August 16, 2016.

PROJECT SUMMARY REPORTS AND PRODUCTS

Briefing Sheets on Safety and Operations of Rural Two-Lane Highways, by Kay Fitzpatrick, **0-6806-TTI-P1**, November 8, 2016.

Collection of Materials and Performance Data for Texas Flexible Pavements and Overlays, by Lubinda Walubita, **0-6658-S**, August 1, 2016.

Completion of Construction and Installation of Travel Time Signs on I-35 in Austin, by Jerry Ullman, **5-9049-05-S**, August 30, 2016.

Construction and Installation of Travel Time Signs on I-35 in Austin, by Jerry Ullman, **5-9049-05-1**, August 12, 2016.

Continued Implementation of High Performance Thin Overlays in Texas Districts: Odessa District Workshop, by Tom Scullion, **5-5598-05-WS1**, August 11, 2016.

Creep Behavior of Soil Nail Walls in High Plasticity Index (PI) Soils, by Marcelo Castilla, **0-6784-S**, August 3, 2016.

Cross-Border ITS Systems with Traffic Management Centers, by Roberto Macias, **0-6879-S**, October 21, 2016.

Guidelines on Design and Construction of High Performance Thin HMA Overlays: Workshop, by Cindy Estakhri, **5-5598-05-WS2**, August 11, 2016.

Regional Operations: One Approach to Improve Traffic Signal Timing, by Kevin Balke, November 2016.

Review of Literature and Practices for Incident Management Programs Technical Report, by Tim Lomax, **PRC 15-56 T**, June 2016.

Spreadsheet-Based Engine Data Analysis Tool — User's Guide, by Jeremy Johnson, **0-6626-P1**, July 22, 2016.

TPADana 2.0: Draft User's Manual of TPAD Data Analysis Software, by Wenting Liu, **5-6005-01-P1**, August 11, 2016.

Using Small Sample Sizes in FDR Laboratory Mix Designs: Small Sample, by Stephen Sebesta, **5-6271-03-P1**, July 28, 2016.

Using Small Sample Sizes in FDR Laboratory Mix Designs: Traditional Sample, by Stephen Sebesta, **5-6271-03-P2**, July 28, 2016.